

# **EDEN 2018 ANNUAL Conference**

## **Exploring the Micro, Meso and Macro**

Navigating between dimensions in the digital learning  
landscape

EDEN 2018 Annual Conference

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### **CONFERENCE PROCEEDINGS**

Edited by

Airina Volungeviciene, András Szűcs

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## Introduction

The demand for people with new, enhanced skills is growing. The volume of information produced and shared in all fields is overwhelming. Building the data economy became part of the EU Digital Single Market. Powerful and sophisticated ICT is part of everyday life, and the world of learning is not an exception. Pressure is on all players of the online education community to keep up with new learning solutions, and better supply the skills currently demanded by growing economies.

Open Education continues its success, providing radical advances in knowledge acquisition, sharing, distribution, and improving business models. Digital credentials and open badges are the new currencies which are beginning to transform the economic models in education.

Social and economic tensions continue to raise the issues of scalability, the micro-credentialling of education, training and skill development processes. Practitioners and stakeholders are eagerly seeking right approaches to providing learning opportunities, and many scholars are researching holistic answers.

Micro, meso and macro aspects provide an interesting range of lenses for considering the problem. These aspects may be applied in a general sense, distinguishing between the learning of individuals, learning at the institutional or group levels through a meso lens, and the learning of organizations or societies directed through policies through the macro lens.

Navigating these dimensions are the reshaping of digital pedagogy and online instructional design; the social elements including digital societal mechanisms and the position of the individual in our new era. We have need of systematic awareness and research in the critical era of sustainable socio-cultural aspects as they relate to learning.

European Union initiatives emphasize solutions to emerging needs and seek to improve competitiveness and professional development; enhance cross-sectional skills; and fuel the engines of social innovation – creativity, entrepreneurship, critical thinking and problem solving.

The EDEN 2018 Genova Conference aims to respond to contemporary needs by:

- tracking and demonstrating evidence about the mechanisms and value chains across micro-, meso- and macro-learning
- exploiting the socio-cultural specifics related to the granularity of learning
- digging deeper into finding viable, achievable and scalable solutions
- learning more about didactical design through peer learning and scholarly observation
- discussing structural and operational questions of collaborative - social technologies

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Secretary General

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## OPEN UNIVERSITIES: THE CHALLENGE FOR RENEWAL

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### Abstract

This paper offers an account of the development of the Open University model, and assesses the extent to which it remains in the key position as owner of innovation in the Higher Education sector. Leadership development is identified as core to the challenge for renewal.

### Introduction

This article reports on an increasing number of recent commentaries expressing concern about the performance and achievement of Open Universities some 50 years after the establishment of the new model for a university, and assesses the sustainability of the Open University model for the next 15 years as governments seek to fulfil the UN Sustainable Development goals.

In the near half-century since the first Open University in the UK some 60 Open Universities or single-mode distance teaching universities (DTU's) have been established, with the largest number being found in Asia, followed by the regions of Europe and Africa. Latin America by contrast has very few DTU's, given its huge population, and some notable countries did not take up the model at all in the first phase, including Australia, France, Russia and the USA. There is, of course, much distance and online education in these countries, and in the last decade or so new online colleges and universities have been widely established, many of them for-profit, with a concentration on work-related programmes.

Starting with Daniel's central notion of the competitive advantage of open universities and building on the further work of Tait (2008a), we can summarise the first-mover advantage for Open Universities in 1970–1990's as having various components:

1. Vision and mission: The courage to advocate and operationalise the move from an elite to a mass HE system, with notions of openness and access;
2. Innovation in learning and teaching: A new flexible student-centred practice demanded by the admission of non-traditional student cohorts, usually people in employment or with family responsibilities;
3. Innovation in technologies for learning: Initially this was based on innovative developments in instructional design, combined with TV and radio, and today with online teaching, peer learning, OER's, MOOCs and other online activities;

4. Innovation in educational logistics: The development of industrial-style management of services to students in large numbers, of high quality, and with an industrial-style focus on scheduling;
5. Significant scale: Breaking the mould of craft-based teaching to create university systems of hitherto unimagined scale.

## Challenges for Open Universities

However, these first mover advantages have now been substantially eroded. Other universities, both public and private, are adopting these practices as their own, enabled by digital technologies along with a change in the culture of higher education for which Open Universities can fairly claim responsibility (Scott, 1995). In the recent period, at least four open universities in Europe have been threatened with closure or merger, either because of these competitive challenges and/or perceptions of their own poor performance. The narrative of paramount leadership by Open Universities for innovation, inclusion and social justice has begun to be challenged by a number of contemporary commentators, who in one way or another identify the spread of innovation elsewhere in the Higher Education sector as threatening for the place of Open Universities in that landscape. A summary of recent critical accounts is given below.

- Garrett (2016) reporting on the Open Universities of the Commonwealth in 2016 makes 3 core points. Firstly, he identifies that about half of the distance teaching institutions that he has examined “have suffered recent enrolment decline or loss of market share, along with financial difficulty in some cases” (p.41). In other words, the forward march of as many as 50% of Open Universities has been halted, which calls into question the sustainability of the institutional model in too many cases. Secondly Garret points out the paucity of performance data, and that this may conceal poor student performance and in particular graduation rates. In the absence of data, the challenge to quality of both supposed and real *drop out* impacts negatively on reputation and recruitment. Thirdly Garrett points to the challenges of distance and e-learning to provide adequate student support in particular for students who come from less advantaged backgrounds, socially and educationally, and who are the core target groups for Open Universities.
- Paul (2016) alludes to a similar nexus of difficulties in his discussion of the challenges for *brand differentiation* for Open Universities today, faced with digital innovation in a wide range of other Higher Education institutions. He also notes the capacity for resistance to change in Open Universities, in particular as regards the realisation of the digital revolution for learning and teaching.
- In 2017 the Commonwealth of Learning published a report of headline data on the 27 Open Universities of the Commonwealth, and while avoiding any critical analysis permits itself to comment on a perceived gap in relating “missions of the universities to outcomes, and the undertaking of performance evaluation to record real achievements in terms of learner progress and success” (Commonwealth of Learning, 2017; p.20).
- Weller (2017) acknowledges the current challenges for the Open University UK, in particular as they derived from a high tuition fee policy in England from 2010.



Organising his thoughts at a number of levels he makes two important points. Firstly, that Open Universities need to redefine “what constitutes an Open University”, and in particular introduce and support Open Educational Practice; and secondly in more detail use Open Educational Resources in its own learning and teaching strategy, rather than propose their use at a more general level.

## **Completing the Move to Mass Higher Education**

The UN Sustainable Development Goals (SDGs) provide a framework for future priorities. Unlike the earlier Millennium Development Goals, the SDGs explicitly embrace tertiary education, including university and lifelong learning, and the supply of teachers. They commit governments by 2030 “to ensure equal access for women and men to affordable and quality technical, vocational and tertiary education, including university” (UNESCO, 2016).

Such a significant ambition means, in effect, extending the move to mass higher education to middle income and poorer countries. The growth in numbers will be primarily in the continents of Asia, Africa and Latin America, rather than Europe and North America where participation rates in higher education already reach up to 85%. Europe and North America, however, continue to have marked patterns of exclusion and disadvantage as well as wider challenges of economic and social development, and therefore also need further reform and innovation in higher education.

In addition to growth in the number of places in the tertiary sector, the UN SDGs also propose *Quality* as a priority, as well as equipping students with knowledge and understanding of the concept and practice of *Sustainability*. Quality however represents a multi-faceted and contested range of issues. The reputation of some open universities is acknowledged in some places to be weak, for both objective and subjective reasons. Quality in universities that define excellence by exclusion – the large numbers of applicants for a limited number of places – dominate in in professional and public *commonsense* definitions of what quality is. However, for Open Universities and other Higher Education institutions that seek to include participants from non-traditional groups whether defined by socio-economic class, ethnicity, rurality, gender or some combination of these, a definition of quality lies in the balance of risk taken in admission with outcomes of student success. However, by definition when these factors are combined with part-time rather than full-time study, with students in the workplace and often having family responsibilities, student success is not going to be limited to 1 or 2% as it can be in elite universities. Open Universities could make a major contribution to both quality concepts and quality outcomes in mass higher education by addressing the issue in the context of the SDGs for 2030. This demands advocacy in public and governmental spheres in order to claim and demonstrate a significant share of the public discourse in how quality is conceived and rewarded.

## **Innovation for Survival**

This takes us to the concluding section of discussion: The centrality of innovation to the identity and resilience of the Open University model. A recent report in Innovation in Online Learning

has 27 case studies of which 4 only are from Open Universities, suggesting that innovation in this field is seen as lying primarily outside that sub sector (Contact North, 2017a). A further report on innovation specifically in the “World’s Open Universities” lists 27 such innovation on topics such as learning design, mobile learning vans, student support, learner authentication for assessment, on demand examinations, and library services (Contact North, 2017b). While this list is not exhaustive it is suggested here that these innovations, valuable though they may be in a specific country, are no more than marginal to the core character of Open Universities, and in some cases do not represent innovation on an international scale at all.

So do Open Universities risk becoming the equivalent of the mainframe computer companies that did not notice or prepare for the arrival of personal computers, and which disappeared? Marginal innovation as reported on above is not, it is argued here, going to provide Open Universities with what they need to validate their identity for the next period of say 15 or so years, and in particular to fulfil the SDG’s. Rather what is needed is a substantive new proposition that once again combines vision and mission with new technology assemblages and combinations, which was essentially the brilliance of the early Open University model. We have seen enough of the potential for the restructuring of industries through the digital revolution to know that there is no guaranteed place for Open Universities in the landscape of Higher Education: It will have to be earned once again.

It is not possible for this article to specify what the new innovative breakthroughs could or should be for Open Universities in all their variety in so many different countries and societies. It is possible however to suggest the most likely areas in which innovation breakthroughs may once again be created.

- The rethinking of the concept of Open Education, of which there are many current constituent parts in rapid development, including Open Educational Resources and Open Education Practice, MOOCs, badging as opposed to formal qualifications, and their continuing incorporation into Open University practice (see Weller, 2017).
- Informal learning, to align and complement the extraordinary amount of informal learning taking place through interrogation of digital resources by adults and children outside educational institutions. This may also lead to curriculum innovation which is more co-operatively developed and learner led.
- A further rethink of what sort of qualification new cohorts of learners want and need. The continuing near total dominance of the Bachelors, Masters and PhD structures risk being too inflexible and lengthy for many part-time adult learners.

Some combination of these and no doubt other ideas may be the elements for recombining into a revolutionary and compelling offer such as was pioneered by Open Universities from the 1970–1990’s. However, it is not possible or appropriate to prescribe what the core elements of innovation are, but more fruitful to argue that reimagining the Open University model is necessary, and to conclude with some comments on how the environment for such innovation can be created.

I owe to a former colleague at the Open University UK, Professor David Vincent, the term *founding father syndrome*: the set of attitudes held by colleagues who are trapped emotionally and intellectually in the early institutional model and are unable or unwilling to consider the need for its revision, and to imagine new avenues for development (Vincent, 2012). Resisting this syndrome has been observed to be challenging in a number of Open Universities around the world.

### Leadership Development

These issues create a pressing agenda for leadership development in Open Universities. In some countries leadership is provided through political appointment rather than ability, and the record is in a number of places poor. In other countries Open Universities are not seen as high status or prestige institutions and do not attract the best candidates. In some societies institutional leaders are always appointed from within, and by election. In others leaders are almost always appointed externally and by open selection of the external field. There have been effective and ineffective institutional leaders using any of these processes for it to be impossible to say that one approach trumps all. However, the need to deliver radical indeed revolutionary change for Open Universities today demands institutional leaders of the highest calibre.

Over and above appointment of leaders of the best quality the need for leadership development at all levels in the organisation is pressing, across academic and professional cohorts. Paul (1990) identified amongst a range of factors for successful leadership in this field the need to be open to learning and to seek to create a learning organisation, and this is no less true now than at the time of writing. A transformational style of leadership is identified by Tait (2008b), who argues that the following capacities are essential:

- An openness to the contested values of both society and the contribution that post-secondary and higher education makes to it domestically and globally.
- The imagination of educational opportunity as being other than it is now, in the face of established political, social and professional interests.
- The invention and management of learning and teaching systems that are radically different in the ways in which they use academic labour to provide programmes of study at scale and quality.
- The competence to integrate complex systems developed with a division of labour that can be industrial in nature. (p.505)

A more recent source also identifies a crucial competence for institutional leaders in this field to be that of “the ability to create conditions for innovation via a transformative leadership style” (Beaudoin, 2015; p.41). There is therefore longstanding commentary to the effect that leadership development for this field has been less attended to than optimally it could have been, and to suggest outlines as to what it should be. At the same time a number of key professional associations all have a record of contribution to leadership development in this field, including the International Council for Open and Distance Education (ICDE), The Asian Association of Open Universities (AAOU) and the European Association of Distance Teaching Universities (EADTU). To conclude however, in order to ensure the continued contribution

that Open Universities present and future can surely make to the SDGs to which our governments have committed it is necessary to reemphasise and restate the importance of leadership development. Relevant priorities might include:

Leadership for

- Challenging policy environments;
- Quality and reputation;
- Institutional change and the Digital Revolution;
- Sustainability across the institution.

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## **Open Universities: The Challenge for Renewal**

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## **E-LEADERSHIP LITERACIES FOR TECHNOLOGY-ENHANCED LEARNING IN HIGHER EDUCATION: A MIXED METHODS RESEARCH DESIGN AND PRELIMINARY FRAMEWORK**

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### **Abstract**

This paper presents the design of a research method for a doctoral thesis in three main phases which entails developing and validating a framework of e-leadership literacies for technology-enhanced learning in higher education (TEL-eLL), applying this framework in three Mixed Methods case studies and finally formulating and validating recommendations for leadership development programmes. In addition to the research design, the paper also presents the results of phase 1 of the research, in the form of the preliminary TEL-eLL framework resulting from an online Delphi study conducted with 31 international experts. The rationale behind the overall study is anchored in the still unsatisfactory integration of technology for teaching and learning in higher education and the hypothesis that one of the reasons for this is a lack of strategic thinking and leadership. The aim is thus to explore the attitudes, mindsets, understandings and behaviours of higher education decision-makers in relation to teaching and learning supported by technology, as well as their wider views on the societal and environmental impact of technology. The voices of teachers with respect to such leadership are also addressed, as is the complex political, hierarchical and cultural environment in which this leadership operates.

### **Introduction**

Technology-enhanced learning (TEL) has been part of the higher education (HE) teaching and learning landscape for several decades but is still not being used to its full potential (Bates, 2015). There are many examples of this, where the focus is on the technology rather than the teaching and learning itself: cumbersome Learning Management Systems serving primarily as storage and distribution of text-based course materials; mass lecture capture with no thought to the design of learning activities around these resources; the rush to get on the high-profile Massive Open Online Course (MOOC) bandwagon with no sound business model and poor pedagogical design (Laurillard, 2016). In times of decreased public funding, changing demographics of the student population and the pervasiveness of technology, HE institutions need to develop a high level of strategic thinking (Bates & Sangrà, 2011) and the leadership capacity (Fullan & Scott, 2009) to make informed decisions.

One area of research seen as being particularly appropriate to studying leadership for TEL is that of e-leadership, first developed as a theory in the business world (Avolio, Kahai, & Dodge,

2001) and defined as “a social influence process embedded in both proximal and distal contexts mediated by AIT [Advanced Information Technology] that can produce a change in attitudes, feelings, thinking, behavior, and performance.” (Avolio, Sosik, Kahai, & Baker, 2014; p.107). Indeed, Jameson (2013) calls for e-leadership to emerge as the *fifth age* of research in educational technology research, yet a recent review of the literature shows that this has not been the case, with a notable absence of such research in continental Europe. One reason may be due to difficulties relating to the different understandings of the concept of e-leadership, where it is either accepted as multifaceted and conceptually ambiguous (Salmon & Angood, 2013) or where other terms such as Digital Education Leadership are preferred, shifting the emphasis from leadership in educational technology to that of “fostering... leaders who have the qualities to lead in a digital culture” (Brown, Czerniewicz, Huang, & Mayisela, 2016; p.8). One could also argue that such leaders need to develop their own (critical) digital literacy (Belshaw, 2014), a proposal that sits well with the theory of Leadership Literacies developed by Davis (2012), where we understand the notion of literacy as the ability to use cognitive skills “in ways that contribute to socio-economic development, to developing the capacity for social awareness and critical reflection as a basis for personal and social change.” (UNESCO, 2006; p.147).

The research thus aims to investigate the role of e-leadership literacies for technology-enhanced learning (TEL-eLL) in European campus-based universities and develop recommendations for Leadership Development Programmes (LDPs). Specifically, it involves developing and validating a TEL-eLL framework, combining the aforementioned prior research on Leadership Literacies (Davis, 2012) and e-leadership for TEL (Jameson, 2013), as presented in Figure 1. The study explores how such a framework can help HE leaders implement strategic and organisational change to improve the way technology is used for teaching and learning. The wider aim is to raise awareness of the need for HE leaders to take into account not only pedagogical and technological considerations but also organisational, cultural, economic, societal, ethical and environmental issues in decision-making about TEL in a VUCA (Volatile, Uncertain, Complex, Ambiguous) world (Johansen, 2012).



# E-Leadership Literacies for Technology-Enhanced Learning in Higher Education: A Mixed Methods Research Design and Preliminary Framework

Deborah Arnold, Albert Sangrà

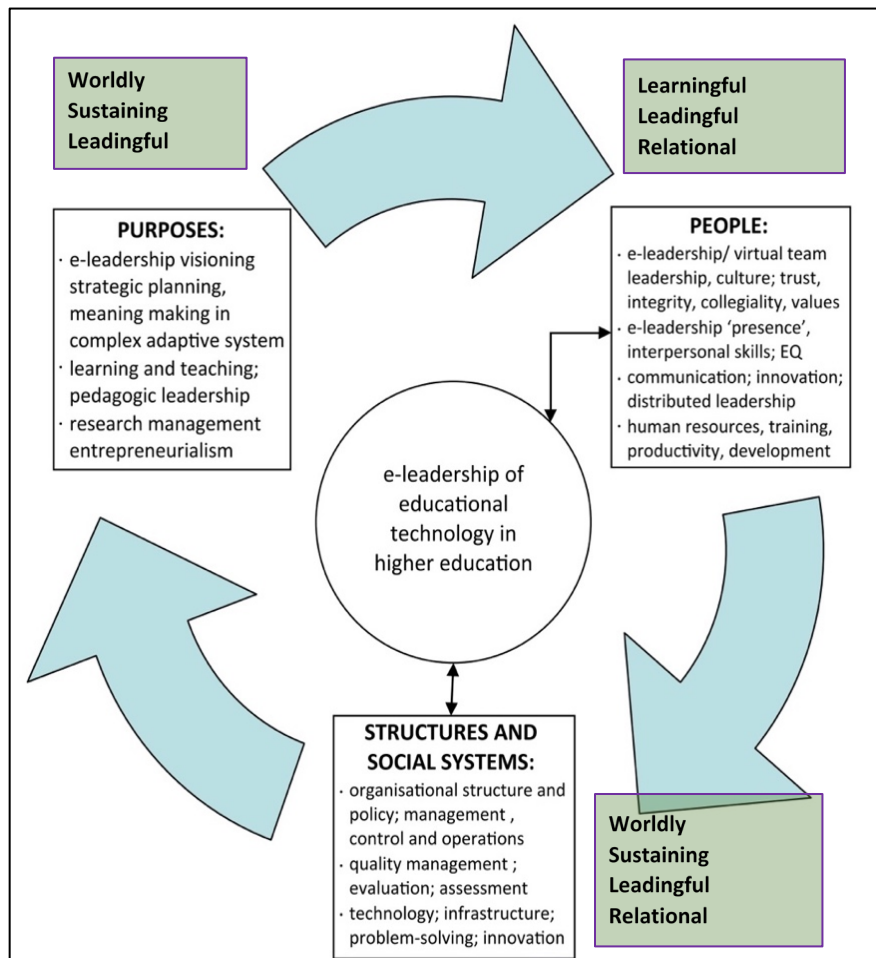


Figure 1. E-leadership literacies framework, adapted from Davis (2012) and Jameson (2013; p.909)

## Research design

The study is designed in three phases, around the following research questions:

- Phase 1: What are TEL-eLL in HE?
- Phase 2: (a) How are TEL-eLL experienced by key informants in selected European universities? (b) How do key informants in European universities develop (i.e. *learn*) TEL-eLL?
- Phase 3: (a) How are TEL-eLL reflected in existing LDPs? (b) What changes should be proposed to integrate the development of eLL for TEL in LDPs?

### PHASE 1 (Research question 1)

The aim of Phase 1 is to define TEL-eLL through an extensive literature review and by producing an initial TEL-eLL framework validated by a group of 30 experts via an online Delphi study. The outcomes of this phase are an agreed definition of TEL-eLL in HE and the refined framework, which will then serve as the basis for Phase 2.

The Delphi method originated in the 1950s (Dalkey & Helmer, 1963) as a means for reaching consensus among a group of experts, enabling anonymity of individual responses, revision of

contributions by individuals and assessment of the group view (Linstone & Turoff, 1975; Okoli & Pawlowski, 2004). The Delphi method is of particular interest to research where judgmental information is indispensable (Okoli & Pawlowski, 2004). This is precisely the case here, where the proposed combination of Davis' (2012) leadership literacies and Jameson's (2013) e-leadership framework for TEL requires validation before commencing the following stages. Furthermore, mobilisation of external experts also minimises researcher bias (Lincoln & Guba, 1985).

### ***PHASE 2 (Research questions 2a and 2b)***

Phase 2 is designed to analyse current strategy, organisation and practice in relation to TEL-eLL, to determine congruence between the proposed TEL-eLL framework and the lived experience of key informants in European campus-based universities, as well as to identify whether and how these participants develop TEL-eLL. In order to achieve these objectives, Mixed Methods Research (MMR) case studies will be carried out in three European campus-based universities in France, Germany and Italy. The qualitative study involves content analysis of strategic documents and organigrams parallel to semi-structured interviews with key informants (vice-rectors with a remit for teaching and learning, pedagogical innovation and technology; TEL managers). The aim is to provide rich contextual data on institutional strategy and organisation, and to explore both how participants demonstrate TEL-eLL in their leadership practice and how, or whether, they develop these literacies through formal or informal learning. The quantitative study involves an online survey to provide statistical descriptions of how faculty themselves perceive TEL leadership through the lens of eLL.

MMR has been chosen to increase the robustness of the study (Venkatesh, Brown, & Bala, 2013), by clarifying and expanding on qualitative data via a quantitative survey, by providing the most complete picture possible and by analysing the diverse viewpoints expressed by governance, management and faculty.

### ***PHASE 3 (Research questions 3a and 3b)***

This final phase is concerned with developing evidence-based recommendations for TEL leadership development in European universities. Content analysis of national LDPs in five European countries will enable these to be mapped against the TEL-eLL framework and any gaps to be identified. Recommendations for integrating TEL-eLL in LDPs will be formulated, before being refined and validated by an online expert panel.

### ***Research design metaphor***

This research design can also be viewed through the metaphor of a burger. The heart of a study is often referred to as the 'meat', but for reasons of personal preference, a veggie-burger has been chosen here. As Figure 2 below shows, the case studies (2) are framed by the interventions of external experts at the beginning (1) and end (5) of the study, to enhance data validity, while the additional content analysis of LDPs (3) and recommendations for TEL leadership

## E-Leadership Literacies for Technology-Enhanced Learning in Higher Education: A Mixed Methods Research Design and Preliminary Framework

Deborah Arnold, Albert Sangrà

development programmes (4) contribute to producing ‘palatable’ results with practical applications.

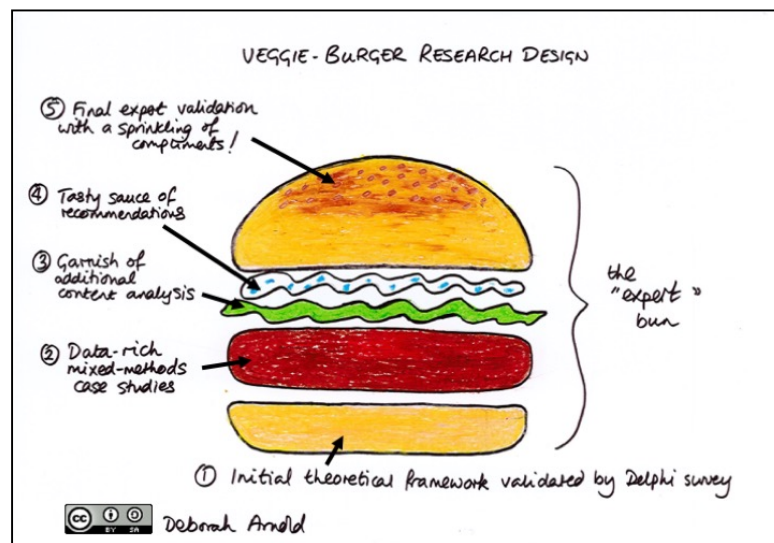


Figure 2. The research design presented as a (veggie) burger

### Results from the Delphi study (Phase 1)

A Delphi study was carried out in three rounds between January and March 2018. A total of 113 international experts were identified and invited from within the authors own extensive networks and from key publications in the field of leadership for TEL in HE. The criteria for the selection of the experts were: significant knowledge and/or experience of (TEL) leadership in HE, knowledge of TEL in particular from a pedagogical rather than a technical perspective, coverage of both ODL and campus-based HE contexts, gender balance of the overall panel.

Forty-eight (42.48%) of those contacted signed up for the Delphi study and thirty-eight actually completed Round 1. Of these 38, 31 (82%) completed both Rounds 2 and 3.

For the first round, a provisional TEL-eLL framework was developed based on Davis’ (2012) Leadership Literacies for professional staff in universities, which provides the overarching dimensions, and Jameson’s (2013) e-leadership framework for TEL. Other work which informed this included Johansen’s (2012) leadership skills for an uncertain world, Sheninger’s (2014) seven pillars of digital leadership, Belshaw’s (2014) digital literacies, Ahlquist’s (2014) ten competencies of a digital leader, Beaudoin’s (2016) recommendations for distance education decision makers in HE, the work of the C-DELTA project in developing a curriculum for Digital Education Leadership (Brown et al., 2016), Appreciative Leadership (Orr & Cleveland-Innes, 2015).

The working definition of TEL-eLL presented to the Delphi experts was the following:

*“a set of attitudes, understandings and mindsets which enable leaders in higher education to address complex problems relating to the integration of technology-enhanced learning and to solve them in ways which are respectful*

*of people and the environment and which contribute to socio-economic development and to developing the capacity for social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change.”*

For reasons of concision, we concentrate here on presenting the overall outcome of the Delphi study. A more detailed analysis together with a full description the associated methodology will form the focus of a subsequent publication.

### **TEL-eLL definition**

In Round 1, 21.1% of experts found the aforementioned definition perfectly satisfactory, 68.4% found it reasonably satisfactory and 10.5% found it unsatisfactory. A total of 21 reformulations were proposed, 14 of which were considered to be adjustments to the initial definition (changing words and punctuation, omitting words and phrases). The remaining 7 were considered to be major rewording or alternative definitions. In Round 2, experts were asked to choose their top three definitions, which resulted in narrowing down the options to four definitions for Round 3. The final result was an absence of any clear-cut consensus, but which enabled the researchers to propose the use of the most concise, general definition (41.9%) as “a set of attitudes, understandings and mindsets which enable leaders in higher education to address complex problems relating to the integration of technology-enhanced learning.”, which also formed part of the second-choice definition (32.3%), while taking care not to neglect the additional issues addressed, namely: an awareness of how technology changes the traditional paradigms of education, research, scholarship and administration; and solving these problems in ways which are respectful of people and the environment and which contribute to socio-economic development and to developing the capacity for social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change.

### **TEL-eLL framework**

Of the 68 statements in Round 1, 4 were validated outright, with a consensus threshold of >80% obtained from the use of a 5-point Likert scale and with no proposed reformulations. Consensus was also reached on 34 further statements, however these all produced proposed reformulations which needed to be rated in the subsequent rounds. None of the statements were eliminated at this stage and 51 new statements were proposed. Rounds 2 and 3 involved the participants in rating both the reformulations and the new statements.

The final overall framework consists of 109 statements, with 4 of the original and 6 of the new statements having been eliminated. In this framework, we find 69 statements which received a clear consensus of over 80%. The remaining 40 statements received weaker consensus of between 50 and 80%. Almost half of these (18) concern the proposed reformulations, which did not lend themselves to a clear-cut decision on the part of the participants. This brings us to highlight one of the limitations of the study in that it had been pre-defined with three rounds, whereas the results of Round 3 indicate that a fourth round would have been useful. In the light

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of these results, it was thus decided to generate a primary framework consisting only of those statements which obtained a consensus of >80%. The structure of the framework including the number of statements and the main themes addressed within each of the dimensions or sub-dimensions is presented in Table 1 below.

Table 1: Synthesis of TEL-eLL framework

DIMENSION	SUBDIMENSION	MAIN THEMES
WORLDLY (29)	e-leadership visioning (13)	Informed decision making; Clear vision of institutional mission; Creating an open and respectful environment for discussion; Involving external stakeholders.
	Self-relationship with technology (9)	Healthy embracing of digital technologies; Ethics, cybersecurity; Critical digital literacy; Awareness of research on student use of media.
	Self-relationship with teaching and learning (7)	Understanding different learning theories and approaches; Design thinking for pedagogy; Affordances and potential risks of TEL.
SUSTAINING (8)		Human and environmental implications; Access, equity and inclusion; Safe, legal and ethical use of TEL; Learning spaces; Social good, digital citizenship, open education.
LEADINGFUL (15)	Leadership style (13)	Creating conditions for innovation and change; Risk-taking; Change management; Distributed leadership, empowering others.
	Branding and Public Relations (2)	Promoting open forms of education; Positive brand image emphasising the quality of teaching and learning supported by technology.
RELATIONAL (10)		Shared vision, meaning and purpose; Managing relationships; Trust, positive affect and caring; Managing divergences and differences, while still being able to make a decision in the absence of consensus.
LEARNINFUL (7)	Leader as learningful self (4)	Formal and informal learning for leadership, change management, information literacy and critical digital literacy; Learning the art of delegation.
	Learningful community (3)	Reward mechanisms aligned with competencies for change; Digital scholarship (teacher and staff development);

## Conclusion

This paper thus describes how a Mixed Methods research design can support the study of leadership for TEL in higher education through the lens of e-leadership literacies. It also reports on the development of a TEL-eLL framework through a Delphi study conducted in phase 1 of the research. The future application of this framework will not only serve to explore the lived experiences of key informants in three European campus-based universities with respect to TEL leadership, but will also inform the design of leadership development programmes.

Further research in the field of e-leadership literacies is required, in order to validate the concept beyond the populations studied, to refine the framework and to contribute to bridging the gap between research and practice. As technology progresses and permeates our collective and individual worlds in as yet unknown ways, the attitudes, mindsets, understandings and behaviours of education leaders at all levels will continue to evolve, reinforcing the need for evidence-based decision making which serves the best interests of students, staff and the institution as a whole, grounded in sound pedagogical principles, a critical approach to technology and a heightened awareness of human and environmental issues.

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## **BUSINESS PROCESSES SUPPORT AND AUTOMATIZATION SYSTEMS IN EDUCATIONAL INSTITUTIONS**

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### **Summary**

Digital transformation of public education encompasses various usage implementation options and possibilities of Information and Communication technologies. While ICT is well accepted for teaching purposes, its systematic design and application for managerial processes improvement in education institutions is slightly neglected. Our research emphasis lays on investigating how ICT can support effective planning and resource management based on effective multileveled resource tracking, managing and reporting by implementing automatic exchange formats, services and procedures. A platform for any multileveled resource management information system is the underlying data architecture that needs to be designed and developed by building common data registries as well as a unique transaction system incorporating a process approach in order to ensure interoperability on all management levels.

### **Introduction**

This paper presents the implementation approach and basic concepts of developing a System for Support and Automation of Business Processes in Schools (SSABP), as well as an illustration of such system being built at the national level in the Republic of Croatia. By structure and functionality, business support and business process automation systems in schools combine typical ERP (Enterprise Resource Planning) functionality in relation to public registry functionality, workflow management, and object and documentation management. In addition to assisting and automating business processes, intermediary effects, such as standardization of business technology and data content, multileveled reporting and interoperability with other systems, need to be achieved when building similar systems. However, before defining the design and implementation approach, the context in which business information systems of educational institutions are developed should be identified.

Digital economy and society are looking for people with improved, but also for some with completely new skills. Educational eco-systems respond to new demands with redefined and new concepts, paradigms and methods, and many of these changes are technologically enabled or conditioned. Changes are obvious at all levels, from intra- and interpersonal micro level, to national and global policies and macro-level initiatives. Thus, the concepts of open learning, distance learning and e-learning have their counterparts in business concepts such as MOOCs, digital credentials and open badges. Information and Communication Technologies (ICT) are



the foundation for development and integration of teaching, administrative and other supporting processes. Clearly, this applies to all levels of educational institutions, as well as informal and non-formal learning. Schools face the challenges and requirements of the information society, and use ICT to make knowledge, information, and education more open and accessible.

Progress in the primary processes of acquiring knowledge and skills should be accompanied by new concepts in management and administrative processes, such as human resources, financial, asset and ICT management. According to Prokopiadou (2012) “ICT have been increasingly incorporated into school administration, in order to improve the organization of official data and to facilitate administrative transactions”. Effects of ICT application in management of schools, measured through performance indicators such as time saving, availability of resources always and everywhere, cost reduction, scalability, flexibility, reduced workload, speed etc., can be achieved only through training of teachers and administrative staff. The level of ICT use in support processes is often lagging behind the level of use in teaching. Selwood (2005) states that “reasons for this relate to the lack of training, availability of time and quality of ICT resources”. Spontaneous implementation of ICT and various applications are more easily implemented in teaching processes than in supporting processes, which are based on integrated databases, transactional systems, and workflow management systems. Building of business information systems requires commitment and support of school management, significant financial resources, as well as well-defined business processes. In such projects, a shortage of specialized knowledge can be offset by outsourcing, but there should be positive and supportive attitude (Potamias & Iordanidis, 2015; p.12).

For the success of complex ICT implementation projects in schools, it is necessary to measure and monitor the effects on teaching and management. In order to measure the indicators relevant to the learning and business analytics, appropriate models of educational and business processes are needed (Rodríguez, Nussbaum, & Dombrowskaia, 2012; p.13).

Further, implemented ICT in daily school work can be a strategical guidance for developing technology competencies, better exchange of information and projects with community, founder and state, implementing different plans and support for informed decision taking and problem solving. On a daily level it means leadership and mentorship easily managed through technology. Some reports show that “ICT use in school units may catalyse radical restructuring and transform administrative processes by establishing an enhanced digital infrastructure for the latter’s implementation” (Vlachopoulos & Pitsiavas, 2016).

All of the abovementioned features and transformations are not only specific to educational eco-systems and organizations, but involve all areas of society and are referred to as the concept of digital transformation. Digital transformation is a comprehensive business transformation with the aim of exploiting all the advantages and opportunities of contemporary digital technologies and their impact on society, taking into account the future (i-SCOOP, 2018).

## **Process, registry and transactional data in primary and secondary education institutions**

In order to create a platform for a multileveled resource management information system in educational institutions the underlying data architecture had to be designed. In our research activities bounded to this project goal we strongly relied our methodology on reference models. A reference model is an abstract framework for understanding essential relationships between the concepts of a problem area as well as for the development of standards and specifications related to problem domain (Reference model, Wikipedia). It is based on a small number of concepts. It can serve for explaining and mapping related objects in the problem area. It is used to create concrete implementation models, e.g. Computer programs. Reference models contain (a) Information systems requirements, (b) Business model requirements extracted from goals, organizational architecture, business processes, data, business rules, etc. and (c) Information system Models describing its Architecture, Structure, Function, Behaviour, Communication, Interface, Deployment and other aspects. Reference Models are mainly used as a tool for Documenting and sharing knowledge on the business area, defining common terminology, overcoming complexity, embracing best practices, implementing standards, performing compliance checking, development of information system and other purposes.

### ***Information systems requirements***

Incorporating a process approach into an information system starts by building a unique set of operational requirements in order to ensure process, semantic and technical interoperability on all process management levels. A linking concept between business processes and information system procedure can be found in data objects that replicate business events into transactional data records.

### ***Business model requirements***

For developing Business model requirements our research was focusing on investigating how ICT can support effective planning and resource management in primary and secondary education institutions. Our primary goal was to identify their processes and data the processes generate or use. In order to gather all relevant data about the resource management of primary education institutions a methodology based on Mendling's BPM Life-cycle was developed (Dumas et al, 2013). In the first phase relevant business process areas were explored and modelled for a selected representative set of schools and other process participants (founders, i.e. local municipalities, Ministry of Science and Education-MoSE, etc.). Later on, the development of reference process models for each of the identified process area was performed. The existing "as is" state was modelled for those processes where it makes sense to illustrate the difference between the current and the future state of the process and the benefit of such improvement. The conceptual model of the future system ("to be") was an attachment to the specification of the new Information system. Detailed models of some representative processes were created as well as a set of procedures and services for various stakeholders (like for the area of student standard) were also developed, with the realization of one or more sub-areas (like

subsidies and scholarships within student standard improvement). Main business areas of Primary and secondary education institution management are listed in Table 1, column one.

### **Information system models**

The introduction of a new IT system for supporting processes recognized in the previous business requirements stage should be based on future principles of single entry of data into operational open ERP modules, automated reporting based on the common registries, technical interoperability with the existing (legacy) systems in real time, and semantic interoperability at the level of the overall education system. These operational concepts are well known in various business industries and could be mapped to a school environment. Operatively, this would mean that primary and secondary education institutions can replicate ERP modules from the business industry sector for supporting processes that are performed in a similar way in schools. Transactional data leans on data registries as well as on computer software procedures and algorithms. For distributed organizational systems like public school systems, it is essential to build a common data infrastructure in form of data registries which can ensure compliance with demands on semantical and technical interoperability. Main data objects generated or used in main business areas are listed in Table 1, column two.

Table 1: Main business areas of Primary and secondary education institution management and their main data objects

Business Area	Data objects
Teaching (Teaching scheduling)	Teacher, Subject, Student, Classroom, School calendar, Teaching schedule
Registry of students and other program participants	Student, Grade, Grade Reports
Information system Management	IS users, Authorization
Student Standard and Subsidies	Grant, Subsidy, Donator, Donation, Selection options
Library Property Management	Book, Borrowing data, Dues, Dues reports
Human Resource Management	Staff, Teacher, Staff assignments, Staff Progress, Leaves, Absences, Travel Management, Life-long education
Project management	Project, Activities, Goals, Materials resources, Funding
Property Management	Building, Classroom, Sport hall, Auditorium, Amortization, Rentals
Finance	Pay-roll data, Funding, Accounts, Budget, Receivables, Credits and Debits, Cash management
Purchase	Supplier, Item management, Purchase order, Credits and Debits, Contracting
Sale	Customer, Customer Order, Invoice, Receivables, Contracting
Warehouse operations	Item management, Purchase order, Receipt of goods, Issuance and delivery notes
Office management	School certificates, Public documents

### **Case study: Croatian e-schools project**

The project is called “e-Schools: Establishing a System for Developing Digitally Mature Schools (pilot project)” and it is part of a wider e-schools programme which is carried out through

several projects aimed at introducing ICT into the school system in the 2015-2022 period. The e-Schools programme consists of the pilot project, which will be implemented in the 2015-2018 period and the major project, which will be implemented in the 2019-2022 period based on the results of the pilot project. The project coordinating body is the Croatian Academic and Research Network – CARNet and partners on the project are: Agency for Vocational Education and Training and Adult Education (AVETA), Education and Teacher Training Agency (ETTA) and Faculty of Organization and Informatics.

In digitally mature schools, the appropriate use of information and communications technologies (ICT) contributes to the following: an efficient and transparent management of the school (direct objective); the development of digitally competent teachers prepared for the application of innovations in their own pedagogical practices (direct objective) and; the development of digitally competent students, who are prepared for a continuation of their schooling and are competitive on the labour market (Indirect objective).

A subset of objectives of the e-Schools pilot project is to pilot organizational, technological and educational concepts of introducing ICT in the educational and operational processes in selected schools during two school years and to develop, based on the experience of the pilot project, a strategy for the implementation of a system of digitally mature schools in the entire primary and secondary education system in the Republic of Croatia, that is for the application in the major project (e-Schools, 2017).

### **Process, registry and transactional data management in Croatian primary education institutions**

The goals of building a system for computer support and automation of business processes in schools (SSABP) differ from project to project. However, some goals are common to different projects, and are often related to the specificity of the activity or technology that is applied at a given time. As an illustration, specific objectives related to efficient and transparent school management defined in the case study, i.e. in the Croatian e-schools project are given:

- Enabling of effective planning and resource management at three levels: school, founder, state;
- Equalizing of business technology in areas that are common to most schools (processes, procedures, data, business rules);
- Developing of reference process models for particular types of schools;
- Enabling of effective multileveled reporting on resource usage based on standardized and automatic exchange formats, services and procedures;
- Providing of ICT support to school processes based on the use of infrastructure, platforms and applications as a service (IaaS, PaaS, SaaS).

The project takes into account the diversity of stakeholders and their interests: (a) Emphasis is on common processes, as there may be more scenarios for each process (different types or sizes of schools, etc.); (b) Specific processes are addressed by specific applications, with which the interoperability is established (e.g. library management, farm, restaurant, etc.); (c) If there are

standard applications at the founder level, interoperability needs to be established with such applications.

The main idea behind building an effective resource management system is to establish and share a common set of registry and transactional data which is generated and used at all levels, from students, through schools and founders, to MoSE. Processes in this area require exchange of data with other legacy systems through services, which are necessary to achieve a desired level of interoperability.

Potential of a new integrated Information system was tested on several processes. One of simulated processes was dealing with creation of a report on request in a two-levelled reporting case. The figure 1 shows process model for Report generation developed as a BPMN process model using Bizagi Modeler (Bizagi, 2018).

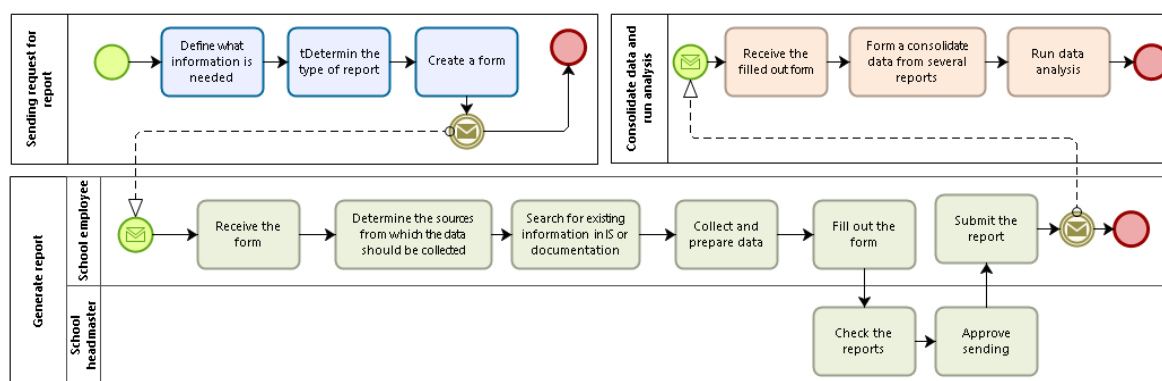


Figure 1. Process model for Report generation

Current (“As Is”) architecture of ICT usage for resource management in primary education institutions is done in a way that the schools use some individually purchased applications, applications provided by the founder and some applications provided by MoSE. Reporting to the MoSE and founder is performed in very few cases somewhat automated and only in cases where available data that are semantically consolidated by the ministry and / or founder. Mostly the reporting is done by delivering data in the default format (xls or paper reports).

Table 2 shows a description of the potential savings based on a process simulation, applying conservative assumptions about resource usage for executing the process, Qualitative and quantitative indicators for improvements. Based on these process parameters future scenarios can be tested and their impact evaluated.

Table 2: Description of the process Report generation (Creating a report on request)

Description	Assumptions (conservative)	Qualitative Indicator	Quantitative Indicator
Upon receipt of the founder’s request or other party (e.g. the MoSE), the school	The report requester defines what information is needed, the type of report is determined and the form to be filled out by the school is provided. (Average time spent 30 minutes)	The occurrence of interruptions of	Report requester: 30 min + 30 min per school = 180 min Report submitter:

employees draw up reports based on data contained in some information subsystems or collect data from the documentation. After that, the report is delivered to the request seeker, and the seeker performs merging and analysis activities.	The submitter of the report receives the form, determines the sources from which the data should be collected, searches for existing information subsystems or documentation, prepares the data, fills out the form, the responsible person checks the reports, approves them and submits the report to the applicant / requester at the end of the report. (Average time consumption of 60 minutes) The requester receives the filled out form, forms a consolidated view for all institutions and conducts the analysis. (Average time spent 30 minutes per school)	regular work for multiple employees (and 2 <sup>nd</sup> setup time) Multilevel approval of output data Errors when rewriting data	60 min x 5 schools = 300 min Average gross payable 09/2016 = 7644 Kn /180 working hours= 42,47 kn/h Costs: 480 min= 8 hours *42,47= 339, 76 Kn per Report
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Process simulation results from Table 1 show Qualitative and quantitative indicators for improvement potentials. Based on these indicators for improvement potentials a future architecture of ICT usage for managing primary education institutions is designed, as shown in Figure 2. In the “To Be scenario” schools should use a new open ERP system for supporting common processes related to main areas of Primary education institution Management which were identified through previous activities within this project.

Reporting to the relevant ministry and founder is performed either automated or through ad hoc queries and reporting using the New e-school Information System for the purpose of more efficient and more effective Management of all resources that need to be managed centrally.

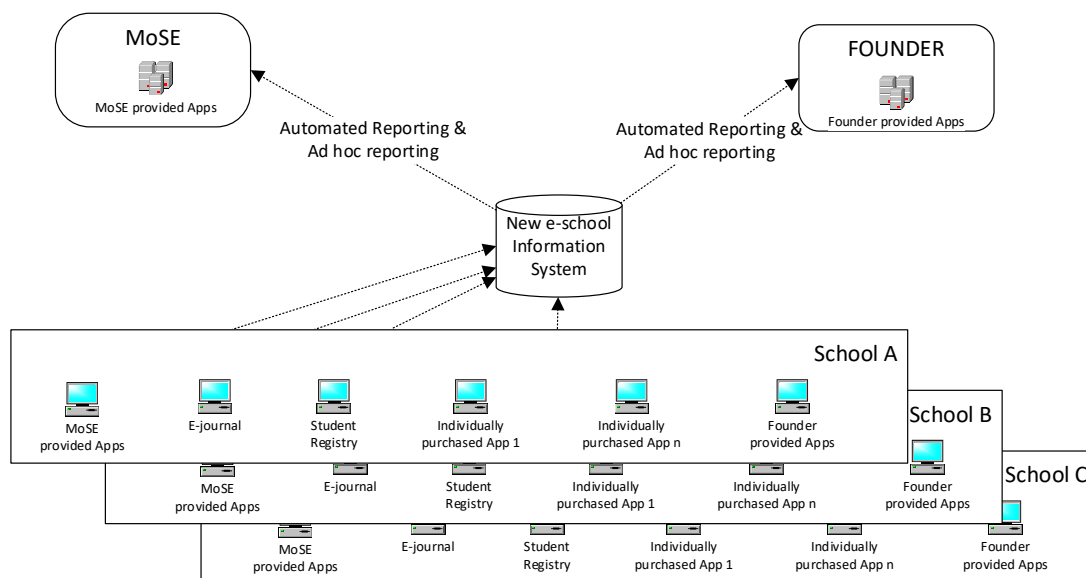


Figure 2. “To Be” Reporting architecture

Operatively, this would mean that schools / primary education institutions can use open ERP modules for all the activities envisaged by the e-School project, as well as additional applications

provided by the founder and MoSE, whereby data will be entered once and exchanged between systems based on semantic and technical interoperability. Schools can, in a smaller scale, continue to use their own applications for specific tasks that are not covered by the open ERP (e.g. borrowing books at a school library). Reporting to the supervisory institutions will be performed automated via the open ERP by providing access to analytical data in accordance with legal authorisation options.

### Conclusion

Digital transformation is not the introduction of an automated process, or a digital product or service. This is a continuous and strategic use of ICT, i.e. digital technologies to improve workflow and business operations within the organization, finding new innovative business models and creating new value-added through user experience.

During previous project activities data about the ICT usage, the process parameters and the relevant data were gathered. According to this input, a new information system architecture was proposed based on applying concepts from business industries into a school environment. The expected impacts of a future system based on common registers, a unique transaction system and an implemented process approach are as follows: Simple forms for data entry, processing and updating; Use of unique sets of master data; More effective management of business events and processes by various key performance indicators; Automatic generation of business documents; Automated reporting; More efficient planning of resources at system level; More accurate monitoring the operational process performance primary education institutions.

Further on, it is necessary to identify other relevant improvement potentials as well as savings options that can be achieved with the use of ICT. This will also contribute to the further development of the information system and its adaptation to school practice and needs.

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## CHARACTERISTICS OF DIGITAL AND NETWORK SOCIETY: EMERGING PLACES AND SPACES OF LEARNING

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### Extended abstract for presentation

Network society is a term by Jan van Dijk which came first into being in 1991 with his book *De Netwerkmaatschappij* (1991) (The Network Society) and by Manuel Castells in *The Rise of the Network Society* (1996), the first part of his trilogy *The Information Age*. It is describing the social, political, economic and cultural changes induced by the spread of networked, digital technologies. The intellectual origins of the idea can be traced back to the work of early social theorists such as Georg Simmel who analysed the effect of modernization and industrial capitalism on complex patterns of affiliation, organization, production and experience. An additional underlying theoretical perspective can be taken from system theory as Luhmann formulated it when he defined societal systems as constituted on bases of communication and interaction (Luhmann, 1996). More recently, in *Networks of Outrage and Hope: Social Movements in the Internet Age*, Castells (2011) takes up the subject of networked social movements with reference to the Arab Spring and other movements.

However, today almost 25 years after van Dijk's works, developments of society under the influence of networks and digital technology have to be taken into focus again to understand the changes, challenges and the potentials. There are no universal definitions for the terms *digital*, *digitalization* or *network*. Digitalization may be seen as the process of increasing integration of digital technology into every aspect of human life. It expresses e.g. in the use of human-computer interaction in order to achieve a desired objective or through integrating technologies into people's lives through digital resources (Niedzwiecka & Pan, 2017). Digitalization, also may be understood as the way of social life, reorganized around digital communication and media infrastructure (Wildemeersch & Jütte, 2017), as when technologies are involved when we shop, make bank transactions, spend our free time, communicate with our friends and co-workers, listen to favourite music, watch TV, play games and learn it affects our daily life. It remains to be defined which role the aspect of digital plays for and within society more in detail, whether as an enabler and medium of developments or an artefact of life itself with which we interact.

Changing digital and network society opens new learning opportunities. European Digital Economy and Society Index (DESI, 2017) data indicates that 79% of Europeans go online regularly (at least once per week). 70% of Europeans read news online and 63% use social

networks. Universities across the world actively suggest possibilities of massive open online learning courses (MOOCs). Research reveals that digital learning is not restricted to the traditional students as non-traditional higher education target groups benefit from digitalization, too. The aim of this presentation is to discuss places and spaces of learning as a particular characteristics of digital and network society taking into consideration accessibility to learning and the benefits of it. The research method used to prepare for this presentation was a systemic scientific literature analysis and desktop research, covering more than 100 recent research publications.

Theoretical foundations for digital and network society are grounded by the research of Spanish sociologist Manuel Castell (2000a; 2000b; 2011) who testifies the reorganization of human activities in relation to the new dimension of time and space, shaped by the real-time communication introduced by digital technologies over great distances. The digital society is characterized by a specific social structure – the network – which functions on the basis of network logics and is empowered by digital technologies. Theoretical foundations serve as a background to analyse the impacts of spatial transformation in the network society, changing places and spaces of digital networked learning.

Places and spaces of learning as a particular characteristic of digital and network society could be summarized by:

- weakened boundaries among formal, non-formal and informal learning as knowledge and information are now widely accessible through the Internet;
- use of new technological devices such as computers, mobile phones, tablet computers, other related tools;
- use of the social networks within work or private life for informal learning;
- increasing MOOC potential to change nature of education through global contribution and new pedagogies;
- and the need for all citizens to develop and master digital skills to adopt changes and to take advantage of learning.

Physical access to the internet and the most recent information technologies does not ensure the same benefits to all members of society. Access to digital technology itself does not solve inequalities in the use of technology for learning. Yet, digitalization is one of the greatest benefits to those with a higher social status, because of the benefits they receive in various important spheres of life including learning.

The theoretical considerations of this paper will be complemented by empirical data in the further stages of a research project Open Online Learning for Digital and Networked Society (3.3-LMT-K-712-01-0189). Project is funded by the European Social Fund according to the activity “Improvement of researchers” qualification by implementing world-class R&D projects’ of Measure No. 09.3.3-LMT-K-712.

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## **A MODEL OF ONLINE COLLABORATIVE PROJECT-BASED LEARNING (OCPBL) WITHIN A DIGITAL COMPETENCE COURSE IN HIGHER EDUCATION**

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### **Introduction**

Digital technologies are essential drivers of innovation, growth and job creation in a global economy (European Commission, 2014), there is a Gap between the social need to be updated in the use of these technologies and the training citizens receive to use them in a critical, collaborative and creative way. In that sense, digital competence is becoming a must for employability and active citizenship.

In order to develop a common understanding of what skills englobe the digital competence and to bridge the worlds of education and labour market, digital competence has been defined as: “the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment” (Ferrari, 2012)

Bearing in mind the importance of the digital competence for citizenship and in the HE scenario, the research presented in this paper attempts to respond, based on a methodological proposal, to the problem of the acquisition of this Competence by university students. This proposal, explained in this work, is based on the combination of the Project Based Learning and Online Collaborative Learning in an online UOC’s course. The study uses a design based research methodology (Anderson & Shattuck, 2012; Reeves, 2006) in which the course (as an intervention) is designed in conjunction with academics and tutors and then delivered in a natural context. The results are then tested and the course design altered in response to student and teacher results and suggestions.

This work concludes with a set of design principles for effective training in Digital Competence.

### **Conceptual design and literature review**

The conceptual design of this work focuses on online collaborative learning and Project-based learning.

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As part of the network society, collaboration has taken another twist, considering that it has to fit in with the networked structure in which the Internet is based (Suárez, 2009). Even collaboration is seen as a key feature of online learning (Garrison, 2006; Kirschner, 2002). In that sense, Dillenbourg (2002) points out that computer-mediated collaborative learning (CMCL) has gained currency in recent years to the point that some state it has become the dominant use of technology in education.

Project-based learning is an instructional method centred on the learner. It allows the investigation of a topic worth learning more about (Harris & Katz, 2001). In fact, a project is defined as a “complex effort that necessitates an analysis of the target and that must be planned and managed, because of desired changes that are to be carried out in people’s surroundings, organization, knowledge, and attitude to life; it involves a new, not previously solved task or problem.” (de Graaf & Kolmos, 2007; p.4)

Starting the implementation of this methodology is not easy for students, but when they advance elaborating their projects, students feel more motivated as time elapses. This occurs because students feel freer to experiment, research and learn for themselves, thus making this method a good learning methodology for the Higher Education context.

### **Research methodology**

This research is based on a critical paradigm (Carr & Kemmis, 1994) in which a transformation of the reality is contemplated and which considers participants as agents of change. Concretely, as can be seen in the following sections, the research was developed through the Design Based Research method (DBR) (Anderson & Shattuck, 2012).

In the early nineties, the Internet made it possible for distance learners to interact with each other. In 1995, the Open University of Catalonia (UOC) was developed as an innovative, online education university focused on lifelong learning.

In this context, the Digital Literacy Area was created considering the digital divide among citizens, as an initiative that helped them to have access to an emerging online education provision and to take advantage of studying online, thereby ensuring digital inclusion and equity.

Within this area, a course for the acquisition of Digital Competence was created to facilitate work and study habits through e-learning to promote the optimal use of technological resources and online learning tools among learners.

The online course evolved from its very beginning from the simple use of the mouse, to acquiring basic digital skills, and then to more complex abilities. The course is taken by an average of 3,500 students per year.

The main aim of the course is to prepare students in a gradual and integrated way for the acquisition of the transversal competence at the UOC: “Use and application of ICT in an

academic and professional environment”. This competence involves: Searching and selection of information online, Processing and development of digital information, Presentation and dissemination of digital information, Digital technology, Study and work planning in a virtual environment, Communication strategies in the Net, Teamwork in an online environment, Digital attitude.

The students are distributed in small teams (4 members) and develop digital projects. To help students with this objective, a set of innovative resources in different formats were created. ICTC is based on a continuous assessment model.

The design of ICTC has evolved over the years through the application of a DBR research process that calls for iterations in which results of student evaluation and learning outcomes as well as changes in the technology, are used to continuously improve the learning design

The major question in this study is which teaching and learning methodology assures students’ acquisition of ICT skills in an online scenario? Specifically, the following sub questions are addressed

- What are student perceptions regarding their own acquisition of the course’s competencies?
- Does the course’s Collaborative Digital Project methodology help the students to acquire ICT competencies?
- Is the assessment model useful for the students’ learning process?
- Are students satisfied with the online teacher’s role during the course?

To answer these questions, a process of selection and design was initiated and developed during the first phases of the research.

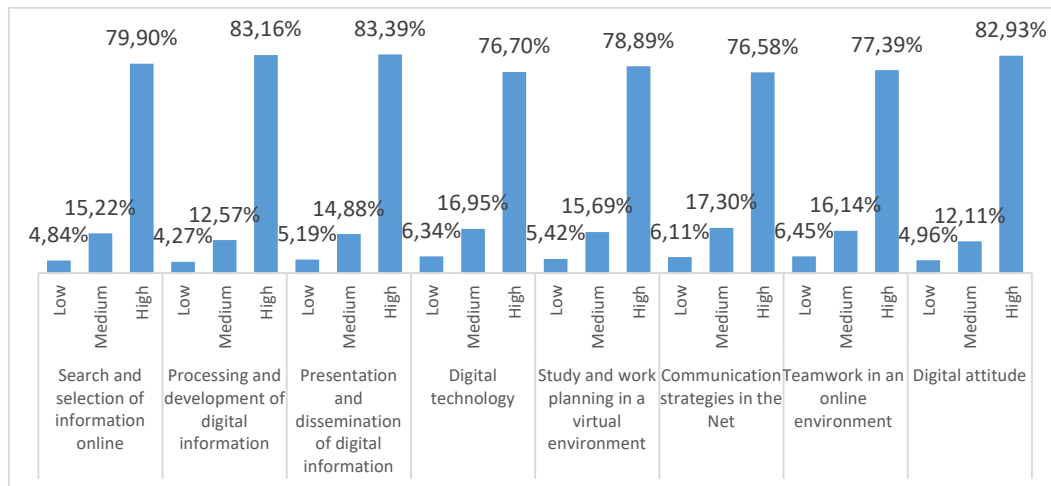
## **Results and discussion**

The quality and relevance of the course is demonstrated by the degree of students’ academic success. According to the institutional statistics, 78% of the students passed the course during the academic year analysed which is higher than the normal pass rate for UOC first year courses. These results are coherent with students’ perception of their acquisition of digital competencies gathered in the course’s questionnaire.

Self-perceptions of the students’ acquisition of the course’s competencies were coalesced from a 1 to 10 scale into low, medium and high ranges: from 1 to 3 being low, from 4 to 7 being medium and from 8 to 10 being high.

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Graph 1. Acquisition of digital competencies in the course. Course 2014-15

The institutional survey reveals that students' satisfaction with the course increased during the last several years (79%) and considered the course helped them to study online, given that the activities are oriented to provide skills to students that are useful for studying and working online, including those of searching, elaborating and presenting information and organizing their time and the information they generate. Hence, they are satisfied with their degree of transference of the skills learned to their professional field as they state in the open text questions of the course's questionnaire:

*"I had no knowledge of group work using the Internet. It has been very useful for me. I think it will be a very useful tool in the future for professional needs."*  
(Student 1)

### The course's methodology

As previously introduced, project-based learning (Railsback, 2002) is the methodological approach utilized; concretely, the developing of a collaborative digital project. To develop the project, students form groups of four, having their own group space which integrates different tools, including the wiki, which stands out as the tool that links all the processes for the creation of the project. The development of the project is planned in four phases (Starting, Structuring, Development, Closing and Dissemination), each of which lay out a set of interrelated activities (Figure 1).

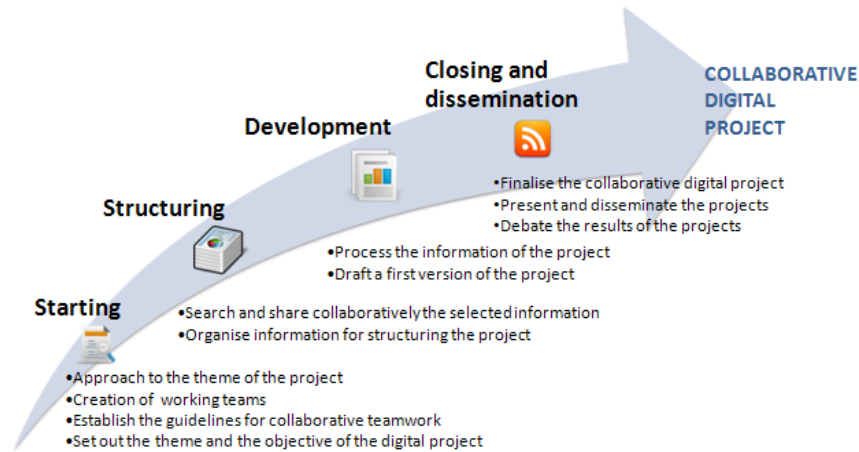


Figure 1. Methodological proposal for a Collaborative Digital Project (Pérez-Mateo et al., 2014)

The starting phase provides an environment to create working teams and perform the initial searches. It is important to give students resources to suitably form the online groups. The collaborative digital project methodology requires the creation of teams. The searches developed during this phase are shared with all classmates through social bookmarking tools.

The second phase involves making a deeper search for information to structure the project. During this phase, students must collaboratively plan the development of the projects and distribute the different tasks among the group members. It involves starting to work together and coordinating different forms of working to share searches focused on the theme of their projects and define its structure for the next phase.

Subsequently, the project is developed: During this phase, groups enter the implementation phase: once each group's dynamics are defined, they draw up the content of the project collaboratively. In order to assess and assure the optimal condition of each group's dynamics, students complete a self and peer assessment process during this phase, which will be explained in the results section.

And finally, discussing the final version of the project. In this phase, students present the final versions of their projects and conclude the collaborative process in the groups with a reflection about the collaborative process developed during the course. In addition, they disseminate their projects in the general classroom space and discuss them in mixed groups created by the teacher.

Most of the students are satisfied with the course's methodology. They consider it has helped them with the acquisition of competencies, represented by some student statements at the open text part of the course's questionnaire:

*“The course activities are regarded as significant knowledge and it will be useful to apply it in future activities in the professional field” (Student 2).*



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### The course assessment

The evaluation of the course is based on continuous assessment (group and individual), thereby assuring the progressive acquisition of competencies in each phase. The final assessment is individual given the fact that every student receives a mark at the end of each phase of the project.

Students are satisfied with the assessment model, with an 85% approval, according to the institutional survey.

The continuous assessment of the course is based on the active role of the student and the guidance and monitoring of all the process by the online teacher. Given the fact that different objectives, actors' tools and scenarios intervene in the assessment of the course, we deem it to be a 360° e-assessment. The aim of this 360° e-assessment is to reinforce and boost the students' learning process to allow them to acquire the course's competencies (Guitert et al., 2015). This model is an adaptation of the model proposed by Llorens (2014) which is based on the assessment of human resources.

The 360° e-assessment model promotes a deep, progressive and collaborative learning process, in which both online teachers and students participate (individually and collaboratively). Individual and group processes and group results are all assessed in both the group space and the online classroom as can be seen in Figure 2.

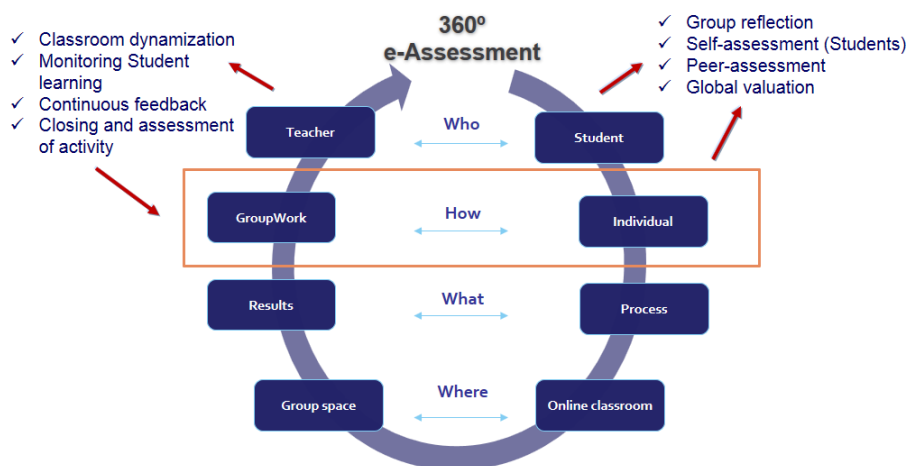


Figure 2. 360° e-assessment of the course

In the course, both the process and the final outcome of the online learning activities are assessed and evaluation is not only performed by the teacher; students also assess their own and their partners' work.

The teacher develops assessment criteria (that are based on the course's competencies) that were public to all during the course; in fact, the assessment criteria are present in the learning activities themselves.

Regarding individual feedback, the students value how it helps them to acquire the competencies and, as some students stated in the open text questions of the course's questionnaire:

*“it helps me to understand what I did right and what I did wrong” (Student 12)*

*“the feedback that the teacher provides makes me improve my activity within the group” (Student 8).*

Most students rate very positively the usefulness of self and peer-assessment activities. Students seem to find self-assessment as a good exercise of reflection in order to understand their own learning process and how they acquire the competencies of the course. Regarding the last one, even though some have stated some reticence, they admit its benefits:

*“At first, I didn't want to rate my peers' activity in the group, but it helped us to improve our participation in the group and in the end, it was no problem” (Student 13).*

### **The online teachers**

Students are very satisfied with online teachers as they stated in both the institutional and course's surveys, which reflects all the work done with them: 88% are satisfied with the teacher's role during the course as they stated in some of the open text questions of the course's questionnaire:

*“He has been very important for my success in the course, and without his guidelines I would not have made it!” (Student 10)*

This online collaboration among teaching staff promotes the role of online teachers during the development of the activities of the course: they orientate and facilitate the student learning process through their constant teaching presence in both group and classroom spaces. This teaching presence promotes, according to Guitert et al. (2015) a proactive role, hence providing encouragement.

The role of online teachers has been raised over the years, through training in the first stages of their teaching practice, and to assure quality, this first type of training has been conceived as a selection process as well: Online teachers are pre-selected and are trained through an intensive one-month online training period and, depending on how they develop and show their skills during this training, they are finally selected to be a part of the team of teachers.

### **Conclusions**

Answering the major research question of this study, in relation to the methodology presented in this article, students clearly perceive that their knowledge of and competence using digital learning has improved. The research presented in this paper has been developed over the last 20 years, provoking the creation of a methodological model based on the combination of

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project-based learning and collaborative learning methods, culminating in the Online Collaborative Project Based Learning (OCPBL) model.

The transition from the collaborative digital project (developed in the course) to the OCPBL is explained in the fact that it is an online methodological model that is transferable to other contexts. Answering the specific questions of our research and to promote transference to other contexts, it is necessary to consider the subsequent design principles:

- The course design is a model for the acquisition of digital competence that goes beyond the method (phases of the project); it includes a set of resources, the role of the online teacher and it is closely linked to a continuous assessment process.
- The key elements of this model are the phases of the project, the proposal of a set of activities based on tasks or challenges and its union with collaborative work. In addition, it is a model that requires a high grade of collaboration during almost all the process. The teams formed go through phases that are very much linked to the phases of the project.
- Assessment must be continuous as this methodological model is not possible with a unique and summative assessment; it must be linked to the group's dynamics during its application and must consider individual assessment, facilitating the students' active role as explained in the 360° e-assessment model.
- The proactive role of the online teacher is essential for the application of this methodology, not only during the design of the activities, but also in the continuous monitoring of the process of the groups and their assessment.

The OCPBL model can be represented by the following figure.

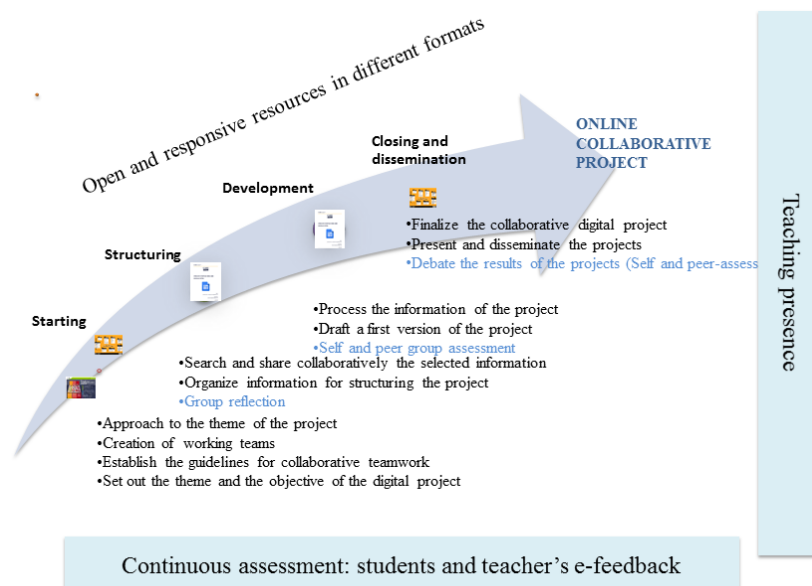


Figure 3. the OCPBL model

Further research could be oriented to analyse if this model can be applied for the acquisition of other competencies besides that of Digital Competence.

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## **SUPPORT LEARNING THROUGH MICROCREDENTIALLING – THE CASE OF THE MICROHE INITIATIVE**

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### **Abstract**

The MicroHE initiative is aiming to examine the scope for and impact of micro-credentials – a form of short-cycle tertiary qualification – in Higher Education. Currently, despite being primarily forms of formal education, micro-credentials such as micro-masters from EdX or nanodegrees from Coursera, are considered to be non-formal education. MicroHE intends to enhance the recognition of such non-formal educational opportunities by bringing them within the framework of existing recognition and transparency instruments for formal education. The project enhances skills-assessment due to the fact, that many micro-credentials are specifically designed to teach particular and narrow sets of transversal competences.

### **Introduction: The need for a next step in recognition**

This paper deals with the emerging problem of a more and more diversifying learning pathway which can be seen in individual biographies of (European) citizens which challenges the standard systems of certification in our (European) higher education systems. In simple terms the emerging variety of certificates a learner can accumulate in their lives need a new way of managing, recognizing and transferring it. The established European Credit Transfer System (ECTS) seem not to be the fitting any longer.

Lifelong Learners earn credentials at the beginning of their careers, but they learn new skills every day. While they are recognized for the time they spend in formal professional development settings, they often don't have the opportunity to demonstrate the full breadth of what they have learned, including in informal contexts. To address this, the (European) initiative MicoHE is building a system of micro-credentials to provide professional educators a new way to identify competencies they are developing and gain recognition for the skills they learn throughout their careers. Universities are recognizing that learning doesn't always have to be packaged into multi-year chunks. It can also be broken up into less than 30-hour pieces, priced and awarded accordingly.

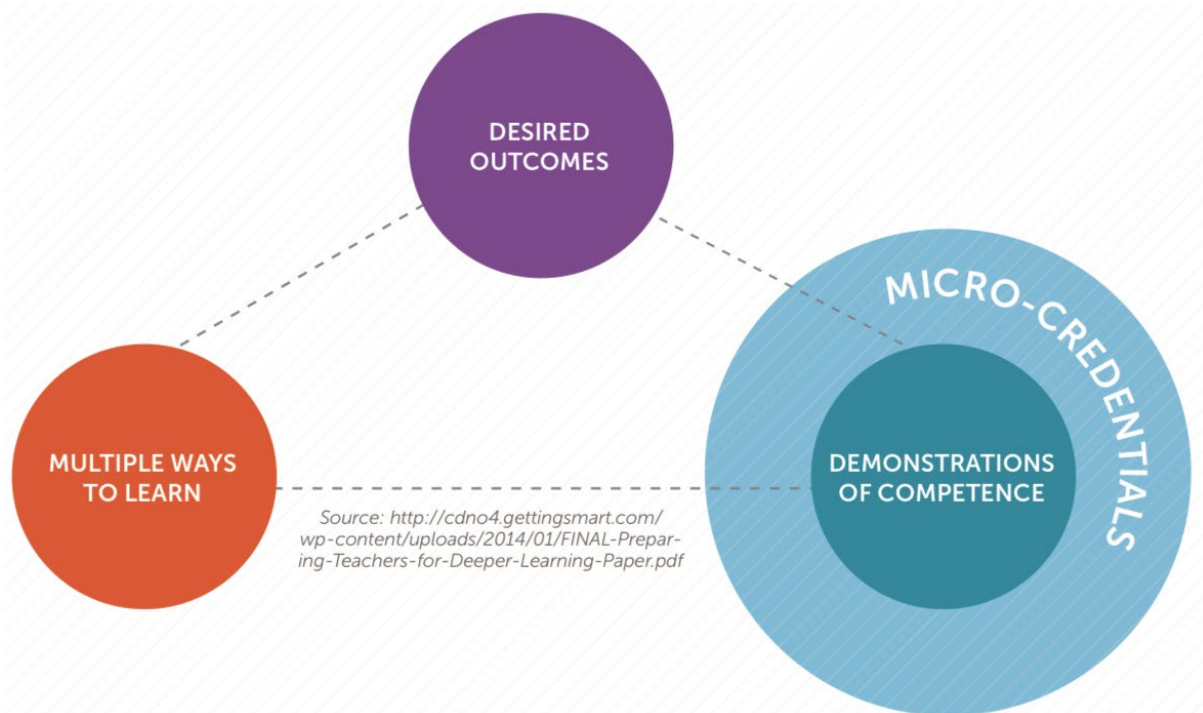


Figure 1. Microcredential structure

This is when micro-credentials come into the picture: short, low-cost online courses that result in digital badges when learners complete one of them and certificates when they complete a series. HEIs globally more and more are taking advantage of a business opportunity and an education need as they experiment with new learning concepts that help today's workforce (Olneck, 2012). While micro-credentials have become more popular, they still have some issues that universities need to work through. For example, who decides what skills and knowledge students will gain in micro-credentials, and how can they be compared across institutions? That is a question which is at the heart and stat of the European MicroHE initiative which has started in early 2018 and will look into providing detailed analysis and tools to better make use of the concept of micro credentials in HE in Europe.

### The MicroHE rational and background

Digital technologies open many opportunities to learning – entry to education is the most important factor for economic success, with access increasingly promoted to those wishing access to furthering their skills. As new technologies and traditional education paradigms have collided, credentialing paradigms have also needed review (Abramovich et al., 2013). Traditionally, academic credentials and professional certifications were awarded as students emerged from education and vocational/ technical programs. By 2015, global higher education institutions were considering validation of knowledge from online learning coursework in one single common, broad-based credentialing platform, and signed the Groningen Declaration to help forward this agenda.

Accreditation for online learning or Massive Open Online Coursework provides challenges for universities to accept and acknowledge learning as credited coursework. Awarding credit for different types of educational coursework disrupts higher education's traditional, formal

educational processes for financial and educational accountability. The challenge for post-secondary institutions is to look at online learning opportunities through a lens of reform and innovation and equally, as an opportunity to increase higher education participation (Lemoine & Richardson, 2015). The Malta EU Presidency Conference on “The State of Digital Education – Engaging with Connected, Blended and Open Learning” concluded that “Unbundling is Unstoppable”, but competition is fierce to lead the micro-credentials revolution. Digital Education is increasingly breaking traditional programs, into smaller, shorter online courses.

This trend is set to continue and expand dramatically. The discussion in the next few years will centre on whether universities will adapt to offer large-scale micro-credentials, whether VET institutions will take up the mantle, or whether it will increasingly become the domain of start-ups and corporations. Credentialing in the form of digital badges, nano-degrees, and micro-credentialing is a new concept in HE advocated for use in the acknowledgement of coursework taken online; badges provide a method of accrediting content knowledge rather than course credit for specific knowledge (Rath, 2013; Reid, 2011). Digital badges are now being examined and accepted for wider applications in HE. However, the precise form of these badges is still very much up for debate, with one approach proposing fully-open credentials which are transparent, and issuable by anyone, while another model proposes verified credentials which are issued by trusted institutions.

The MicroHE initiative aims to bring ground into this debate and clarify the existing positions currently under discussion. It will also look into the policies behind it, and provide a comprehensive policy analysis of the impact of modularisation, unbundling and micro-credentialing on Higher Education in Europe yet conducted. In particular, the following areas will have to be focused on if credentialing is to be taken a step further.

- Analysing and categorizing the state of the art in micro-credentialing in European Higher Education today, with the aim of understanding the current level of provision, the types of micro-credentials offered and future trends in provision of micro-credentials.
- Creating different scenarios for the impacts of continued modularisation of Higher Education on HEIs.
- Examining the adequacy of European recognition instruments for micro-credentials in particular ECTS, the diploma supplement and qualification frameworks.
- Developing a ‘credit supplement’ to give detailed information about micro-credentials in a way compatible with ECTS, the diploma supplement and qualification frameworks.
- Proposing a meta-data standard and developing an online clearinghouse to facilitate recognition, transfer and portability of micro-credentials in Europe.

Through these activities, the initiative will:

- promote increased choice for students and lifelong learners by increasing the range of educational opportunities offered to them;
- equip universities (esp. public universities) to adequately adapt to the changes brought about by modularisation of education;

- improve the recognition and transfer of learning between different educational organizations as well as the world of work, including transnationally;
- while maintaining the European tradition of high quality education and high-levels of student-protection, provided through systems of accreditation and quality assurance.

### Tools and concepts for recognition and improved portability

The world of work increasingly demands a quick response from the education system to provide people with the desired qualifications. In response, MOOCs have tried to make their content as digestible and flexible as possible. Degrees are broken into modules; modules into courses; courses into short segments. The MOOCs test for optimal length to ensure people complete the course; six minutes are thought to be the sweet spot for online video and four weeks for a course.

Universities are responding to this trend by becoming more modular, too. EdX has a *micromaster* in supply-chain management, that can either be taken on its own or count towards a full masters at MIT (Education Writers Association, 2015). Coursera now offers everything from full-degrees to single courses – with content offered for free and learners paying for assessment and accreditation at the end of the course. However, while traditional students could depend on recognition of widely understood signals of experience and expertise such as university degrees, the same cannot be said for the creatures of MOOCs such as *nanodegrees* and *specializations*. The private sector is proposing a host of solutions to recognize learning in smaller segments, from the aforementioned nanodegrees, to centralized skill-banks verified by standardized testing to online systems of recommendation similar to those to peer-reviewed literature (The Economist, 2017). The MicroHE Approach is based on four pillars:

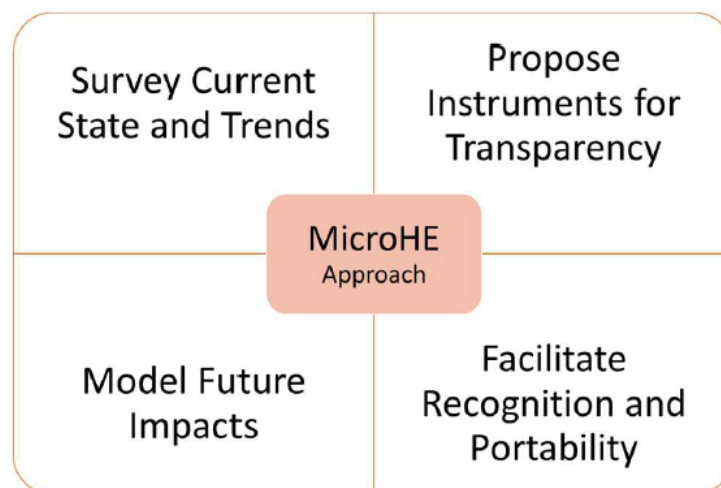


Figure 2. MicroHE approach

### Measure current state and trends

While the term micro-credential is widely used to describe any sub-degree learning experience, whether formal, non-formal or informal, the initiative aims at looking a credentialing within Higher Education. Thus, we focus on credentials which confer a minimum of 5 ECTS credits from accredited and/or recognized institutions (i.e. which are at a L4 level of recognition-



formality, as proposed by the OpenCred Study commissioned by the Institute for Prospective Technological Studies within the Joint Research Centre of the European Commission). The measurement of current trends and the state of the art will comprise surveying European higher education practices, to better understand (a) the scope of microcredential provision within the context of their overall activities, (b) the drivers behind the increase in microcredential provision, (c) changes in the HEIs to enable provision of micro-credentials, and (d) future plans for further provision.

### **Model future impacts**

While there is a clear increase in the number of MOOCs and other forms of micro-credentials, the impacts of such radical unbundling in Higher Education are far from clear. Micro-credentials change everything from the structure of qualifications, to pedagogy, modes of provision, types of assessment, economic models and every other aspect of Higher Education. As such, simple trend-forecasting offers little insight into future models, or in how Higher Education Institutions may adapt and prepare for these futures. To this end, the initiative will create scenarios for the use of microcredentials in higher education in the future, as well as the effect on Higher education policies and activities.

### **Instruments for transparency**

The OpenCred Study proposed that the highest level of transparency for credentials involves ones which: formally and clearly state on whose authority it was issued from, provides information on the content, level and study load, states that the holder has achieved the desired learning objectives, provides information on the testing methods employed and lists the credits obtained, according to a standard international system or in some other acceptable format, are demonstrably and clearly based on authentication (i.e. student's identity is verified) and state that the examinations have been administered under supervision and specifies the nature of this supervision.

The “State of Digital Education Conference” concluded that there is scope for a distinctly European solution to the following issues: The educational reforms in Europe arising out of the Bologna Process were designed to enable portability and transfer of qualifications, as well as to create trust between different educational institutions. These same methodologies apply excellently to digital education, with little change... all that remains is for governments to deploy the policies necessary to bring digital education within existing quality and recognition frameworks. To this end, the MicroHE initiative intends to:

- propose a standardised *credit supplement* modelled on the European Diploma supplement, which can be used to document learning achievement for sub-degree qualifications;
- clarify how the European Qualifications Framework can provide a recognition and translation framework for;
- all types of documented achievements, in particular, including micro-credentials, without the need to create;

- parallel systems of accreditation such as *badge* systems.

Finally, the described concepts push to give recognition for e-learning and thus provide competition for degree granting global higher education. Digital credentialing systems, have been proposed to assess, recognize, and communicate knowledge acquisition. Establishing a system of digital credentials allows recognition of learning no longer bound by time or location, interest-driven, or, increasingly, by cost. The Groningen Declaration recognizes that digital student data portability will contribute to the free movement of students and skilled workers on a global scale in the years to come. Issuing of digital educations need to solve issues of ownership of the credential (by owner and issuer), revocation, tracking and stackability. To build trust in the same credentials, issues of privacy, identity, validation and measures of competence need to be solved. Several countries including France and Estonia have addressed these issues by creating their own national systems for issuing and verifying credentials – however, differing national standards hinder the creation of a free market for services, one of the fundamental freedoms of the EU. To solve this issue, the MicroHE initiative will propose a prototype for a European credential repository, which can accept both full degrees and micro-credentials, based on already accepted standards in European Education, namely the diploma supplement, ECTS, the European Qualifications Framework and accreditation of Institutions according to the European Standards and Guidelines for Quality Assurance in Higher Education.

## **Summary**

More and more educational institutions, training agencies and ICT companies are awarding digital badges to course participants worldwide. This development is an expression of increased relevance of lifelong learning and more flexible education. Learners have already acquired competencies and knowledge relevant to their studies before they enter HE or in parallel to their studies. The challenge is to find a way to provide recognition of these learning achievements within their study programs. Digital badges are possible tools to meet this need, as well are open badges. Based on the input of the higher education institutions, the MicroHE initiative will develop usable scenarios and models for HEIs to facilitate the uptake of micro credentials. Agreements and alliances between HEI are important as well, particularly for mutual recognition of credits.

Digital badges based on an open standard can be used as tools in support of a more flexible education system. Badges are not a goal as such in this respect (Hickey et al., 2015). They are a means to make education more flexible, and thus to meet the needs of the students, educational institutions and employers. The introduction of badges also raises ethical and technical questions: trust, archiving and privacy. The MicroHE initiative aims to include these aspects into the discussion and contribute to building a badges ecosystem.

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## **INDIVIDUAL AND INSTITUTIONAL SUPPORT IN ODL: HOW THE MACRO MAY BENEFIT FROM THE MICRO**

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### **Summary**

Educational support for students in the field of open and distance education is a multifaceted and decisive parameter for enhancing and promoting student engagement and academic progress. This is a conclusion that draws on a number of research findings on the need for effective support for students to make the most of their learning and social backgrounds in a diverse learning and participatory process. Given the growing demand for new skills acquisition and lifelong learning, online education welcomes diverse categories of learners with differentiated needs and levels of online participation. The purpose of this article is to summarize the context of the ongoing research effort of the PENER-16 program of the Hellenic Open University (EAP), emphasizing the need to develop an integrated student support system in the learning community of a distance learning tertiary institution. The paper holds that support services in higher education ought to be organized on three distinct levels, in accordance with the focus lens of the conference, so as to allow for wider participation, coping with new learning solutions, and better provision of skills currently demanded by growing economies. More specifically, (a) on the individual level, support should include needs' diagnostic tests, provide academic skills and offer ongoing psychological support, tailored to the study phase that students face; (b) on the institutional level, support might provide assistance in administrative issues, promote collaborative and community-building skills, extra-curriculum activities that promote digital literacy and enhancement of communication media use; and (c) equally important, on the societal level, support services should consider offering recourses that enhance the cultural sensitivity of learners and institutional agents that eliminate learning disparities and encourage individual and collective learning. As these levels are interrelated in the learning and teaching process, they should also be delivered in terms of support via a holistic system that cultivates cross-sectional and cross-cultural skills, places the individual and the university in the current socio-economic and marketing context and follow the main principles of online instructional design.

### **Introduction**

The issue of educational support strongly occupies the terrain of open and distance learning in recent years since it has become clear that the very stake of successful integration into the educational landscape of the 21<sup>st</sup> century is largely dependent on how educational institutions recognize and support the particular needs of heterogeneous student/learner groups. This

article documents the necessity of developing an integrated support system that stretched across three levels (individual, institutional, and societal) and is part of the research effort underway at the Hellenic Open University. The research seeks to address the gap between the learning profiles of adult students coming to open and distance universities internationally, and the high academic or technical requirements that they have to meet throughout their studies, without substantial support. This results in grave problems, both for the learners themselves and for the respective educational institutions, such as lack of information and self-management of the study, inability to cultivate cognitive skills data, high dropout rates, low performance, frustration and isolation, etc. We propose that targeted support services on the micro-, meso- and macro-levels of distance learning could greatly assist in the resolution of such pressing issues.

The issue of qualitative support for students, especially at a time with highly sophisticated technical capabilities, has occupied the most important theorists in the field of distance learning (Tait, 2003a; 2003b; Sewart, 1993; Keegan, 2003). In these studies, we can look for historical data related to the definition of support in the earlier stages of development of open and distance education, especially in Europe, and the transformations that the concept has undergone over time, following on the theoretical and technological progress. The emphasis on support has been recognized as a strong priority to distance learning universities, as compared to the conventional higher education (Tait, 2000), but has not always received the attention it deserves. Various student support guides were compiled in this early phase, but they were soon wiped out by leaps and bounds in open and distance learning and technology in recent years. Indeed, the fragmentation of older approaches to student support has recently led to more systematic efforts to investigate the complexity of the given issue which have already begun to provide interesting evidence.

The recent special issue of “Open Praxis” journal (International Council for Open and Distance Education, 2014) emphasizes the critical role of student support and the corresponding theoretical models and applied tools. Topics presented there (digital literacy, sense of satisfaction, sense of belonging, academic tools, quality assurance, etc.) and the reference to corresponding international surveys, as will be shown below, illustrate the breadth and importance of overall student support in the ever-changing terrain of open and distance learning. In addition, issues of wellness and tailor-made support are for the engagement of the individual, but also institutional solutions (such as Course-Embedded Student Support and virtual tutorials) are indicated as suitable solutions for the mid-level. Similar references to research work are also made in the extensive Guide to Good Practices for Distance Learning, issued by the Council of Higher Education (CHE, 2014; pp.42-48), with particular mention of the importance of an effective support in our direction successful training process in the digital age (Ludwig-Hardman & Dunlap, 2003) but also focusing on the quality specifications of the parameters of on- line tertiary education in relation to the ever changing social reality. What is evident from the literature is that support systems need to take into account all three levels simultaneously if it is to be effective and in accordance with current social trends and technical possibilities in distance learning.

## **The Micro: The importance of pre-entry & ongoing individual support**

Students' integration to the new environment has been identified as a major factor in need of support services that plays a key role in the further development of studies. In the study of Dearnley (2003) the proper support of the students was directly related to the success or failure of future study. In particular, there is a need for practical, technical, academic and emotional support before and during the entrance phases, when students are more disoriented and vulnerable. Other studies (Jara & Mellar, 2007) have also linked student support to the quality of content of distance learning programs, focusing on pre-start and academic support both at academic level and at the level of equal opportunities provided to trainees.

The survey of Bird and Morgan (2003; pp.14-15) offers useful information for the guidance, support and advice in the pre-entry stage in adult distance education students. Researchers note that, in addition to incentives, the following topics should be discussed with prospective students prior to their decision to register: managing their fears, creating academic skills through available academic preparation courses (Johnson, 2008), literacy skills, and information technology, anticipating the impact of the study on roles within the family, preparing for change, anticipating the impact of the study on the student's psyche and personality and identifying the support networks related to the student's needs. Consulting services to meet the emotional needs or health issues, and also meet the need of students to feel socially connected not only with their peers and teachers, but also with the staff of the institution shall complement the investigator proposals for support of students. It is therefore perceived that the process of familiarization and support in this early phase is extremely complex and burdensome for the initial and subsequent course of study. Further research (Brown & Mbati, 2015) reinforce the value of institutional support services that can help students to figure out what is personally realistic during the learning path, already with their entry in institution. However, research findings warn that while some students are open to support services, others are not; hence, a future challenge for distance education providers is to design not only the relevant services that can be made available to students when support is needed but to prevent students from taking a "solitary wolf" approach.

Therefore, on the individual level support services ought to cater for needs' diagnostic tests, provide academic skills (both content-related and technical) and offer ongoing psychological support, tailored to the study phase that students face.

## **The Meso: Creating a supportive institutional community**

Apart from the impact that psychological support has for the individual, it also bears significance for the institution, as it affects both the community building and the dropout rates reported. Approaches from various fields of knowledge, such as motivation psychology, have highlighted the urgent need to set up an integrated theoretical support model for open and distance learning (Simpson, 2008). The factors that seem to help reduce students' negative feelings, especially those who are first required to operate in a distance learning environment, are as soon as possible familiarizing students with distance learning, communication with fellow students and teachers, time organization and management.

According to Sharma (2002), all activities related to providing support to students are related to learning, interaction and effective communication. That is why a support system ought to cover issues of teaching and counselling to solving management issues of the student's everyday life. Along the same lines, the study by Choudhry, Gujjar, and Hafeez (2008), states that the main objectives of a student support system at a distance institution are (a) to help students make the most of the educational package offered to them; (b) provide information on the form and content of studies, (c) reduce the sense of isolation, providing easy access to resources and resources but also opportunities for interpersonal communication. The structure and activities of student support services depend on the diverse needs of students, the ethics of the organization and the distribution of resources and resources of the university. The student support system should contribute to creating an environment that facilitates distance learning, motivating students to continue their education, encouraging student socialization, and promoting teamwork and team spirit in general.

Another central issue that emerges in most studies is the importance of communication and the processes of community-building and sense of community during distance learning. According to Kelly and Stevens (2009), students in an educational environment wish to communicate both among themselves and with their teachers, but in such a way that they feel suits them personally. At the Open University UK, two student support programs were created and implemented, which were applied from the first day of enrolling in the curriculum until the end of their educational course (Learner Support Framework and Personalized Integrated Learning Support). The first was created to support students from the beginning of their learning process, and particularly focuses on dynamic interactive and interactive activities without losing sight of person-driven activities to enhance communication and a sense of participation in the community. At the same time, it focuses particularly on the forums and activities aimed at students with special needs. The second program focuses on the specific characteristics and requirements of study programs and in as much as possible efficient use of technologies in support of a mixed (blended) educational system.

Communication is an extremely important factor in the learning process both in conventional and distance learning contexts. Its use is absolutely essential for the support and success of studies. According to Thormann and Fidalgo (2014), participation in discussions in an online community is characterized as a complex process in which students manage the learning needs as a practical means of communication and interaction. Past and recent studies on the types of digital learning communities illustrate the way that students interact in the digital environment and empirically record their emerging needs (Rumble, 2001), both from the environment itself and from the content hosted on it. Indeed, in the context of support for young students, Pennsylvania State University, a conventional university with a high degree of e-learning approaches enabled through a case study for students to work in an environment with e-learning forums, where the teacher involvement was frequent and energetic. Equally important to strengthen communication and cooperation was the participation of the students that were involved actively in the creation of study guides but also in commentary specific films, who had

to attend after recommendations of teachers so through their involvement learn to comment, interact, evaluate, participate in the community they belonged to (Loyd-Smith, 2009).

The de Moraes, Rodrigues Paz, Lumi Matuzawa, and Jantsch Fiuza (2003) study describes the student support system developed at the Federal University of Santa Catarina in Brazil. A Distance Education Laboratory (LED) was created in order to serve a fast and efficient flow of communication between students and tutors and students among themselves. The support team also provides instructors and students with instructions on how to use the tools and general overviews of the lesson. Other means of use are a support website, a virtual library, and interactive tools used in regularly scheduled off-campus activities and events, discussion forums, collaborative learning spaces, bulletin boards with general information, and a digital “Coffee House” where students can socialize and relax in a virtual environment.

Furthermore, the issue of administrative support and its great importance in institutions providing a “virtual person” through the websites and digital spaces that represent them (Jones & Meyer, 2012) is seen by international experience as another parameter to be taken into account in the design of systems support academic activities KON students (Kishore, 2014).

As it appears from the literature and our own preliminary research findings, on the level of the institution the support nexus needs to include assistance in administrative issues, promotion of collaborative and community-building skills, extra-curriculum activities that promote digital literacy and enhancement of communication media use. As Tait (in ICDE, 2014) stresses, there is a need reconfiguration of support in the Digital Age and he proposes the integration of support with teaching, instead of considering support services as separated structures within institutions. In this way, effective support can be achieved in the intra-institutional level, for students and teachers alike, serving for more sophisticated learning experience on the meso-level.

### **The Macro: Culturally sensitive learning in a distance-shrinking world**

As the world of online education has gradually eliminated all distance through the sophistication of technological interventions, there still remain certain issues in teaching and learning that need to take into account the social and cultural differences among learning communities. As our research purports, for a support system to flexible and effective, it needs to integrate the parameters of cultural sensitivity as well as the social disparities that students increasingly present. In global audiences and national education systems that are called to incorporate transient conditions and populations (e.g. refugee flows), the examples that come from universities from around the world might prove to be essential in designing and implementing support systems.

According to the example of Great Britain (Arnold, 2004), the establishment of flexible learning, which tends to replace distance learning, requires well-designed academic support systems, hybrid and personalized as far as feasible, to create a growing Virtual Environment Learning, through which an extended range of support services can be provided. This would require a shift in education policies from the traditional British regimes and the integration of innovative



elements into a single set of educational and support mechanisms (Arnold, 2004; p.4). This directly addresses the issue of a wider educational policy that frames an open university and the need to harmonize support systems with the historical and cultural evolution of distance learning in the respective country of application. For example, the use of local means of communication and social networking should be studied before the design of support systems, so that it actually serves the participant needs in a way that is neither costly nor intimidating. Such an example is presented in the Brown and Mbatia (2015) survey, which notes that various distance learning institutions in Africa have been using SMS on mobile phones since the early 2000s as a simple but a very powerful tool, to communicate easily and on time with large groups of students or even individuals. SMSs have now been fully integrated into most of the learning management systems at the distance learning institutions in Africa.

Another factor is the symbolic meaning that students invest in the role of face-to-face communication and the expertise of the teacher, which greatly depend on the cultural context and educational culture of each institution. India's Open University presents its own approach to support for students, which gives importance to live support in specialized centres (Dimri, 2015). On a similar note, the Hellenic Open university places special emphasis on Student Support Centres, where students come in contact with their academic advisors but also receive administrative and academic assistance. Another example comes from the University of UNISA (N. Africa), where students have access to the online library, academic and administrative services while operating specialized departments, to enhance student learning, such as Counselling Office, University Office, Training Centres through the Student Support Department, Learning Centres, Financial Assistance Office and Library.

### **Closing Remarks: Three-level support for a sustainable future**

The need for support is highlighted by the different examples that emphasize the importance of the educational and cultural context for the additional effective enhancement of students' skills and participation, making it clear that there are many available tools and approaches to establish support mechanisms at a distance learning level. As Tait (in O'Donnell et al., 2006; p.10) underlines, "there can be no universal plan for student support systems that can be transferred from one institution to the other".

Engaging with the intricate character of support services on the micro-, meso- and macro-levels are the only ways to keep in contact with student needs, to continually enhance their technical, learning and social skills and to keep up with technological and societal changes that usually move much faster than education can afford to notice.

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### **About the Research Project**

Research project entitled “Academic support system for students of tertiary open and distance education” (PENER EAP 2016). Academic Director: Professor: Prof. Antonis Lionarakis. Research team: Aggeli Athanasia, Apostolidou Anna, Hartofylaka Antonia-Maria, Ioakimidou Vasiliki, Ligoutsikou Efi, Manousou Evangelia, Niari Maria, Papadimitriou Sofia, Sfakiotakis Kyriaki, Siakas Spyridon, Stamati Marianna, Stavropoulos Ilias, Tzilou Georgia, Verikios Vassilios. The present paper is a product of team work in collecting and reviewing the literature.

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## IHE DELFT'S DIGITAL EDUCATION TRANSFORMATION

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### Introduction

IHE Delft Institute for Water Education (<https://www.un-ihe.org>) is the largest international graduate water education facility in the world, having provided graduate education to more than 15,000 water professionals from over 162 countries, since its creation in 1957. The Institute is based in Delft, The Netherlands, offering fully accredited MSc degrees, PhD degrees in collaboration with partner universities, summer courses and short tailor-made trainings in specific topics. Online education products are also part of the Institution's educational portfolio, namely accredited online courses that mostly originate from the MSc programmes, a Graduate Professional Diploma Programme (GPDP) and an OpenCourseWare (OCW) platform with free open educational resources.

The pedagogical model is based on active learning, engaging learners in real world problems. IHE Delft provides a highly contextual learning experience, contributing to the development of essential skills to analyse and solve global water challenges. The Institution promotes critical thinking, preparing learners for trans-disciplinary (involving non-academic stakeholders) challenges associated with the complex water issues in the real world. Studying at IHE Delft is considered a life-changing experience for its learners by exposing them to an intercultural environment, characterized by plurality and diversity of ideas, experiences and disciplines. The implementation of the programmes is characterized by a high degree of transparency, openness, flexibility and inclusiveness (IHE Delft, 2018).

Part of IHE Delft's mission is to contribute to the education and training of professionals. Embracing the opportunities of digital technologies, IHE Delft intends to expand its online efforts, making education more flexible and accessible to learners worldwide. In this way, the institution is undergoing an internal reflection, analysing needs, implementing processes and exploring possibilities to improve education and enrich its portfolio with the use of digital technologies. We use the term *transformation* in our title as it reassembles an organizational shift (Nwankpa & Roumani, 2016), where for instance, collecting and understanding data is critical to continuously improve the quality of our working processes, educational practices and products.

In this paper we present our online education products, a reflection on the development of Massive Open Online Courses (MOOCs) as an upcoming new product and where it stands in

our offering, the implementation of an online course development process to improve quality, and finally a reflection about the future of education at IHE Delft.

## **Online Education Products**

### ***Accredited Online Courses***

IHE Delft offers accredited online courses (<https://www.un-ihe.org/online-courses>) for professionals in the water sector who hold a Bachelor Degree in a relevant field of study, allowing our learners to study part-time, without interrupting a day-time career. A workload of 140 hours is distributed throughout 4 months, requiring a time investment of approximately 8 hours per week to complete the learning activities and study the educational resources. In these courses learners have the opportunity to interact with fellow participants, while guided by a Module Coordinator (content expert) who gives support and personal feedback.

Several new courses are under development, to be offered as single courses and/or part of new GPDP.

### ***Graduate Professional Diploma Programme (GPDP)***

The online GPDP (<https://www.un-ihe.org/graduate-professional-diploma-programme>) in Sanitation and Sanitary Engineering consists of a sequence of four or five accredited online courses, and was created for learners who wish to specialize professionally in the field, without having to commit to an MSc programme. In order to obtain a diploma, learners need to reach a minimum of 20 credits (ECTS), which equals a workload of 560 hours, to complete in 1.5 (minimum) to 4.5 (maximum) years. Personalization is an added value of our GPDP, since the curriculum is selected based on the learners' needs – each learner has a personal study plan, designed in collaboration with a study advisor.

Because of the success of this flexible and personalized programme, new GPDPs are being developed to be offered in the next academic year.

### ***OpenCourseWare (OCW)***

The main objective of IHE Delft's OpenCourseWare (<https://ocw.un-ihe.org>) is to contribute towards lifelong learning and fulfilment of our mission regarding knowledge sharing with the international practitioner and scientific community, and project partners. The Institute is committed to help solving the world's water crisis by educating the water leaders of the future, mainly from developing and transition countries. The demand for water education by far exceeds the number of professionals that IHE Delft can train and OCW helps to bridge this gap, allowing professionals and students to access open educational materials, in a format that is designed for self-study.

Currently, IHE Delft has 18 courses available as OCW and is planning to gradually expand its volume over the coming years. Typically, these courses include: lecture notes, lecture presentations (PowerPoint), video-lectures and examples of exercises, tools, models and/or public domain software.

By using a Creative Commons license (CC-BY-NC), partner institutes, educators and the general public have the opportunity to use, re-use, and/or redistribute these open resources for non-commercial purposes. Consequently, these educational materials are benefiting a much larger audience and as such, increasing substantially their impact worldwide. This licence is chosen to further optimise the use of course materials and to encourage educators around the world to make use of these open resources.

### **Massive Open Online Courses (MOOCs)**

The status report on “MOOC Strategies of European Institutions”, published by the European Association of Distance Teaching Universities (EADTU), indicates that offering flexible learning opportunities and increasing institutional visibility are the main objectives for Higher Education Institutions (HEIs) offering MOOCs (Jansen & Konings, 2017).

IHE Delft's main goals regarding open education is to reach a worldwide audience and to have high impact in developing and transition countries. While increasing institutional visibility would be a valuable addition, we believe that this goal is highly dependent on where MOOCs are offered. In other words, high visibility is easier achieved when MOOCs are placed in one of the big providers, namely Coursera, edX or FutureLearn. Taking this into account, IHE Delft realizes that in order to offer MOOCs, two distinct scenarios have to be explored before taking this important next step:

- The scenario in which we publish our MOOCs on our own website and develop them on our own learning management system (Moodle), building on internal expertise. This would require a lower initial investment, although our courses would be limited to our own network.
- The scenario in which we offer our MOOCs on a well-known platform with millions of users such as edX or FutureLearn. This would require a higher initial investment (paying the provider's fee), with the advantage of reaching a much broader audience and receiving course development and production support.

IHE Delft is expected to launch its first MOOCs in 2018. Whatever the scenario, offering MOOCs will definitely have an impact on our existing offering. Looking at MOOCs as a new product, we can see that it fits between our accredited online courses and our OpenCourseWare initiative, since they'll be released with an open license but at the same time allow certification for a certain fee (Table 1).

Table 2: Summary and main characteristics of IHE Delft's existing online products, including the upcoming MOOCs

	Graduate Professional Diploma Programme (GPDP)	Accredited Online Courses (MSc level)	MOOC	OCW
Admission requirements	Yes (BSc)	Yes (BSc)	No	No

Workload	560 hours 1.5 – 4.5 years (combination of 4-5 accredited online courses)	8 hours/week 4 months	4 – 6 hours/week 1 – 2 months	Flexible
Pricing	Tuition fee	Tuition fee	Open (small fee for the certificate)	Open

## Course Development Process

At IHE Delft, Online Education is coordinated by the Education Bureau, a process management unit responsible for organising the educational programmes and for coordinating the processes of innovation in education and quality management. Implementing a course development process is ongoing, in collaboration with the Information and Technology unit. This process holds 4 stages and is expected to last approximately 10 months, from starting the project to creating the course, delivering and evaluating it (Table 2).

Table 2: Course development process with 4 stages and represented as a timeline

Month	1	2	3	4	5	6	7	8	9	10
Stage	Envision		Design & Create			Deliver		Evaluate		

Although we represent it as a continuum timeline, course development is executed as an iterative process, especially in the *Design & Create* stage, where course content is designed, created and tested before moving into full production. The ending *Evaluation* stage feeds back in order to improve any of the previous stages of the process. The following topics describe the main activities in each stage:

- *Envision* – a shared vision is established between the course team, who sets roles and responsibilities, project deadlines, describes the course and defines the main learning objectives to meet the target audience's needs.
- *Design & Create* – a course design is produced in order to make learning objectives, assessment, learning activities and resources aligned and explicit. After a course topic/unit is designed, created and tested, full production takes place. A final check is done before the course is ready to launch.
- *Deliver* – a trained online tutor delivers the course by providing guidance, feedback and support, anticipating and solving problems, facilitating participation and motivating learners throughout the course.
- *Evaluate* – feedback from learners is collected using surveys and learning analytics are used to produce a report that will lead to a list of possible actions and/or improvements for the next run of the course.

An e-Learning expert from the Education Bureau is assigned to execute the process with the course teams, facilitating several workshops, providing guidance and support in the different stages. In order to provide a more efficient support, a number of trainings is offered periodically related to course design, content creation, course implementation in the learning management system and an online tutoring course. This approach not only allows us to offer a more consistent support, but also to promote sharing experiences between different course teams.



## **Future Challenges at IHE Delft**

IHE Delft is a campus based institution with a history of online education efforts, initiated by highly motivated academic staff. Several initiatives are ongoing and new products are being considered that will definitely enrich our portfolio, allow us to reach a broader audience and at the same time contribute to the improvement of our educational practices. At a pedagogical level our academic staff develops courses based on the university teaching qualification (UTQ) guidelines, aligning topic structure, learning objectives and formalizing assessment. Offering more online education and improving it is seen as a natural next step.

Our short term plan is to widely implement the course development process, contributing to increase the quality of our support and ultimately the quality of the educational products that we offer. We believe that a well-established process will allow us to optimize the development of online courses and contribute to its consistency. Although this implementation has already started, time is needed to consolidate before it's seen as a standard process in the Institution.

Another upcoming challenge is to start offering MOOCs. At the moment, we have several in the pipeline that involve multiple partners, which adds more complexity. The new course development process will definitely be useful in these upcoming projects, where straightforward guidelines and effective project management are required to keep the development on track.

Regarding MOOCs, we expect a natural growth of this product in the coming years, since it fits our mission to offer flexible and open education to a worldwide audience. Hence another interesting development would be to use the same strategy with MOOCs, as used when combining several accredited online courses at IHE Delft to offer a GPDP. This combination of MOOCs could develop to flexible micro-credential programmes (Cabral, Jorge, & van Valkenburg, 2017), and perhaps inverted admissions into IHE Delft's campus Master's programmes in the future.

OCW is another initiative we want to see growing, and we expect MOOCs to have a positive impact on this matter. Although we still see some resistance to openly share our courses, it's important to motivate a change towards a culture of sharing to avoid that it becomes a barrier to OCW. Once this culture of sharing course materials is incorporated within the IHE Delft staff members' and partners' routine, and based on the lessons learned up-to-now, we believe that it will be possible to scale-up the number of open educational resources made available in OCW faster in the coming years.

Another challenge is to make IHE Delft's MSc programmes on campus more flexible. The programmes consist of 14 sequential Modules, each running for a period of 3 weeks. The workload is intensive, consisting of lectures (including guest lectures) and practical activities. A blended learning design would be a viable alternative, combining best practices in both online and face-to face methods (Adams Becker et al., 2017). This approach could make the programme more flexible, enrich the learners' experience and allow lecturers and learners to make better use of contact time in a more meaningful way.

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## **“EDX INSIGHTS” METRICS FROM A SOCIO-CONSTRUCTIVIST PEDAGOGICAL PERSPECTIVE**

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### **Abstract**

Understanding learning analytics from a socio-constructivist pedagogical perspective implies the design and use of learning analytics to inform decision-making, so teachers, as relevant stakeholders, can create richer educational experiences. We focus on the learning analytics module facilitated by OpenEdX and implemented, in an early stage yet, by two MOOC providers: Thai MOOC and UNED MOOC. Using the Community of Inquiry model, we explore the type of data that *EdX Insights* provides for analysing each of the presences included in the model. Finally, we conclude with a pedagogical discussion about learning analytics.

### **Introduction**

Learning analytics has been defined as “the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs” (LAK, 2011). This concept has been included as a development in technology in the NMC Horizon Report (Higher Education Edition) in years 2012, 2013, 2014 and 2016 (Adams Becker, Cummins, Davis, Freeman, Hall Giesinger, & Ananthanarayanan, 2017). In the 2017 Horizon Report, learning analytics is conceived as the foundation for facilitating assessment of learning, within what the report identifies as the mid-term trend “growing focus on measuring learning” (p.14).

The goal, in any case, should be the improvement of student learning. Domínguez, Álvarez, and Gil-Jaurena (2016) have identified two major approaches to the implementation of learning analytics:

- A maximalist approach that holds a determinist model of human action and proposes to measure any activity related to learning, which is facilitated by big data. Privacy and security issues derive from this approach that tries to collect as much data as possible. The assumption is that the analysis of data obtained in learning activities is a key for unlocking the “black box” of human mind, improving educational processes and making learning more efficient (Cuban, 2015; Westervelt, 2015).
- A different approach supports the study of learning analytics to better understand students’ performance in digital environments, but assumes that big data cannot give

direct answer to relevant questions for improving learning. Using Justin Reich’s (2015) words, “we have terabytes of data about what students click but little understanding about what changes in their heads” (p.34).

In this paper we want to explore the topic of learning analytics from a critical pedagogical perspective, that pursues a better understanding of learners’ performance in an attempt to develop a pedagogical knowledge derived from data facilitated by technological tools that can lead to making educational decisions regarding instructional design, management of students support services, etc. As stated in ECAR (2015), “analytics without action is merely reporting; interventions based on analytics are needed to improve student outcomes” (p.3). The collection and analysis of relevant data from a pedagogical perspective is the approach we defend at this stage, which permits to go beyond deterministic models and analyses big data within a broader set of information about learners.

Our focus will be on MOOCs (massive online open courses), as an online educational modality introduced in our respective countries and institutions. Specifically, Thai MOOCs and UNED MOOCs.

## **Pedagogical framework**

### ***Socio-constructivism learning theory***

Among different approaches to learning, we adhere to constructivism. Its central idea is that human knowledge is constructed. Learners build new knowledge upon the foundation of previous learning. The construction of knowledge takes place within the socio-cultural context in which the individual acts (IGI Global, 2017). This approach implies:

- An active role of the learner in the process of learning.
- The importance of interaction with the environment.
- The importance of collaboration.
- The role of teachers as creators of rich learning experiences.

In online environments, the development of high order cognitive skills (Anderson & Krathwohl, 2001) and the development of soft skills (Gil-Jaurena, 2017) under this socio-constructivist approach implies that teachers have to design and create rich interaction environments using technological tools that can support better learning experiences. Learning analytics, in this regard, can be considered as a tool that, used by teachers, can lead them to better know learners’ behaviour and interaction patterns in order to improve their teaching.

### ***The Community of Inquiry model***

The Community of Inquiry model (CoI), also based on socio-constructivism, is a model that has been widely used in online education. An educational community of inquiry is a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding (The Community of Inquiry, 2017). Thus, an online higher education course, a MOOC, etc. can be considered communities of inquiry.

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The Community of Inquiry conceptual framework represents a process of creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements: social, cognitive and teaching presence (The Community of Inquiry, 2017), as shown in Figure 1.

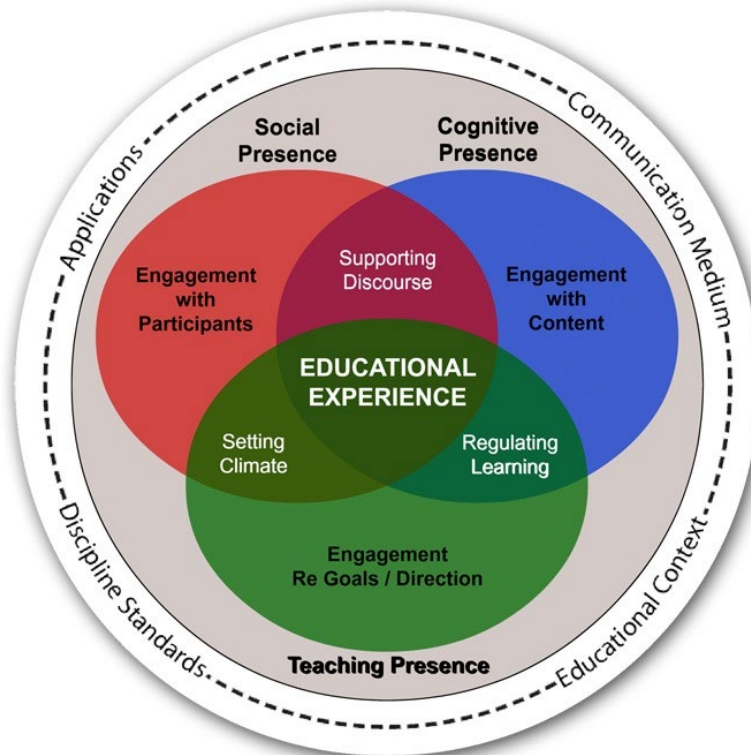


Figure 1. The Community of Inquiry model

(source: <http://www.thecommunityofinquiry.org/content/images/diagram.coi.jpg>)

- Social presence: the ability of learners to project their personal characteristics into the community of inquiry, thereby presenting themselves as ‘real people.’ It refers to interaction with peers.
- Cognitive presence: the extent to which the participants are able to construct meaning through sustained communication. It refers to interaction with content.
- Teaching presence: the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes. It refers to interaction with the teachers and/or their directions.

Any educational community can be characterized according to this model. For instance, distance education courses have relied, traditionally, in strong cognitive presence and teaching presence (in the sense of design and structure of the course, not necessarily direct interaction with the teacher). Connectivist MOOCS (cMOOCs), as another way of providing education, have relied on a strong social presence (connection with other learners) and less teaching presence (less structure and previous course design). xMOOCs, on the other hand, resemble more to traditional education.

It is important for teachers, in order to create rich educational experiences, to understand which type of interactions they are promoting and for which purposes. In traditional distance education, the existence of an increasing number of technological tools can support the potential of social presence, thus promoting collaborative learning and new ways of interaction in distributed learning systems.

### Learning analytics within a CoI pedagogical framework

Learning analytics is based on collecting information about learner’s behaviour and performance in a learning experience, course or environment. As shown in Figure 2, there are a series of relevant questions that stakeholders need to ask before accomplishing the use of learning analytics. Teachers are key agents to reply to what, why, how and who can collect, analyse or use the information.

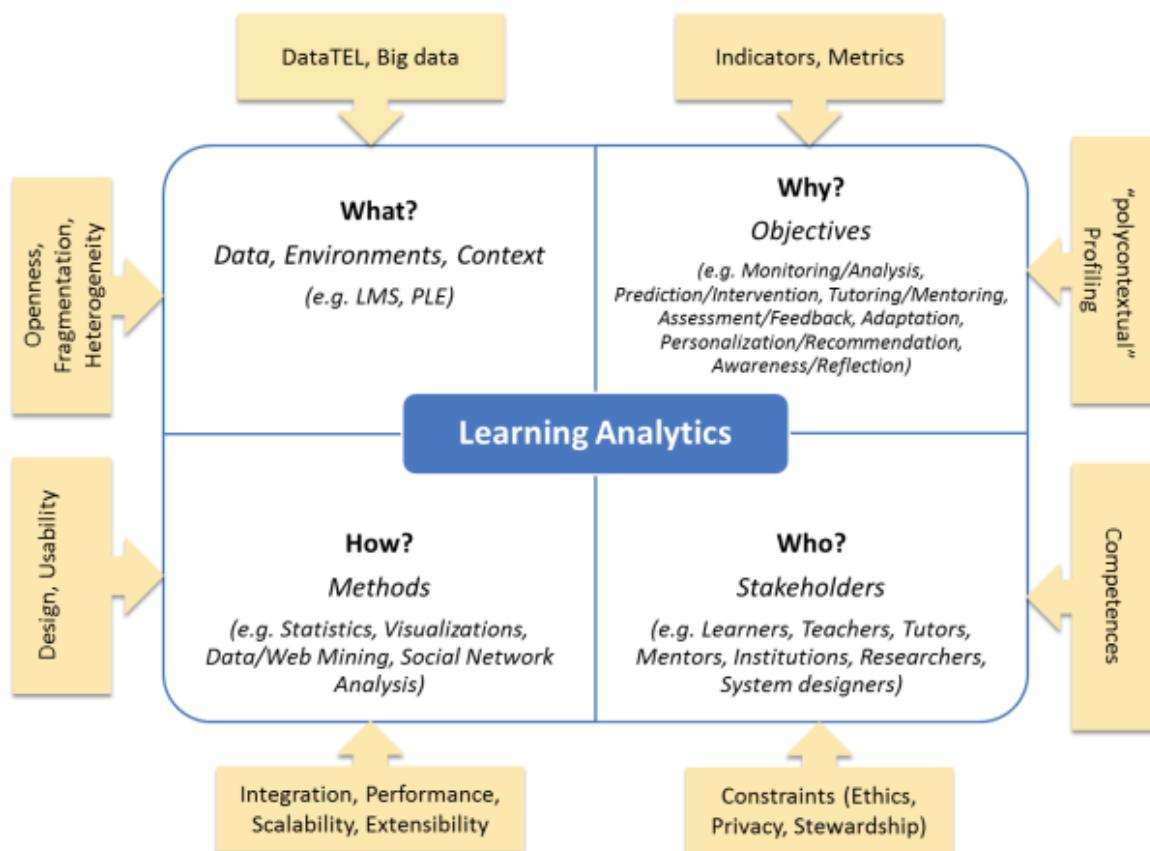


Figure 2. A reference model for learning analytics  
(source: <https://elead.campussource.de/archive/10/4035/dippArticle-1.png>)

Based on the CoI model and thus on a socio-constructivist approach to learning, it is important to collect and analyse information related to the interactions learners get involved in during the learning process.

In our study, we have focused on MOOCs as a learning experience and, particularly, in two MOOC providers that use the same learning management system, OpenEdX. We have selected the case of Thai MOOCs (a national programme developed in Thailand) and UNED MOOCs (an institutional programme developed in the Spanish National Distance Education University)

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to analyses the implementation of learning analytics from a pedagogical perspective. Given that these two MOOC providers are in their early stages in the use of EdX Insights (the OpenEdX LA module), as a first step we have focused on the type of data that this tool provides. It is not possible, at this moment, to analyses; current data from either Thai MOOC or UNED MOOC.

“EdX Insights provides the course team members with data about learner activity, background, and performance throughout the course. Using EdX Insights can help you monitor how learners are doing, and validate the choices you made in designing your course. It can also help you re-evaluate choices and inform efforts to improve your course and the experience of your learners” (EdX, 2017). This module provides data in the following domains:

- Individual Course Enrolment Metrics;
- Enrolment Activity;
- Enrolment Geography;
- Enrolment Demographics;
- Engagement with Course Content;
- Engagement with Course Videos;
- Performance: Graded Content Submissions;
- Performance: Ungraded Problem Submissions.

When compared to other learning management systems (LMS) used in online education (such as Moodle, dotLRN, etc.), the new information we can find in OpenEdX is “engagement with course content” and “engagement with course videos”. All the other data were, somehow, present also in other LMS. Engagement is, as stated before, a measure of the interaction with the course, thus these data provide input for analysing the CoI presences in the MOOCs (Table 1).

Table 1: Engagement in “EdX Insights” in relation to the Community of Inquiry model

“EdX Insight” domain	Specific data about individual activity	Type of presence in the CoI model
Engagement with course content	Watched a video last week	Cognitive presence
Engagement with course content	Tried a problem last week	Teaching presence
Engagement with course content	Participated in discussions last week	Social presence and / or Teaching presence
Engagement with course videos	Replayed segments	Cognitive presence

If we consider the specific data that EdX Insights collects in each engagement measure in relation to individual learners’ activity, we can state that it permits to analyses, along with other data:

- The cognitive presence: as direct interaction with the course content, that in the MOOCs is primarily video based.

- The teaching presence: as the interaction with the course structure and activities designed by the teacher (problems, tests, etc.), but not directly with the teacher. If the participation in discussions is an assignment in the course, it is a measure of the teaching presence, along with social presence.
- The social presence: as the participation in the forums where peers can interact.

From a socio-constructivist approach to learning, the data collected by this LMS used in the MOOCs shows a quite traditional educational model, based on content (video), structure of the course and a not so important social learning experience. MOOCs (or, more accurately, xMOOCs), not necessarily take advantage of the potential of social presence.

## **Discussion and conclusions**

Technologies permit access to information and data not available before; when course content is embedded in the LMS, information about the interaction and engagement of learners with the course content is one of the measures we can access. MOOCs, unlike traditional distance education courses (where the content, usually a textbook, is not in the LMS in a traceable format), are self-contained, so the interaction with content, assignments, peers, etc. can be more easily measured and analysed. Learning analytics can then provide input for understanding the learning process and, consequently, improve the courses. But we cannot forget the limitations that, when we are blind and overwhelmed by data, can lead us to biased conclusions about learning. We would like to highlight the following due to their pedagogical relevance:

- Not all relevant data can be collected automatically from the LMS.
  - The collected data does not provide qualitative information; for instance, about participation in discussions, the system can inform about number of interactions, networks, etc. but not about the content of the interaction.
  - Other information has to be collected by other means: asked to learners by survey, satisfaction questionnaire, etc.
- Data can be incomplete (not all learning happens in the LMS). What about interactions with content or peers that does not happen within the LMS? They are part of the learning experience, but are not traceable by the LMS system. The use of standards such as those by IMS Global can help to overcome this limitation and integrate different learning environments.

As a conclusion, we would like to stress the importance of working collaboratively between teachers, learners, IT specialists and other stakeholders both in the development of technological tools that can support the teaching and learning processes, and in the analysis of the collected information about them. Particularly, teachers are a key agent and they should receive understandable data about their courses. In a survey study undertaken by Gil-Jaurena and Domínguez (2018) among teachers at UNED, they found that teachers use learning analytics in their online courses (54.5%) and in the MOOCs (59.1%); at the same time, they demand more technological tools, learning analytics among them. The perspective of the Thai MOOC project with the implementation of Thai MOOC Insights (<https://insights.thaimooc.org>) is similar: empowering teachers to improve their courses thanks



to data. To make a proper use of the already available learning analytics and of those that will be available in the future, teachers and institutions need to be aware of the underpinning learning theories that lay under the technologies, and of the pedagogical implications.

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## TEACHING IN CONTEXT: INTEGRATING MATHEMATICAL THINKING AND PERSONAL DEVELOPMENT PLANNING INTO THE CURRICULUM FOR PART-TIME, DISTANCE-LEARNING ENGINEERING STUDENTS

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### Abstract

This paper describes changes to the way mathematics is taught to engineering students at The Open University, moving away from *service teaching* via generic mathematics modules to incorporating mathematics teaching into the core engineering curriculum. Mathematics is taught in the context of engineering with the aim of reducing the emphasis on derivations and mathematical proofs and putting greater emphasis on understanding basic concepts and being able to create useful models. Mathematical methods are taught and practised, then extended and applied to different engineering contexts as students' progress through modules, in order to develop students' mathematical thinking and build confidence. Professional development planning has also been embedded into engineering teaching for improved context and relevance and a more integrated approach to assessment has been taken across the whole qualification.

### Introduction

The Open University (OU), based in Milton Keynes with six national and regional centres across England, Scotland, Wales and Northern Ireland, is one of the largest universities in the UK with over 170,000 registered students. This total includes approximately 4500 students currently studying towards an undergraduate Bachelor of Engineering (BEng (Hons)), Bachelor of Engineering Top-up (BEng (Hons)), Master of Engineering (MEng), or Engineering Foundation Degree/Diploma of HE (FDEng/DipHE).

The OU has an open access policy and, with very few exceptions, there are no formal academic entry requirements. Some students on the engineering programme join with no previous educational qualifications (PEQs), though often with extensive practical vocational experience, whilst others may bring transferred credit from Higher National Certificate or Diploma qualifications. The majority of our engineering students are in full-time engineering-related employment.

As a result of higher education funding changes for England in 2012, the OU changed its student registrations from a module-based to a qualification-based system to enable access to loans for part-time study. This change resulted in more prescriptive and structured routes through the engineering degrees as well as simpler identification of students registered for particular

qualifications. This enabled the performance of students on individual modules making up the qualifications to be interrogated more easily at a qualification level and problems identified. The changes were reported by Organ and Morris (2012).

We identified that engineering students were performing poorly on two, 30 CATS, compulsory mathematics modules and consequently failing to complete their first year (equivalent full-time) of study successfully. Anecdotal evidence and feedback from students suggested that engineering students would benefit from greater connections between mathematics principles and relevant engineering topics and techniques.

Following an evidence-based approach we proposed a restructuring of the engineering qualifications to incorporate mathematics teaching in an engineering context. The new structures incorporate revised study patterns allowing students to pace their studies more effectively alongside their work and family commitments. Teaching is delivered primarily through a mixture of print and online media distance learning with some face-to-face or online group tutorials and laboratory based residential schools. Students are supported in their studies by Associate Lecturers who typically work with groups of 20 students and provide individual support alongside the tutorial programme. The curriculum has been designed to satisfy the academic requirements of the United Kingdom's Engineering Council's professional registration framework (2014).

Mathematics skills, personal and professional development planning, practical laboratory based residential schools, and wider skills are all integrated into broader modules that provide context and relevance to students while they are studying engineering topics. We have also taken an integrated approach to assessment, developing an assessment strategy for each stage of the qualification rather than on a module-by-module basis.

## **Curriculum changes**

### ***Mathematics in an engineering context***

The wide range of student abilities in mathematics skills and preparedness on entry to engineering degrees has been recognised as problematic for a long time (Mustoe, 2002; Cardella, 2008; Alpers et al., 2013). The problem is exacerbated at the Open University as students come from a wide range of educational backgrounds and may not have studied mathematics formally for many years; many students also exhibit low confidence in dealing with mathematics. Approaches to help students on entry to conventional HEIs (Perkin & Bamforth, 2011), such as additional lectures or drop-in support sessions, are impractical in a distance-learning setting. We know that the majority of our engineering students are in full-time employment and frequently combine study with work and family commitments and have finite time for study. Strategies that give students additional workload to strengthen their mathematical skills are unlikely to succeed in the context of the OU.

From October 2012 to February 2016 our engineering students were required to study 2 x 30 CATS modules of mathematics at FHEQ (Framework for Higher Education Qualifications)

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level 4 (SCQF – Scottish Credit and Qualifications Framework level 7) from a choice of 3 x 30 CATS modules. The two modules included a compulsory 30 CATS module in Essential Mathematics. The second mathematics module choice would either further support open access students requiring more introductory practice in mathematics or alternatively provide a more challenging mathematics module for those students who were intending to study further engineering mathematics at a higher level. The compulsory Essential Mathematics module was designed primarily to satisfy the requirements of the mathematics teaching programme and students on mathematics qualifications and was available to study either from October to June or from February to September each year. The proportion of BEng(Hons) students gaining credit on Essential Mathematics in the period from October 2012 to February 2016 varied from 34 to 51 percent.

Although there was an upward trend in the percentage of BEng (Hons) students gaining credit over the period it was, nevertheless, at an unacceptably low level and having a detrimental impact on progression, as students were required to either re-sit the end of module examination or retake the module at the next opportunity. Many students failed again on re-sitting the examination, were unable to progress, and were lost from the programme.

From October 2016 students no longer study mathematics modules in isolation as we have integrated mathematics teaching into the core engineering modules, ensuring that it is taught in context.

Much of the base content has been adapted from the existing mathematics modules but the emphasis has been on *mathematical thinking* – that is, understanding basic concepts, creating useful models and recognising reasonable solutions to engineering problems. We also encourage students to experiment and to interrogate units to aid their understanding of relationships between physical quantities and check their results. We are encouraging students to define a problem and then to identify what information they would need to solve it, which we hope will discourage students from learning mathematics by rote and consequently being unable to apply it to unfamiliar situations. A *learning spiral* approach has been taken where engineering content places mathematics skills in context; these skills are taught, practised and applied, and are then revisited, extended and applied further as students' progress through the curriculum.

### ***Personal development planning (PDP) and skills development***

It cannot be assumed that on entry to The Open University students automatically have the skills required for successful study at degree level since approximately one-third enter the university with no *A level* (or equivalent) qualifications. Even those with conventional university entry qualifications frequently lack the skills required for distance-learning or have been away from formal education for many years.

We have incorporated PDP and professional skills into our engineering qualifications for many years to ensure our graduates are well prepared if they wish to apply for Incorporated of

Chartered Engineer status, and to enhance their employability. Our qualifications align with the requirements of the UK Standard for Professional Engineering Competence (UK-SPEC). Prior to 2012, students were required to study 2 x 15 CATS specialist PDP modules at level 4 and level 6. Student loan funding changes in England in 2012 necessitated combining learning content into larger credit modules and this provided the opportunity for us to integrate PDP into other engineering modules. PDP was integrated with technical content, engineering professions' case studies and compulsory practical engineering residential schools to produce 2 x 30 CATS modules – one at level 4 (SCQF level 7) and one at level 5 (SCQF level 8). PDP was continued into an individual engineering project module at level 6 (SCQF level 9).

We have subsequently taken the approach of integrating PDP and study skills into other core engineering modules, enabling key skills such as communication, presentation skills and report writing to be studied alongside relevant engineering concepts. Students maintain an online log of their learning activities which forms the basis of a portfolio of evidence which can be transferred between modules and used if they subsequently apply for chartered engineer status with a professional institution after graduation.

### **Study patterns**

Prior to October 2012 engineering students could study up to 120 CATS credits in an academic year, although the majority chose to limit their study to 60 CATS credits a year. However, the times at which different modules were available meant that approximately half of new entrants to the engineering programme were studying 2 x 30 CATS modules concurrently (from October to June) resulting in high intensity study, and then having a break until the following October. This study pattern meant that students often had conflicting assessment cut-off dates and were frequently unable to get their assignments submitted on time. Students adopting an alternative study pattern where they started their second module in February were more likely to be successful, but the study intensity was not evenly spread across the year.

We have now amended study patterns so that students study the first 2 x 30 CATS modules of their engineering qualification consecutively over a 12-month period, with the first module, Engineering: origins, methods, context (T192), studied from October to March and the second, Engineering: frameworks, analysis, production (T193), studied from April to September. Students would then go on to study a more mathematically intense 30 CATS module, Engineering: techniques, maths, applications (T194), from October to June in their second year of part-time study, completing stage 1 study with 30 CATS Engineering: professions, practice and skills I (T176) which incorporates a residential week of laboratory-based study. Our aim is to ensure that students do not have conflicting assessment dates, are able to concentrate on one module at a time at this early stage of study, and are able to utilise knowledge and skills acquired in the first module to successfully study the second module. Sequenced skills development plays an important role alongside knowledge attainment as students' progress through the modules.

A schematic of the modules studied at level 4 for the BEng (Hons) and MEng is given in Figure 1.

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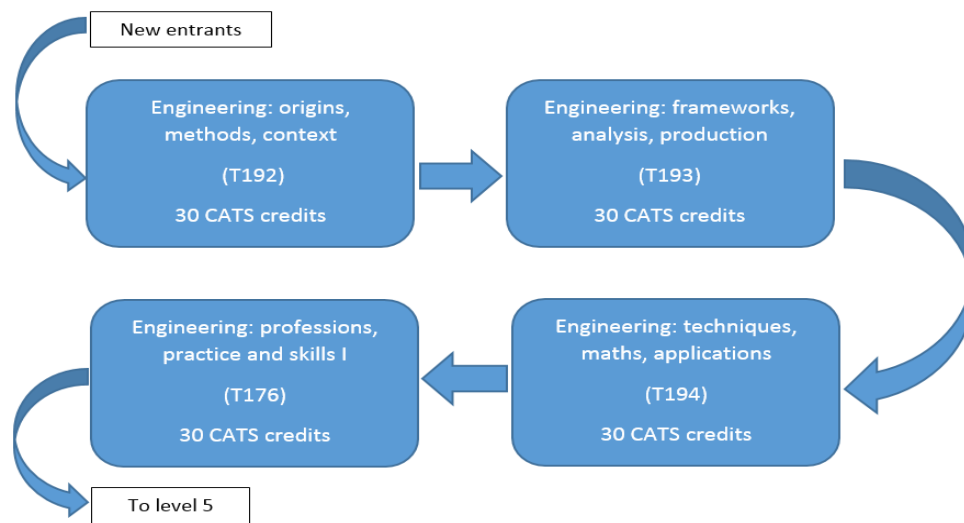


Figure 1. Schematic of study order for new entrants to OU engineering qualifications from October 2016

### Assessment

We have taken a qualification-based approach to assessment, ensuring that assessment tasks build in difficulty as students' progress through each module and build in type as they progress through the qualification stage. Students are required to complete formative activities which have been designed to feed into summative assessment at regular intervals and, if they complete these activities at the appropriate time, assignments should be straight-forward and not the last minute rush often experienced by part-time learners. Pacing of assessment activities in this way also benefits reflective skills development as adequate time remains close to an assessment deadline for students to review their work, complete self-assessment reflective activity, and finalise their assessment submission. Student self-assessment of intended learning outcomes attainment is also built in to assignments, ensuring good student engagement with the intended learning outcomes.

Students are continuously assessed through tutor-marked assignments (TMAs) and interactive computer-marked assignments (iCMAs) combined with end-of-module assignments and unseen examinations where appropriate.

Practice quizzes are incorporated into most weeks' study for the duration of the first three modules and the time taken to do them is accounted for in the overall study time. These quizzes enable students to have multiple attempts at particular mathematical problems, with feedback given for incorrect answers. More formal mathematical assessment at level 4 takes the form of iCMAs developed at the OU and outlined by Jordan (2014). Students are allowed 3 attempts at each question, with feedback for incorrect attempts suggesting where the student has made mistakes and referring them to appropriate module material as necessary. Each question has several *variants* ensuring that each student gets a different set of questions from their peers,

mitigating against plagiarism. Student can repeat the iCMAs as many times as they wish up to the cut-off date, emphasising their role in promoting learning rather than simply testing.

iCMAs and practice quizzes are combined with tutor-marked assignments to ensure that all the intended learning outcomes are assessed appropriately.

### **Initial results and student feedback**

At the time of writing, the first cohort of engineering students that entered the University in October 2016 has completed the first two modules, Engineering: origins, methods, context (T192) and Engineering: frameworks, analysis, production (T193) and is part way through study of Engineering: techniques, maths, applications (T194).

Analysis of this cohort show that 75% of students have completed and passed the first module (T192), with 91% of these progressing immediately to study the second module, T193, in April 2017. The pass rate for these students on T193 was 73% and of these 81% have progressed immediately to T194, in October 2017. Pass and progression rates of this order are very encouraging on open-access qualifications where students are often encountering distance learning for the first time. The pass rate for engineering students of 75% on T192 is significantly higher than that achieved by the previous entry module prior to October 2016, which varied from 65-68%. We will not be able to make meaningful comparisons with previous cohorts until all study at level 4 (SCQF level 7) has been completed, but we are confident that greater numbers of students will progress successfully to level 5 (SCQF level 8) and beyond.

Integration of mathematics teaching with engineering content has been welcomed by students as two quotations from a recent student survey illustrate

*I am particularly pleased with how the mathematical content is taught. It makes a lot more sense to develop maths alongside the core subjects. It helped me to understand how the maths is relevant and applied. I have previously studied pure maths in isolation, but did not enjoy it to the same extent. Using maths within an engineering context is a big improvement it helps to animate the subject.*

*I can happily say that I have learned more about maths and calculus in these last two months of studying than I have in about two years of school and 6th form.*

Another student, reflecting on their learning on the first two modules stated

*Having studied the T193 module as a follow-on from T192 you begin to realise that the journey is not just about the end qualification but the way it develops you as a person. It has been a tremendous effort to get to this stage but the time has flown by. The sense of achievement at the end is priceless.*



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Associate Lecturers (ALs) have also broadly welcomed the changes to the curriculum and a more formal consultation with ALs and evaluation of their experiences is planned. The comment below from an experienced AL is typical of the feedback we have received to date.

*I found the way the maths was taught was very good. Introducing new maths concepts in each chapter and in the context of the engineering topics helped the students to understand not just how to do it but also why they do it and how it applies to real situations. Feedback from my student group was mostly very positive about the maths and I found they had a better grasp early on of the basics.*

### **Conclusions and future plans**

The ethos and methodology applied to level 4 of the engineering qualifications will be continued as higher levels of the curriculum are redeveloped. Based on evidence to date, and our experience so far through the redesign of the engineering curriculum, we will continue to work towards qualifications that are more integrated in nature. Engineering context is key for part-time distance learners, particularly when they are already employed in a sector relating to their chosen academic discipline. However, we have taken care when choosing examples, case studies and images not to make assumptions about students' prior experience and to make the teaching material relevant to a diverse student group. The integration of mathematics teaching with core engineering content is proving more popular with students and their tutors, particularly at the early stages of the qualifications. We will also continue the integration of personal and professional development planning in the context of technical engineering content - all towards enhancing student academic success and employability skills.

Although it is too early to make any firm conclusions about the success of the reconfiguration of the undergraduate engineering curriculum at The Open University, we are encouraged by early indicators and the increased student retention rate on the first two modules of the revised qualifications. Feedback from students and Associate Lecturers has been positive and pass and progression rates have both improved since the introduction of the new modules. Further projects are in place to track the performance of students through the new modules as they progress through their qualification (this is not trivial, since students can pause or resume their studies, or switch between qualifications, at any point), to learn from the experiences of the ALs delivering the modules to students, and to gain a better understanding of the particular motivations and aspirations of our female students, for whom progression rates are currently lower than for men.

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## **ENHANCING TEACHERS' INTERCULTURAL CONFLICT MANAGEMENT COMPETENCES THROUGH DIGITAL GAME- BASED LEARNING: A PEDAGOGICAL FRAMEWORK**

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### **Summary**

With the recent immigration flows, diversity has become a structural characteristic of European societies. The growing proportion of students with a migrant background implies a series of challenges for the education systems in most member states: diversity leads to educational disparities between dominant cultural groups and immigrant students; also, discrimination and intercultural conflicts have become significant phenomena at school. Teacher education programs do not seem to adequately address those challenges. Hence, there is a growing need to prepare educators to effectively deal with diversity and to build bridges towards migrant communities. In the context of the ACCORD project (Erasmus+ programme), this paper proposes a pedagogical framework aiming to prepare teachers to take an active stand against intercultural conflicts. Through an open online course using scenario-based learning and game-based learning, teachers will develop competences in terms of intercultural literacy, inclusive education and conflict management. A preliminary study, based on national focus groups conducted in five European countries, allowed for confronting the pedagogical framework to teachers' views and practices. Results allowed for validating and refining the ACCORD competence areas, pedagogical approaches and digital tools.

### **Introduction**

Europe has recently experienced increased population flows, and immigration now constitutes the main factor of demographic growth (United Nations High Commissioner for Refugees, 2017). Consequently, ethnic, cultural and religious diversity has become a structural characteristic of European societies (European Commission, 2017). In this context, the education sector faces a growing proportion of students with a migration background. This implies a series of challenges at the level of the classroom, the school, and the whole education system. First, diversity leads to educational disparities between dominant cultural groups and immigrant students (Bishop, 2010). Furthermore, intolerance, discrimination and intercultural conflicts increase in schools; as a result, migrant students sometimes experience feelings of isolation or prejudice (Janta & Harte, 2016). Finally, some teachers lean towards developing negative attitudes towards students with diverse cultural backgrounds (Agirdag, Loobuyck, & van Houtte, 2012). Teacher education programs do not seem to adequately address those challenges (Katsarova, 2016). Hence, there is a growing need to prepare educators to effectively deal with diversity and to build bridges towards migrant communities. Indeed, when adequately

addressed, diversity constitutes a substantial opportunity for education: it may enhance rich learning processes by promoting intercultural interaction and peer-learning (European Commission, 2017).

In the context of the ACCORD project, this paper presents a pedagogical framework aiming to prepare teachers to take an active stand against intercultural conflicts. Through an open online course using Scenario-Based Learning (SBL) and Game-Based Learning (GBL), teachers will develop competences in terms of intercultural literacy, inclusive education and conflict management. A preliminary study, based on national focus groups conducted in five European countries, allowed for confronting the pedagogical framework to teachers' views and practices.

## **ACCORD Pedagogical framework**

The ACCORD project targets secondary school teachers. Indeed, students from secondary education tend to show a prominent and developed cultural personality, as well as conflictive attitudes towards teachers in comparison to primary classrooms (Oliver, 2016). The following subsections synthesise the competence areas, pedagogical approaches and digital tools selected for developing teachers' intercultural conflict management competences.

### ***Competence areas***

On the basis of relevant literature, we have identified three different competence areas, namely intercultural literacy, conflict management and inclusive education. Below we elaborate on each of those areas.

#### *Intercultural literacy*

This first area refers to the upstream competences required by teachers for understanding and addressing culturally diverse educational environments. Numerous terms and theories address intercultural abilities; we selected the concept of intercultural literacy, which is widely used in the field of education. It defines the "ability to interpret documents and artefacts from a range of cultural contexts, as well as to effectively communicate messages and interact constructively with interlocutors across different cultural contexts" (Dudeney, Hockly, & Pegrum, 2014). Heyward (2002) highlights the multidimensional aspect of the concept: "understandings, competencies, attitudes, language proficiencies, participation and identities which enable successful participation in cross-cultural setting" (p.10). By focusing on intercultural literacy, we aim to help teachers to better understand the world and its cultures, as well as to develop their ability to function and effectively interact in culturally diverse classroom contexts.

#### *Inclusive education*

It refers to the competences needed by teachers for applying methodologies oriented to an inclusive school, featured by intercultural interaction and positive approach towards conflicts. Inclusive education can be defined as "the inclusion and teaching of all children in formal or non-formal learning environments without regard to gender, physical, intellectual, social, emotional, linguistic, cultural, religious, or other characteristics" (UNESCO, 2015). When

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inclusive in nature, education has the potential to prevent conflicts, contribute to peace by reducing inequalities, and promoting tolerance (Kotite, 2012). In ACCORD, we relate inclusive education to several interconnected educational practices for learning how to live together (UNESCO, 2006), e.g., peace education, intercultural education, as well as proactive restorative practices, which prevent the emergence of conflicts through affective communication, social connection and community-building (Gregory, Clawson, Davis, & Gerewitz, 2016).

### *Conflict management*

This last area refers to the competences required for peacefully resolving conflicts when they occur. Conflict management practices include a wide range of strategies, such as communication, problem solving, dealing with emotion, understanding positions (Brett, 2001), as well as negotiation and mediation (Carnevale & Pruitt, 1992). As applied to education, the challenge for teachers is to channel conflicts into constructive responses (Kotite, 2012). In ACCORD, we consider conflicts as opportunities for stimulating relations and moving towards group cohesion.

Intercultural conflicts define the implicit or explicit emotional struggle or frustration between individuals from different cultures over perceived incompatible morals, values, norms, face concerns, goals, scarce resources, processes, and/or outcomes in a communication situation (Ting-Toomey & Chung, 2012). In order to help teachers to deal with such situations, the ACCORD training explores the different aspects and levels of intercultural clashes, as well as their impacts on the involved parts and on the overall classroom dynamics.

### ***Pedagogical approaches***

As explained below, ACCORD adopts two main pedagogical approaches, i.e., SBL and GBL.

#### *Scenario-based learning*

SBL is part of the situated learning approach (Lave & Wenger, 1991) embedded in the constructivist learning paradigm (Duffy & Jonnasen, 1991). Situated learning provides meaningful learning experiences by engaging students in authentic learning environments based on real world experiences (Brown, Collins, & Duguid, 1989). In such contexts, knowledge can be transformed into action competences. Erol, Jäger, Hold, Ott, Wilfried, and Sihna (2016) define SBL as the use of scenarios to support active learning. To the authors, scenarios constitute a starting point for students to immerse in a real-world problem and in a subsequent solution finding process. SBL has proved to support reflective practices in teachers' professional development (Naidu, Menon, Gunawardena, Lekamge, & Karunanayaka, 2005). Furthermore, its application to digital environments enables learners to find solutions to real-world problems (Mery & Blakiston, 2010). In the context of ACCORD, we design scenarios depicting intercultural classroom conflicts, which teachers will be able to solve by testing different dialogue patterns.

### *Game-based learning*

Various authors (e.g. McClarty et al., 2012; Rapeepisarn, Wong, Fung, & Khine, 2008) have demonstrated the potential of digital games for educational purposes. They promote learner-centred methodologies, by offering a learning path which adjusts to individuals' pace and performance: following a scaffolding system, games allow for personalized learning processes which adapt to different profiles, learning styles and level of skills (Gee, 2003). In the context of ACCORD, such self-paced learning processes are particularly suited for teachers, given their professional and time constraints.

In addition, digital games are interactive objects which react and give feedback; hence, they provide players with a real sense of agency over their actions (Gee, 2005). They also create meaningful learning experiences by simulating highly interactive scenarios where learners face real-world problems (Ulcsak & Williamson, 2011). This interactive quality seems adapted for the ACCORD training, which aims to reflect real-life intercultural conflict scenarios.

Games constitute virtual worlds featured by freedom and exploration (Gee, 2009): they allow for trying out different roles and identities. They present risk-free environments where learners can try out various options without suffering the consequences of failure in real life (Perrotta et al., 2013). Rather, failures are considered positive in games, as they enable to understand new patterns and progress towards a goal. In this context, failure naturally shapes the learning experience (McClarty et al., 2012). In the context of ACCORD, this quality would allow teachers for experiencing intercultural conflicts from different points of view, in safe and controlled settings.

### **Online environment and digital tools**

The ACCORD training programme is supported by an innovative digital platform. This will allow for reaching a large number of teachers, making the training available as a freely accessible tool, as well as rebating implementation costs. First, we design, implement and validate a MOOC course which includes a series of Open Educational Resources (OERs).

In addition, we use ENACT ([www.enactgame.eu](http://www.enactgame.eu)), a game platform which allows for developing skills through a role-play simulation using autonomous agents as virtual interlocutors (3D bots). An intelligent tutor provides a reliable analysis of players' intercultural conflict resolution competences. The game is organized into different scenarios, each one independent from the others, in which users play a different character and negotiate with various virtual agents. The conflict resolution model is based on the five styles of handling conflict, i.e., integrating, obliging, dominating, avoiding, and compromising (Rahim & Bonoma, 1979). Figure 1 shows some interface characteristics of the game.

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Figure 1. Screenshots of the ENACT game

## Methodology

Following a qualitative approach, we conducted focus groups in five European countries (Austria, Belgium, Germany, Italy and Spain), in order to collect secondary school teachers' perspectives and feedback on the ACCORD pedagogical framework (i.e., competence areas, pedagogical approaches and digital tools). Participants were carefully recruited, so to obtain a heterogeneous group of teachers from different levels and disciplines. In order to stimulate active discussion among participants and collect in-depth information, each focus group gathered a small number of people (between 5 and 12). In total, 69 secondary school teachers participated.

Following common guidelines, facilitators introduced participants to the ACCORD consortium, context, objectives, activities and pedagogical framework. Furthermore, they addressed the status of intercultural education at both European and local levels. Afterwards, participants were shown examples of typical intercultural classroom conflict scenarios, and exchanged their points of views. Finally, teachers expressed their perceptions on the ACCORD pedagogical framework, as well as their training needs in terms of inclusive education and intercultural conflict management.

## Findings

A systematic analysis of the focus group results across the different countries allowed for confronting the pedagogical framework to teachers' views and practices, as described below.

### **Teachers' perspectives on competence areas**

Teachers acknowledged the relevance of the ACCORD competence areas. Indeed, they generally feel unprepared to deal with intercultural concerns, to apply training methodologies which challenge discrimination and racism, as well as to solve related classroom conflicts.

In terms of intercultural literacy, teachers highlighted the importance of understanding the key-elements which characterise the cultures of their students (e.g., codes of conduct and manners, value systems and beliefs, religions and communicative conventions). Regarding inclusive education, teachers need to get familiar with practical strategies for creating a democratic classroom culture, e.g., participatory approaches involving students in decision-making and cross-cultural collaborative learning activities. As for conflict management, teachers find it critical to learn about the factors that contribute to the development of classroom conflicts (e.g.,

stereotypes and prejudices which create discrimination among students), as well as the steps and strategies for solving them (e.g., discussion circles for promoting students' expression, responsibility and reparation in case of damages).

### ***Teachers' perspectives on pedagogical approaches***

SBL was considered to be a relevant and innovative approach for teachers. To them, real-life scenarios constitute a powerful tool for reflecting on their teaching practices and sharing their insecurities in terms of intercultural conflicts. They also argued that scenarios allow for embodying theoretical concepts into real situations. Teachers highlighted the need to address more examples of real-life conflict situations, to share their own scenarios, and to address potential solutions for solving them.

The GBL approach was highly valued across the different countries: some teachers stated that “the use of games allows for a better understanding of intercultural concepts in a safe simulation application”; another teacher compared the GBL strategy to “a gym where to get hands-on experience on the dynamics of intercultural conflict”.

Besides SBL and GBL approaches, teachers expressed their need for collaboration with other educators. Indeed, they find it critical to debate and discuss around intercultural conflicts, as well as to share related experiences and good practices (e.g., testimonies). Collaboration would allow them for appraising teaching practices across Europe, and critically evaluating theirs. As expressed by a teacher, “we should create a team of teachers reflecting around intercultural topics, an online space where everyone can share their experiences and, most importantly, without being afraid of sharing missteps and mistakes”. Furthermore, teachers highlighted the importance of accessing practical learning resources (e.g., protocols related to mediation, negotiation and group management; lesson plans for inclusive educational practices; examples of classroom activities like role-plays and creative writing), and hands-on activities, so to become confident when facing classroom conflict situations.

### ***Teachers' perspectives on the online environment and digital tools***

With regards to digital tools, the MOOC was seen as a flexible solution which matches teachers' time constraints. Indeed, they expressed their need to set up their own pedagogical objectives, self-manage their learning time, as well as decide on the study location and freely access OERs. To teachers, the MOOC should also allow them for uploading and sharing their own materials and cases within the project community. As for the ENACT game platform, it was perceived by teachers as a “powerful tool to make real-life experiences visual, thanks to the use of e-characters”.

## **Conclusions**

This paper sets a pedagogical framework for enhancing teachers' competences in terms of intercultural conflict management in the context of inclusive education. On the basis of relevant literature, we identified competence areas, pedagogical approaches and digital tools. We



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confronted this framework to teachers' perspectives and practices, in the context of national focus groups conducted in five European countries. Results allowed for validating and refining the ACCORD competence areas, pedagogical approaches and digital tools.

The ACCORD pedagogical framework is composed of three competence areas, namely intercultural literacy, inclusive pedagogical approaches and conflict management. It is supported by two main pedagogical approaches (SBL and GBL) and mediated by a MOOC and the ENACT game platform.

This pedagogical framework will guide the design of the ACCORD training content, activities and digital tools. As future steps, this paper constitutes a solid basis for the elaboration of a complete competence model in the field of intercultural conflict management, as applied to today education contexts.

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## IDENTIFYING LEARNER TYPES IN DISTANCE TRAINING BY USING STUDY TIMES

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### **Background**

Distance learning research intensively investigates how to foster successful student learning (Rowe & Rafferty, 2013). One research focus is to explore the extent that learner characteristics and skills determine learning outcomes and to elaborate predictive models of performance (e.g., Akçapınar et al., 2015; Yukselturk & Bulut, 2007). Although these approaches often start with diagnostics of learner characteristics before learning (e.g., Yukselturk & Bulut, 2007), diagnostic methods applied while learning are becoming popular nowadays (e.g., Kinnebrew et al., 2013; Lile, 2011). Modern approaches use data mining and learning analytics to identify learners that have problems. These methods attempt to benefit from objective data that are provided by various types of log systems catching online traces (e.g., Akçapınar, 2015). Data mining methods might result in better online diagnostics and intervention methods when the mechanisms behind usage pattern are known. Hence, it is recommended to relate usage patterns to student characteristics to render them meaningful (Akçapınar, 2015).

The following study gained objective and subjective study time indicators and used them to identify groups of learners in a distance-training course. The groups were first compared in some characteristics that have already been shown to be empirically relevant for distance learning and that address motivational, affective, cognitive and skill aspects (i.e., domain-specific prior knowledge, intrinsic motivation, computer attitude, computer anxiety, and learning strategies). This step, which should show the extent that these correlates affect study time, could serve as a starting point for adequate interventions. Second, group differences in learning were explored to show the relevance of study time for learning. This step should show how study time is related to learning. Our investigation was conducted against the background of self-regulated learning (Rowe & Rafferty, 2013).

### ***Self-regulated learning, learning strategies and motivation***

“Self-regulation refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals” (Zimmerman, 2000; p.14). Bringing cognitive, metacognitive, motivational and behavioural skills into action and using them adequately are thought to be the core of competent learning (Wild & Schiefele, 1994). Accordingly, self-regulated learning is understood as a process that “involves students’ intentional efforts to manage and direct complex learning activities toward the successful completion of academic goals” (Rowe & Rafferty, 2013; p.590). Self-regulated learning was

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found to be significantly related to (academic) performance (e.g., Agustiani et al., 2016; Song et al., 2016) and is particularly considered a key component of successful distance learning because of its high demands on self-regulation skills to succeed (Rowe & Rafferty, 2013). Management skills, especially managing time and organizing learning effectively, were significant predictors of learning success (e.g., Tsai & Tsai, 2003; Yukselturk & Bulut, 2007).

Related to self-regulated learning, Lee (2013) discussed deep and surface learning approaches, characterized by motives and strategies. These approaches refer to usage patterns of learning strategies that learners show while performing specific learning tasks. In her study, she reported that deep learning correlated with higher performance in distance learning, whereas surface learning correlated negatively. She further discussed that surface learning is more likely guided by extrinsic motives while exerting minimal effort to pass a course, whereas deep learning is more likely guided by intrinsic motives and the desire to comprehend the material. Similar patterns of correlations between motives and performance have been found. For example, deep motives were found to correlate positively with performance, surface motives negatively (e.g., Akçapınar, 2015; Yurdugül & Menzi Çetin, 2015; Lee, 2013).

Overall, motivation to learn has been the focal correlate of learning success. Intrinsic motivation refers to performing a task, because it is inherently interesting or enjoyable. Extrinsic motivation pertains to performing a task, because it leads to a separable outcome (Ryan & Deci, 2000). Intrinsic motivation is connected to high-quality learning and to successful distance learning (Ryan & Deci, 2000, Yukselturk & Bulut, 2007). A higher level of intrinsic motivation might make learners invest more resources in learning and particularly process information more deeply, thus contributing to successfully passing tests (Lee, 2013; Yurdugül & Menzi Çetin, 2015).

### ***Prior knowledge, computer attitude, and computer anxiety***

The level of prior knowledge is known to predict school and academic performance and especially influences learning in various instructional settings (e.g., Hailikari et al., 2008; van Gog et al., 2005). In general, possessing prior knowledge is considered a desirable condition for learning (e.g., Chi, 2006). Learning succeeds best when new information can be connected to available knowledge from long-term memory (van Gog et al., 2005). Prior knowledge was shown to affect performance in various educational contexts. The more students knew, the more they gained when studying. In the context of complex learning environments, including distance learning scenarios, domain-specific prior knowledge is known to positively influence performance (e.g., Knestrick et al., 2016; Song et al., 2016; Stiller, in press). A higher level of prior knowledge was also found to correlate with higher levels of self-regulation skills (e.g., Chi, 2006; Hailikari et al., 2008).

The influence of computer attitude and computer anxiety on self-regulated learning has been reported in the literature. Attitudes are often defined as beliefs that are organized in topics. Hence, the computer as a self-experienced instrument for working and learning might be of interest in distance learning (Richter et al., 2010). Computer anxiety is considered a trait, which comprises both cognitive and affective components such as feelings of anxiety and worrisome

thoughts (Richter et al., 2010). Anxiety and attitude are assumed to have only a direct influence on self-efficacy, which then directly influences performance and course usage (e.g., Hauser et al., 2012). In this context, a negative attitude and a considerable level of computer anxiety might lead to a lower level of self-efficacy and thus to inadequate usage of learning strategies. Studies have indicated that adequate use of strategies correlate with positive attitudes and a lack of anxiety (e.g., Tsai & Tsai, 2003; Wong et al., 2012) and that negative attitudes correlate with worse performance (e.g., Stiller, in press).

### **Usage data of online learning environments, study time and learning**

Usage data of an online or distance learning environment can inform educators about learning and in particular about performance (Akçapınar et al., 2015; Kinnebrew et al., 2013; Lile, 2011). For example, usage patterns gained by log file analyses could be related to level of performance and surface and deep learning approaches (Akçapınar, 2015; Akçapınar et al., 2015). A less intensive usage reflected by low numbers of events (logins, posts etc.) and short event times (e.g., total time spent in the online environment) correlated with surface learning and low performance, and an opposite pattern of intensive usage correlated with deep learning and high performance (Akçapınar, 2015; Akçapınar et al., 2015). Among the usage pattern variables, various time measures were indicative of learning approaches and level of performance (Akçapınar, 2015; Akçapınar et al., 2015), suggesting that time spent on the learning task is important for successful online learning apart from frequency of participation (e.g., Akçapınar, 2015).

### **Research objectives and expectations**

Groups of students should be profiled based on their study periods in a distance training. Therefore, students were first clustered according to their module study times into fast and slow learners. First, the clusters were compared on the learner characteristics of learning strategy usage, domain-specific prior knowledge, computer attitude and computer anxiety, and in reference to their demographic characteristics. Second, they were compared in the experienced difficulties of content and learning, the invested effort and experienced pressure while learning, and performance. Clusters are expected to be meaningful entities that differ in relevant individual characteristics influencing distance learning, learning experience, and performance.

## **Method**

### **Sample**

The data of 159 (68% female; age:  $M = 37.42$  years,  $SD = 8.98$ , range from 21 to 60 years) of the 318 in-service teachers who registered for a distance training about media education in the German Federal State of Bavaria were used for this study. They had completed at least one training module by taking the final module test. In-service teachers were recruited by promoting the training offline via flyers at all elementary schools, secondary schools, secondary modern schools, and high schools in Bavaria. Most teachers worked in secondary modern and high schools, followed by elementary and secondary schools, and other school types (see results section).

### **Description of the distance training**

The training was based on a modular design and instructional texts. Students could learn at their own pace and at any time, and they could freely decide how many of the modules to study and in which sequence. The starting point of the training was a Moodle course portal. It consisted of nine modules, an introductory module, and eight modules about media education (e.g., Generation SMS: The use of mobile phones by children and adolescents; How to find a good learning program: Evaluation criteria for educational software). The introductory module informed about content, technical requirements, course organization, and learning skills. Each module had a linear structure of six sections: (a) An overview of the content and the teaching objectives was presented in the module profile, followed by (b) a case example of a real-life problem. (c) A test of domain-specific prior knowledge was used for activating prior knowledge and giving feedback about its level. (d) The instructional part comprised an instructional text and optional supporting material. (e) A questionnaire about studying the module was provided. (f) A final performance test evaluated learning success and provided feedback. The workload for studying a module was estimated to take 60 to 90 minutes. Students were supported via email, chat, and phone.

### **Procedure and measurements**

The first login directed a student to the introductory module, which could be studied optionally. Then, students completed the first questionnaire assessing demographic information and the student characteristics in focus. Then, the eight course modules were accessible. A prior-knowledge test was presented at the beginning of each module and a final module test at the end. Students were questioned about each module before completing it by taking the final module test. A student could provide up to eight data sets, one for each module.

The first questionnaire assessed intrinsic motivation (Interest/Enjoyment scale; Leone, 2011), attitude towards computers and computer anxiety (“Confidence in dealing with computers and computer applications” and “Personal experience/learning and working/autonomous entity” scales; Richter et al., 2010), skills in using meta-cognitive learning strategies, time management strategies, and strategies to arrange an adequate learning environment (Wild & Schiefele, 1994). Scale scores were calculated as means of items.

The module questionnaires measured the effort put into learning and the tension experienced while learning (Effort/Importance and Pressure/Tension scales; Leone, 2011), and the difficulty of contents and studying (one item each; de Jong, 2010). Per module, prior knowledge was assessed with a 5-item and performance with a 15-item multiple-choice test (including the pre-test items). Tests were considered appropriate for measuring learning success, because the training was intended to provide factual knowledge. Per module, the scores of the multiple-item scales were calculated as the mean of items, prior-knowledge and performance scores were calculated as percent correct. A high score expresses a higher level of the feature except for computer attitude, which indicates a low negative attitude. Finally, means were calculated across the number of completed tests.

## Results

A short and long study-time group were identified by considering the following three criteria. (a) The objectively measured period between completing the prior knowledge test and starting the final module test was calculated as an indicator of a module's study time. Periods are assumed to be reliable for detecting short study times. The criterion to classify study time as short was set to 20 minutes. A successful completion of any module was calculated with a workload of 60 to 90 minutes. (b) The objectively measured periods are not reliable when they are longer, because they might include periods not dedicated to learning (e.g., pauses or time between downloading and studying a script). Accordingly, the self-reported study time was used instead as an indicator of study time. The criterion to distinguish between short and long study periods was set to 25 minutes. (c) Finally, learners having studied at least one of the modules with a short study time were assigned to the short study-time group; otherwise, they were assigned to the long study-time group. This process resulted in 117 long study-time learners and 42 short study-time learners. Slightly more than half (57%) of the students in the short study-time group studied most of their modules quickly. No differences were found between the study-time groups for sex, age, type of school, and number of successfully completed modules (for analysis, the categories of 0 to 3 and 4 to 7 completed modules formed one group each; see Tables 1 and 2). The students mostly completed one (17%), two (12%) or all modules (43%), but less often three to seven modules (23%).

Table 1: The demographic characteristics of the registered in-service teachers and their successfully completed modules.

		No. (%) of studying students	No. (%) of short study- time students	No. (%) of long study- time students	$\lambda^2$	<i>df</i>	<i>p</i>
Sex	Total	159 (100.00)	42 (26.42)	117 (73.58)	0.41	1	ns
	Female	108 (67.92)	28 (66.67)	80 (68.38)			
	Male	51 (32.08)	14 (33.33)	37 (31.62)			
Type of school	Elementary school	20 (12.58)	7 (16.67)	13 (11.11)	3.77	4	ns
	Secondary school	14 (8.81)	4 (9.52)	10 (8.55)			
	Secondary modern school	69 (43.40)	16 (38.10)	53 (45.30)			
	High school	39 (24.53)	8 (19.05)	31 (26.50)			
	Other than listed	17 (10.69)	7 (16.67)	10 (8.55)			
Successfully completed modules	0-3	67 (42.14)	16 (38.09)	51 (43.59)	0.40	2	ns
	4-7	24 (15.09)	7 (16.67)	17 (14.53)			
	8	68 (42.77)	19 (45.24)	49 (41.88)			

The study-time groups were compared on the learner characteristics and the study ratings of interest (see Table 2). Significant differences were found only for prior knowledge, intrinsic motivation, and performance. Long study-time learners showed a higher level of motivation and performance but a lower level of prior knowledge. The ANOVA analysis with repeated measures of prior knowledge and performance revealed a large effect of time,  $F(1,157) = 265.48$ ,  $p < .001$ ,  $\eta^2 = .63$ , and a medium sized interaction effect,  $F(1,157) = 10.41$ ,  $p < .002$ ,  $\eta^2 = .06$ ,



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showing that the long study-time students gained more knowledge than the short study-time students.

Table 2: Means and standard deviations of the student groups, results and effect sizes are shown. Rating scores range from 1 to 5, knowledge from 0 to 100% correct answers. One-sided Welch-tests and t-Tests were calculated.

	Short study-time group			Long study-time group			<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>N</i>				
Age in years	37.55	9.26	42	37.38	8.92	117	.10	70.08	ns	.02
Intrinsic motivation	3.91	.52	42	4.07	.60	117	-1.70	83.91	.046	.28
Computer attitude	4.25	.73	42	4.21	.57	117	.36	59.98	ns	-.06
Computer anxiety	1.82	.78	42	1.81	.61	117	.09	59.85	ns	-.02
Metacognitive strategies	3.45	.58	42	3.52	.53	117	-.62	67.73	ns	.13
Time management	2.46	.91	42	2.53	.91	117	-.42	71.74	ns	.08
Learning environment	4.05	.69	42	4.08	.59	117	-.28	64.43	ns	.05
Prior knowledge	56.10	21.17	42	49.80	11.14	117	1.84	49.39	.036	-.44
Difficulty of contents	1.79	.77	40	1.63	.52	111	1.23	52.18	ns	-.27
Difficulty of studying	1.85	.74	40	1.66	.67	111	1.50	149	.068	-.28
Effort / Importance	3.26	.52	40	3.35	.55	111	-.94	149	ns	.17
Pressure / Tension	1.85	.78	40	1.79	.70	111	.49	149	ns	-.08
Performance	77.12	15.17	42	81.20	13.20	111	-1.65	157	.050	.30

## Discussion

Two learner groups were formed according to study time per modules. One group completed most of their modules quickly, spending little time studying. Hence, these students likely missed important information that could not be organized and integrated to an adequate knowledge representation. Students of the second group spent reasonably long periods for studying, which allowed an adequate selection, organisation, and integration of important information. Evidence for this assumption was found only for performance (Akçapınar, 2015; Akçapınar et al., 2015). Groups also differed in motivation and prior knowledge. These findings are consistent with results on intrinsic motivation (e.g., Park & Choi, 2009). That is, learners spending more time with studying are more motivated. Overall, this pattern of results is not surprising given that intrinsic motivation is understood to be inherently linked to self-motivated learning (Ryan & Deci, 2000). The finding that a higher level of prior knowledge contributed to faster study periods could have occurred as a result of the method. A module was deemed successfully completed when a student correctly answered at least 50% of the items in given module test. Most students of the short study-time group had already met that criterion after the prior knowledge test. Consequently, they might have expected to perform equally well in the module post-test without spending much time studying a module. This procedure might have contributed to faster study times and worse performance.

Overall, the results must be interpreted carefully. Although the sample size was adequate, the distance training modular design, the use of instructional downloadable pdf papers, and the special target group of teachers are all a matter of concern when generalizing conclusions, especially to whole distance study programmes. Nevertheless, the present study results are consistent with the theoretical approach and empirical evidence reported in literature.

Study time could be used as a predictor for how students study and thus for identifying students that should be guided to a deep learning approach (Akçapınar, 2015; Akçapınar et al., 2015). This might be especially important when log files cannot be used for calculating study times. For example, instructors cannot use them because of institution security policies, or the files do not contain this kind of information (e.g., for distance learning courses that provide offline instructional material). In general, when log files can be used, additional indicators are likely to exist that are related to learning approaches (Akçapınar, 2015; Akçapınar et al., 2015; Kinnebrew et al., 2013; Lile, 2011). The data used in this study were gained by a Moodle system protocolling the entry timestamp of course pages. Even self-reported study times seem useful.

A problem might arise by trainings that are free to everybody, for example, the training in this study. A wide range of motives could lead to course registration and to participation, making it difficult to assess which students are willing to study and complete the course and which students could be targets of interventions. One particular problem in the present training might have forced a gambling behaviour of students, because the hurdle to complete a module was set low by using multiple-choice items of low-medium level difficulty that tested for factual knowledge. Thus, students could try their luck in succeeding in subsequent module tests with little effort. More challenging tasks might have shifted learners to dropping out. Normally, such tasks cannot be solved by guessing solutions. Future research could aim to first identify user groups and analyse these groups separately to gain clearer insights about the factors that lead to dropout and learning success.

For practice and research, it seems promising to combine logfile analyses with an initial diagnostic of relevant learner characteristics and their framework conditions for studying. Logfile analyses could especially be used to support students in their learning behaviour and to lead them to higher performance, and it might also be used to identify and support students that drop out after having studied parts of a training (Akçapınar, 2015; Akçapınar et al., 2015; Kinnebrew et al., 2013; Lile, 2011). In complex educational environments like study programs, other possible correlates could be analysed such as academic background, grade-point average, or former distance learning experience and success (Lee & Choi, 2011).

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## **IMPLEMENTING NEW EDUCATIONAL STRATEGIES: SYNERGETIC EFFECTS FROM A UNIVERSITY OVERARCHING PROJECT**

*Helen Asklund, Laura Brander, Linda Näsström, Mid Sweden University, Teaching and Learning Services, Sweden*

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### **Introduction**

In 2011 Mid Sweden University launched an educational strategy which was prolonged until 2017. The educational strategy was missioned by the vice-chancellor, and it focused on creating active learning environments for the students, on increasing and improving the technical support for teaching and learning and on enhancing the teachers' professional competence (Dnr MIUN 2011/277, 2009/1671). One of the overall goals was that all educational activities at Mid Sweden University should be characterized by professionalism and innovation. This was specified in several objectives to strive for during the period of 2015-2017, such as:

- Educational development should be a clearly prioritized activity at the university.
- The possibilities for professional qualification for teachers should be strengthened.
- Teachers should be given increased prerequisites for continuous participation in workshops and courses in teaching and learning.

In 2016, the unit for teacher support at Mid Sweden University, Teaching and Learning Services, was assigned to implement or support some of the projects that were focusing on enhancing the teachers' professional competence and the goals above. Several parallel university overarching projects focusing on the teachers' professional development were initiated, for example:

1. *A new educational program for the teachers:* Teaching and Learning Services developed a new educational program that offered workshops in active and technique enhanced learning. Teachers at every department (altogether twenty departments) were given time to participate in these workshops or other activities designed to improve their teaching qualifications.
2. *A model for professional qualification for teachers:* A model for teachers' professional qualification (standards for certified/excellent teachers) was developed. In late 2017, the project group suggested a model that was accepted by the university's management. The model for acquisition of qualification is conducted for the first time during the spring term 2018.
3. *Teaching and learning resources:* The project called Teaching and learning resources ("pedagogisk resurs" in Swedish) was based on the idea that cooperation and shared experiences between teachers from different faculties and departments in different ways

can promote educational development at the university. Several subprojects were initiated and some of the preliminary results will be presented here.

### ***Aim***

Our aim is to describe the above-mentioned project Teaching and learning resources, and to discuss experiences and synergetic effects that have arisen from this university overarching project where all departments were invited to develop educational strategies of importance to them. The invitation resulted in the development of a number of different subprojects, all with their own purposes and contents, but with the joint intention to develop new educational traits and methods of teaching and learning. A number of these subprojects are useful examples of how teachers can develop teaching methods that can be shared across department and subject boundaries. It is, we believe, of vital importance that there will be a continuous discussion about how this kind of interdisciplinary project, with its elements of peer learning as well as individual and shared experiences, can best be managed and come of use. With our contribution, we want to be part of this discussion.

By now, it should be clear that the aim of this contribution is not to present a scientific evaluation of the project and its effects. Rather, it is to share our experiences and observations from following the process from our positions as managers of procedure and project, respectively. What happens when teachers from various faculties, departments and subjects come together and are assigned to work with educational development? What effects have we noticed and what would be our recommendations for future projects?

### **Presentation of the project**

The purpose of the project Teaching and learning resources was, firstly, to strengthen the educational development at the departments by financing lecturers as teaching resources with 20 percent of a full-time salary, respectively. Secondly, the project was designed to strengthen the continuous dialogue about teaching and learning methods within and between departments and faculties, as well as between departments and Teaching and Learning Services. One important presumption was that the teaching and learning resources should be able to work on issues based on the needs of each department.

An invitation to participate in the project with one or two teachers each was sent to all departments of both the Faculty of Human Science and the Faculty of Science, Technology and Media. In the end, seventeen out of twenty departments joined the project with altogether thirty teachers. The project started in August 2016 and will end in June 2018. The group had regular e-meetings or physical meetings approximately every other month, where the participants were given the opportunity to share their project plans and help each other in solving any problems that arose. The group was led by educational developers at the Teaching and Learning Services.

Each participant focused on one or several projects of importance to their colleagues and departments. This could for instance include teaching enhancement on course or program level, collegial interaction (i.e. teaching and learning fora), or creating a model for introduction of new employees. The teaching and learning resources were suggested to have different roles,

such as supervisor, observer, coordinator and/or educational developer. It was also suggested that the participants could present results of their projects at the annual Mid Sweden University conference on teaching and learning or at other educational conferences in Sweden or abroad.

### **Working process**

The group was first invited to an introduction meeting online, where all participants presented themselves and discussed the framework of the project. The first step was to collaborate on working out its aim. Teaching and Learning Services proposed a formulation, which the participants could reflect on and revise. Thereafter, the text was sent to all participants and their heads of department. In this way, an informal agreement as to the goals and aims of the project was made.

The second meeting was a physical full day workshop, based on active learning methods. The participants were asked to prepare a short presentation of their ideas on subprojects and discuss them in groups. These discussions generated interesting effects of problem solving as well as understanding and consensus between teachers from different departments and faculties. The teachers gained insight into the fact that they are not left alone. Often they faced similar problems (such as the students' poor academic writing or complexity concerning methods of active and technique enhanced learning) and they could actually benefit from each other's experiences and knowledge.

The forthcoming meetings were arranged as online or blended meetings, and the agenda was based on the needs of the participants to discuss and solve any problems that had arisen. Some of the subprojects were discussed more closely than others. The results of the subprojects were summarized in final reports, and here, we would like to highlight a few of them.

One of the subprojects dealt with *academic writing*. Teachers from two departments experienced problems with students who had difficulties both from a linguistic point of view and when it came to adapting their way of writing to academic standards and genres. These teachers planned a series of seminars where they discussed how to collaborate on and manage these problems.

Another example was a collaborative subproject between two departments, which aimed at constructing a *guide for new teachers*. This guide was meant to initiate new colleagues into how the annual planning cycle works and what is requested of them as teachers.

A third subproject consisted of forming *teaching and learning fora*. Several departments had noticed a certain lack of a continuous dialogue about teaching and learning. Their initiative was to create environments for meeting peers, sharing experiences and inviting guests for inspiration and knowledge exchange.

### **Findings and discussion**

The project Teaching and learning resources should be looked upon as part of an educational strategy that is about to form at our university. As we know, many universities are currently

broadening their perspective on academic development. In a recent study, Bilbow et al. (2017) state that the academic development units at many universities gradually have come to be involved in developing strategies about how to form a structured and well-organized educational context. They accentuate that it is preferably done in collaboration with teachers, departments and faculties. Similarly, Mitchell and Sackney (2011) speak of three integrated tracks for capacity development of education; on the individual, group and organizational level, respectively.

Bilbow et al. stress that seven factors are common when institutions form their enhancement strategies (see figure below).



Figure 1. Strategies for enhancement, according to Bilbow et al. (2017; p.163)

Several of these strategies are at work in the project Teaching and learning resources; The project is about exchanging knowledge (a), the subprojects were started by enquiring the departments' needs (b), the project aims at advancing the learning-teaching engagement (d) and we wish to engage the management in forming strategies for a continual teaching and learning enhancement (e). Above all, this project should work as a means for surfacing and sharing good practices (f).

There are on the whole several reasons why we agree with Bilbow et al. and stress the importance of finding ways of interdisciplinary collaboration, not least when it comes to educational development. Firstly, it is a way of bringing together the different subcultures that are always at work at different levels in a large organization, such as in various departments and



within groups of fellow-teachers. Deem and Lucas (2006; p.127) say that cultures within university departments might contain “both enabling and constraining” factors which have an impact on the teachers and scientists. When working on forming a university overarching educational/academic culture, it is vital to bring these subcultures together in order to find out what shared values and norms there are to build on in the organization. This is exactly what happened in some of our subprojects. For instance, the subprojects that initiated teaching and learning fora at their departments aimed at discussing and sharing ideas and experiences of teaching within their group. This increased their understanding of each other’s educational practice and ethos.

Secondly, at our university there are quite a few examples of how similar kinds of developmental projects have taken place at different departments, but without the various project groups having had any knowledge of each other’s existence. When working with interdisciplinary projects, the risk of such tunnel vision thinking is minimized. During the meetings with the group of teaching and learning resources, they spoke about the benefits arising from meeting other colleagues in order to avoid duplication of work. This kind of collaboration could thus save resources for the university. Another synergy effect has clearly been that learning on micro and meso level is broadened to macro level.

Thirdly, at a university like ours, where many teachers are struggling with a heavy workload and symptoms of fatigue and burnout, collaboration and shared experiences might work as tools not only for individual empowerment, but also for group empowerment. The participants mentioned the importance of the project’s structure, not least the fact that they were given specified time to function as teaching and learning resources. This gave substance and weight to their task, and a confidence in that their individual and collective efforts are invested upon. Many studies verify that organizational support, communication and management are related to the experience of job strain and job satisfaction (Karasek & Theorell, 1990; Kuoppala et al., 2008). Therefore, in order to achieve a creative and supportive environment we need to continue encouraging staff collaboration.

Another positive effect that came out of the project is that the participants broadened their view of the university and became more aware of what happen in other departments. They were also shown that others are struggling with problems similar to their own. For example, the subproject of creating a guide for new teachers, which emerged as a collaboration between a few teachers, has resulted in that several departments are now asking for such a guide, but with a university overarching perspective.

In sum, the project Teaching and learning resources has contributed, in our experience, to not only individual professional development of the teachers that participated in the project, but also to educational development and enhancement at group and organizational level. The unexpected forms of collaboration and united action across department and faculty borders has given us an understanding of the importance of structured forms of teaching and learning dialogue and fora. It is surely worth the effort to give teachers time to participate in this type of activity, due to the synergetic effects that are discussed above. Our strong belief is that our

university would greatly benefit from continually providing the prerequisites for the kind of cooperative teaching and learning environment of which our project is an example. For that, we need leaders on all levels who prioritize this sort of activity.

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## **THREE DIMENSIONS OF PERSISTENCE IN DISTANCE HIGHER EDUCATION – THE MAIN ACTORS: MEXICAN NON-TRADITIONAL STUDENTS**

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### **Abstract**

The objective of this paper is to propose a systemic model for the persistence of non-traditional students in Distance Higher Education. The phenomenon of persistence has often been declared a complex problem; despite this recognition, the dimensions that constitute it are absent in academic discussion. From this perspective, the proposed model is made up of the dynamic conditions in which this type of student performs, the preferences in relation to the decisions that bring them closer to their expectations and the highly changing diverse environments in which they are involved.

### **Introduction**

Distance Higher Education in the world reveals low rates of persistence (Inkelaar & Simpson, 2015). According to Rovai (2003), "Persistence, that is, the behavior of continuing action despite the presence of obstacles, is an important measure of higher education program effectiveness". The persistence or drop-out in distance higher education has repeatedly been declared a complex phenomenon (Cendeja-Navarro, 2014; Zhang, 2010). The imbricated environments of the work, school and family of non-traditional students alters the learning dynamics.

The understanding of the persistence of this kind of students has been analysed through models such as those formulated by Tinto (1979), Bean and Metzner (1985), Rovai (2003), Park and Choi (2009). However, from a systemic perspective, the models have omitted the dynamic dimension resulting mainly from changes in expectations, acquired knowledge and the changing of the environments in which non-traditional learners perform. For these reasons, the aim of this article is to propose a systemic model of persistence, in order to understand the continuous change in the realities of students who at the same time work, have family responsibilities and study.

### **Non-traditional students**

Those who study in non-classroom educational modalities are usually non-traditional students (Bean & Metzner, 1985). This kind of students mostly works, has children, maintains a relationship and their age exceeds twenty-four years. Since the advent of virtualization, they do not attend the traditional school (Rovai, 2003). In the Mexican context, this phenomenon is

further upset because we consider that this type of students, in addition to being non-traditional, are also heterogeneous as in other parts of the world due to their multiculturalism (Stoessel et al., 2014), unequal (Solís, 2013) and disconnected (García, 2004; p.28) in the sense that they hide their indigenous origins as a tactic against discrimination.

## **Approaches of persistence / dropout**

### ***Psychological models***

Psychological approaches analyse the personality traits of students who complete their studies with respect to those who do not. The approach of Fishbein and Ajzen (1975) is pioneer in this field. The authors establish that attitudes and beliefs have a significant influence on the behaviour of students (Hart, 2012) and on their cognitive processes (Simpson, 2015; Rurato & Gouveia, 2014); that is, the decision about to study or leave the school is correlated with the individual's previous behaviours, their attitudes, subjective norms and their achievements, which translate into behavioural intentions to persist during their university life (Rurato & Gouveia, 2014).

### ***Sociological models***

The external factors have become the main attractors of analysis from the sociological perspective. The Spady's model (1970) analyses the dropout. This model is based on the Theory of Suicide developed by Durkheim, who argues that suicide is the result of the lack of social integration individual with the social system and its inability to insert itself into the system. The break is presented by a low moral conscience and insufficient social affiliation.

Spady argues that there is a high probability of dropping out of school, when the various sources of influence go in a negative direction, resulting an unsatisfactory academic performance, low level of social integration, dissatisfaction and institutional commitment. On the contrary, if the effects go in a positive direction and are consistent with the initial situation, the student achieves an academic and social development consistent with both their own expectations and with the institutional ones, which significantly favours their retention in the university.

### ***Organizational models***

University institutions, constituted as organizational systems, design and implement services to improve student performance and consequently the persistence of students (Rovai & Downey, 2010). They focus their interest on improving the quality of teaching, the digital educational resources, and the students' experiences in virtual spaces. Scholarship, degree and institutional image financing policies are factors that influence school success. To these efforts, are added the services regarding bibliographic resources, number of students per teacher are added to those efforts. In this sense, they also promote social presence as an operation to maintain permanent contact with students (Sung & Mayer, 2012).

## Three Dimensions of Persistence in Distance Higher Education – The Main Actors: Mexican Non-Traditional Students

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### Interactionist model

Tinto's model (1986,1987,1975,1975,1997) is the pioneer of interactionist vision in order to understand the scholar retention. The model considers several variables or factors that contribute to reinforce their adaptation to the institution he or she has selected. Family background, such as the family's socioeconomic and cultural level and the values are characteristics that influence the persistence. In addition to this, the personal attributes for interaction (Sung & Mayer, 2012) and self-regulation are important to strengthen academic experience (Sitzmann, 2012).

In the context of Distance Higher Education and from an interactionist perspective, Rovai (2003) and Bean and Metzner (1985) proposed a persistence model (see Figure 1). Bean and Metzner (1985) contributed to the characterization of distance students as non-traditional. The Tinto's model incorporated the concepts of "Before and after entering university". At the same time, it suggests adding digital literacy as detonating parts of persistence/abandonment in distance education, among other components.

However, the aforementioned models have obviated or dealt tangentially the highly changing dynamics which non-traditional, heterogeneous, unequal and disconnected students face, as the ones in Mexico. For this reason, we propose a systemic model of school persistence, to approach the understanding of the persistence to those who are surrounded by highly changing environments.

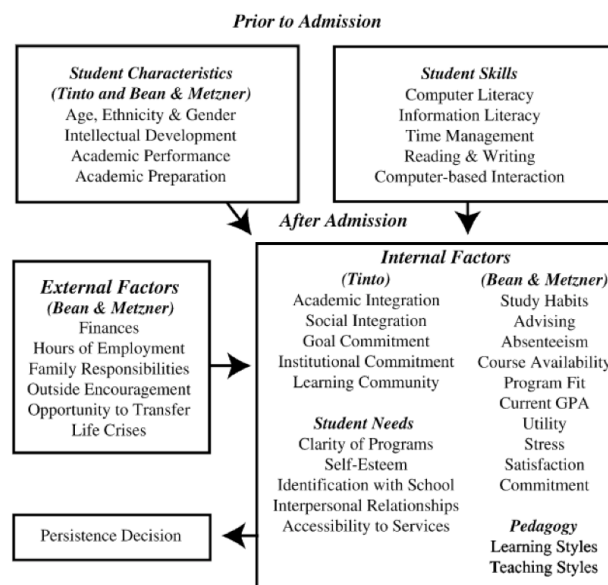


Figure 1. A composite persistence model (Rovai, 2003)

### A systemic model of school persistence

From a systemic perspective and considering the Parsimony principle, the proposed persistence model is made up of three interrelated dimensions. The expectations, the acquired knowledge and the environments constitute the model. The interaction of these three components

generates a dynamic condition that disturbs the scholar path, where the alteration of one of the parts modifies the others (see Figure 2).

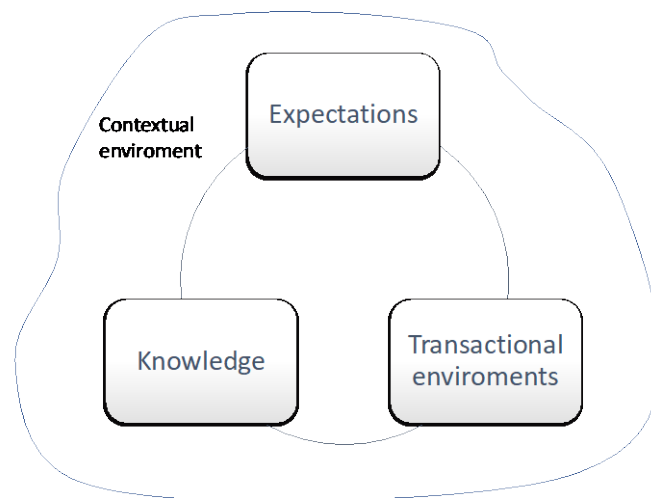


Figure 2. A systemic model of scholar persistence

### ***Knowledge***

According to Nonaka et al. (2000), the individual acquires knowledge through a continuous process of learning. The process is a spiral that transits from the most elementary situation to transcendence. It covers the individual and the collective. Its conceptual bases are tacit knowledge and explicit knowledge. The stages through which it transits are socialization, externalization, combination and internalization. Knowledge takes meaning in the different environments where students interact. We consider this approach particularly because in general non-traditional students have an active participation in different atmospheres of everyday life.

### ***Expectations***

Expectations correspond to the hope of achieving an attainment. They can be classified as short, medium or long term. The student has aspirations, of course, from before entering school, even when he is doing his studies he builds tacitly or explicitly an idealized design of his future after finishing his studies. The knowledge acquired or that which the student is unable to acquire alters any of his or her stated expectations. The acquisition or non-assimilation of knowledge continuously has a direct impact on the decisions that students make during their school career, both to positively and negatively transform their expectations.

### ***Transactional Environments***

The appearance of non-traditional students is the result two factors: the increase of social demand of higher education and the rapid massification of higher education systems (Schuetze & Slowey, 2002); these characteristics demonstrate that full-time students are not anymore, the main target of educative systems and the patterns are changing in relation to marketization of universities, occupational structures, rising workers and professionals qualifications, family diversification, gender roles, etc.

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In this sense, the non-traditional students have been forgotten from pedagogical studies because of the complexity of their context: adults who enter or re-enter in universities “with a prior major break in their formal involvement in learning” (Schuetze & Slowey, 2000; p.314), large range of age, enough experiences in life and commitments, and labour and personal expectations for upgrading.

It is important to understand the inter-role that students play to identify the approach context of non-traditional students. Markle (2015; p.4) found a double conflict between family-school and work-school. However, there is a personal and subjective conflict for the student, who has to twine the multiple expectations from familiar, social, labour, and intrapersonal microsystems.

### **Contextual environment**

The influence of hegemonic forces on social, economic and productive policies must be analysed holistically as substantive parts of the design of educational policies and programs. Otherwise, we will continue to replicate actions that have not improved persistence. The pauperization of work, low salaries, the digital divide and the low quality of life of citizens are the challenges faced by distance higher education in Mexico.

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## WHAT FACTORS INFLUENCE STUDENT DECISIONS TO DROP ONLINE COURSES? COMPARING ONLINE AND FACE-TO-FACE SECTIONS

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### **Purpose**

This research is intended to inform a theoretical model of online retention, and to support the development of effective support services for online learners. Specifically, we ask: What are the reasons postsecondary students give for dropping out of online courses?

### **Literature Review**

Booming enrolment in online education continues worldwide, with particular growth in Asia, India and Latin American countries expected (GIA, 2017; ICEF, 2017; Docebo, 2016). However, online attrition is reported to be 7-20 percentage points higher than face-to-face rates (see Hachey, Wladis, & Conway, 2013). Yet, the specific reasons for this gap remain under-researched/unclear (Jagger, 2013). Diaz (2002) notes that “the mere fact of high drop rates is not necessarily indicative of academic non-success” but may reflect a mature decision on the part of students who are characteristically different from face-to-face students. There is strong evidence that students in online courses are more likely to be female, older (e.g. over 24 years old), employed and financially independent, married with children, and with other life responsibilities (Johnson & Mejia, 2014; Shea & Bidjerano, 2014; Wladis, Hachey, & Conway, 2015; Xu & Jaggars, 2011a; 2011b). These factors have been connected to higher rates of time poverty, which has been shown to mediate college outcomes (Wladis, Conway, & Hachey, 2016b).

In a meta-review, Lee and Choi (2011) found only seven empirical studies which seek student reasons for dropout. For example, Willigig and Johnson (2009) ( $n = 10$  masters students) report that students dropped out of an online program due to: personal issue (i.e. lack of time; family), work reasons, program reasons (course workload/ difficulty) and technology difficulty. The other studies noted by Lee & Choi also found some combination of these reasons. However, all previous studies have issues of small sample size and selection bias, which severely limits generalizability. Moreover, we know of no studies that employ our method of comparing online versus face-to-face students in the same course in order to do a direct comparison of potential differences in dropout motivation.

## **Conceptual Framework**

No empirically validated model for online retention currently exists; the few models available (Kember, 1995; Rovai, 2003) are largely untested. However, there are substantiated models for face-to-face students. Tinto's model (1975; 1986; 1993) posits that family background, pre-college schooling, and individual student attributes influence student persistence through two *integration* variables: academic integration and social integration. Bean and Metzner's (1985) model contains three main input categories: environmental, academic, and background. Our conceptual model (see Figure 1) is based on Bean and Metzner's model since it is the only widely-validated model that focuses on the non-traditional students that are highly represented online; we add additional factors identified in the literature on online learning to existing categories in this model.

## **Method**

A survey was conducted with students who were either enrolled in a fully online course at the City University of New York (CUNY), or who were enrolled in a face-to-face section of one of the courses that was offered online. Students who dropped the course ( $n = 780$ ) were asked about their reasons for dropping and 702 responded. Course medium was classified by the percentage of instruction that occurred online (fully online is  $\geq 80\%$ ; face-to-face is  $< 20\%$ ). Courses that fall in between were classified as hybrid courses, and have been excluded because of the difficulty of distinguishing between hybrids with large differences in proportion of online content. By comparing fully online to face-to-face courses, the distinction allows for more straightforward comparison.

# What Factors Influence Student Decisions to Drop Online Courses? Comparing Online and Face-to-Face Sections

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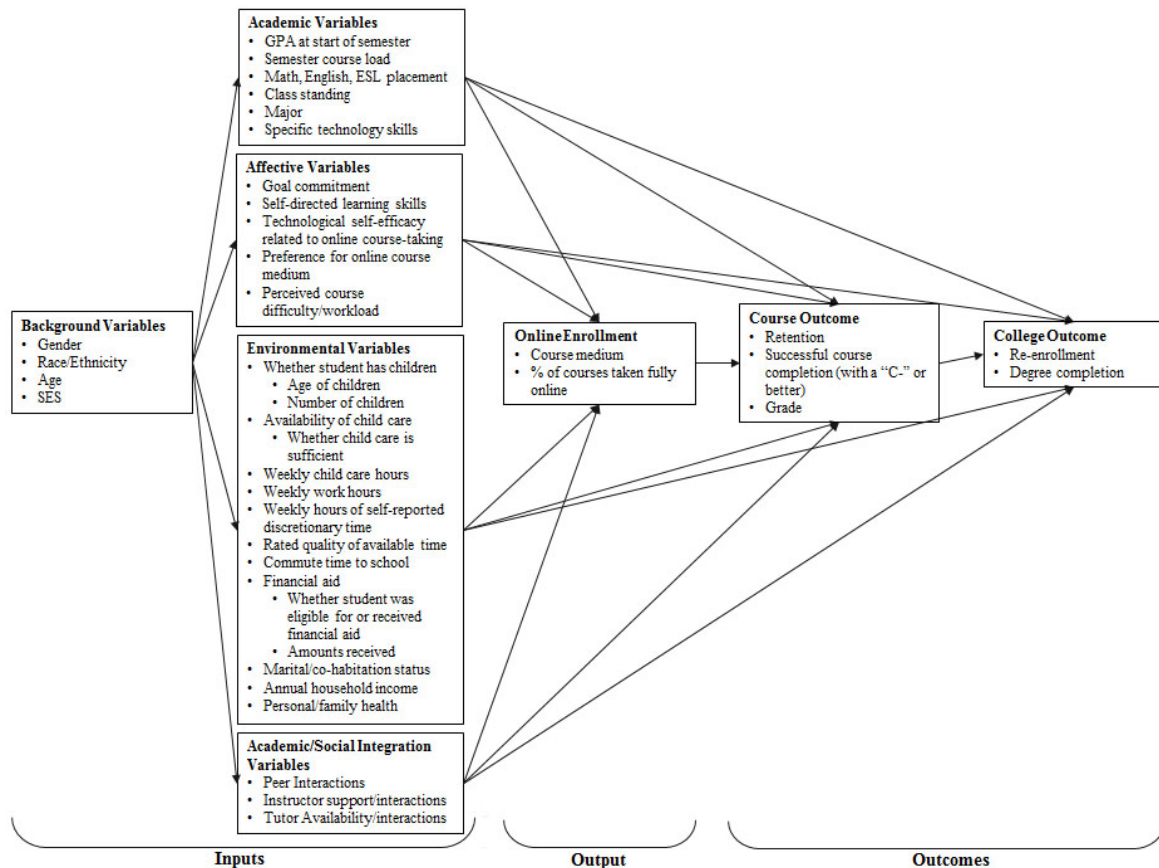


Figure 1. Conceptual Model of Online Retention

Responses to a survey, given to a different sample the prior year, were used to develop a coding scheme. Three coders read all responses and developed three coding schemes, organizing the types of answers given under hierarchical groups. All three coders discussed the categories and came to a consensus for a coding scheme, which was used in this study. Each response was coded by two coders. After the first round of coding, inter-rater reliability, as measured by Krippendorff's alpha (based on presence/absence of each code for each student) was 0.71 for individual sub-codes and 0.85 for larger categories. Then, coders went through a round of norming; many cases of disagreements involved subtle distinctions (e.g. one coder may have selected "teaching style did not fit student learning style" while another selected "quality of instructor"); to resolve this, many codes were more carefully defined to clarify such distinctions. After the second round of coding, inter-rater agreement was 0.98 for individual codes and 0.99 for larger code categories. General trends were initially explored for all codes, however, for results reported here, analysis was limited to only those codes assigned to at least 20 students.

## Results & Discussion

The most common reasons in both modalities for dropping a course related to specific course characteristics (most commonly cited: quality of the instruction/instructor; course workload/difficulty). Lack of time was the second most commonly cited reason (most commonly cited: personal time commitments; paid work; family commitments; other academic

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demands on time). And performance in the course (e.g. course grade) was the third most commonly cited reason for dropping both online and face-to-face.

However, there were distinct differences in patterns of reasons given by online and face-to-face students (see Table 1). Online students were much more likely to cite specific course characteristics or a lack of time as their reason for dropping the course; whereas face-to-face students were more likely to cite financial circumstances, no longer needing that particular class for their degree, or a lack of feeling of fit/belonging. Students in fully online and face-to-face classes cited course performance as a reason for dropping at almost identical rates.

Table 1: Reasons for course withdrawal by course medium—general trends

	fully online	face-to-face	F-test	p
course characteristics	58.8%	44.7%	7.20	0.007
lack of time	40.4%	33.0%	3.16	0.076
money/resources	0.9%	4.4%	2.69	0.101
no longer need this particular class for degree	0.9%	2.9%	1.26	0.262
fit/belonging	0.9%	2.3%	0.73	0.392
class performance	19.3%	19.8%	0.07	0.798

Percentages indicate proportion of students who gave responses that were coded at least once with a given code.

Students who gave no explanation for dropping are included in the denominator, so the maximum percentage is 90%.

Table 2: Reasons for course withdrawal by course medium—detailed course characteristics

	fully online	face-to-face	z-score	p
course workload	31.6%	8.6%	7.01	0.000
online medium didn't fit learning style	15.8%	2.0%	6.99	0.000
quality of instructional materials	7.9%	1.1%	4.76	0.000
quality of peer interaction	5.3%	0.6%	4.09	0.000
quality of instruction/instructor	37.7%	55.9%	-3.59	0.000
difficulty understanding instructor expectations	7.0%	2.7%	2.37	0.024
course difficulty	28.1%	19.4%	2.12	0.042
instructor teaching style did not fit learning style	6.1%	10.1%	-1.32	0.093
did not like course content	3.5%	6.3%	-1.17	0.121

Percentages indicate proportion of students who gave responses that were coded at least once with a given code.

Students who gave no explanation for dropping are included in the denominator, so the maximum percentage is 90%.

Table 3: Reasons for course withdrawal by course medium—detailed reasons related to time

	fully online	face-to-face	z-score	p
work	26.3%	16.7%	2.47	0.019
other academic demands	19.3%	12.0%	2.13	0.041
family	21.1%	14.3%	1.86	0.070
personal time commitments	30.7%	23.3%	1.71	0.093
commute	0.0%	1.2%	-1.18	0.120
time quality	2.6%	4.5%	-0.92	0.179
general lack of time	11.4%	8.6%	0.98	0.246

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Percentages indicate proportion of students who gave responses that were coded at least once with a given code.

Students who gave no explanation for dropping are included in the denominator, so the maximum percentage is 90%.

Because both course characteristics and lack of time were cited at different rates online versus face-to-face, patterns of sub-codes were analysed in each category. Word clouds were generated using QDA Miner, to visualize the differences in patterns of reasons given by students fully online versus face-to-face (see Figures 2 and 3). These figures reveal both strong commonalities (e.g. quality of instruction is overwhelmingly the most important factor for both groups) as well as differences (e.g. issues related to time were more prominent for students enrolled online).

### Course Characteristics

While the most commonly cited reason for course dropout in both groups was the quality of the instruction/instructor in the course, face-to-face students cited this reason at much higher rates (56% vs. 38%). While many themes related to instructional quality were apparent in both modalities (e.g. unresponsiveness of instructor; unsupportive environment), there were specific patterns only observed face-to-face. Specifically, many students cited lectures that were disorganized or off-topic, or that were difficult to understand, for example because they were delivered too quickly or because the instructor had an accent.

*The professor was unorganized, did not cover all material and shouted out homework at the end of class when everyone was on their way out of class.*

*She had a heavy accent which made it even harder to understand her and she skipped steps without explaining them when teaching new topics.*



Figure 2. Word cloud of reasons for face-to-face course dropout

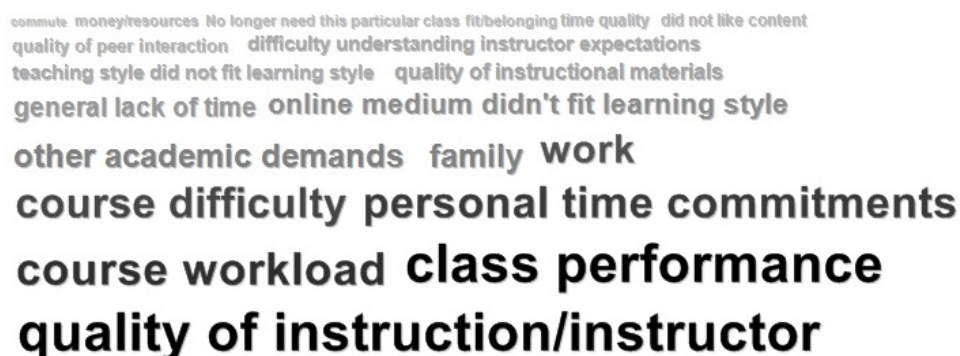


Figure 3. Word cloud of reasons for fully online course dropout

Online students were much more likely to cite the course workload (32% vs. 9%) and course difficulty (28% vs. 19%) as a reason for dropping.

*I found the class hard to keep up with. The readings were intense and in heavy amounts. The assignments were every week and it was just too much.*

*The workload required for the course was overwhelming...face to face courses taken during the same semester did not require the same amount of time.*

Even though cited at lower rates, online students were also more likely to say that they had dropped the course because of the quality of instructional materials (8% vs. 1%) or the quality of peer interactions (5% vs. 1%).

*The syllabus/blog was very intricate. There were so many places to find the information.*

*I was forced to do group work. My group members did not want to do anything... I dropped because I wasn't putting my grade in the hands of lazy classmates...*

Sixteen percent of students who dropped a fully online course stated that the online medium didn't fit their learning style (in contrast, 2% of face-to-face students listed required work online as a reason for dropping).

*I felt I wasn't understanding the material fully as I would have in a classroom atmosphere.*

### **Time limitations**

Students in fully online courses were much more likely to say that time they had to spend on work was a factor in their decision to drop the course (26% vs. 17%).

*Because of my work schedule, I was unable to dedicate the time needed to do the necessary reading and turn in my assignment in a timely fashion.*

Students in online courses were also much more likely than those in face-to-face courses to cite time commitments to family (21% vs. 14%) and other academic demands (suggesting a general lack of time for all of their courses) (19% vs. 12%) as reasons for dropping the class.

*It got hard for me to handle the class since it requires a lot of reading plus my duties as a mom and working as well since I am a single mother taking 3 other classes it's hard.*

Both groups cited personal time commitments as a reason for dropping, the majority of which were personal health issues; online students were more likely to report personal time

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commitments as a reason for dropping the course, but these differences were not as significant as for other time-related sub-categories.

*...I'm getting a divorce. So all this was just too much for me to take on at the same time.*

### Significance/Implications

This study suggests that issues related to time are cited more commonly as the reason for dropping an online than face-to-face course. This corroborates recent research that online students are more time poor (Wladis, Conway, & Hachey, 2016b) and that the quantity and quality of time that students have for college has a direct effect on persistence (Wladis, Conway, & Hachey, 2016b). Course workload, also highly cited by online students, could also be classified as a time issue. This suggests a direction for future investigation: did online students just have less time and therefore cite workload; is perceived workload higher online than face-to-face because of characteristics of the online environment (e.g. reading on own instead of attend lectures); or was the workload actually higher online?

The results of this study also suggest that although the quality of the instructor is important to persistence in both mediums, face-to-face students perceived it to be a bigger factor. A closer look at student responses suggests that this difference is likely due to student experiences of oral lectures. However, there are other possible interpretations, such as instructor self-selection: those instructors who decide to develop and teach online courses may already be more interested in investing time into pedagogy and innovative teaching approaches. While less commonly cited, quality of course materials and peer interactions were found to be more predictive of course dropout online than face-to-face. These relate to aspects of online course design and seem to support Travers (2016), who cites a need for data collection on student performance and retention from programs where online instructors receive pedagogical and instructional design training versus those with only technology training.

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## **TECHNICAL INNOVATION IN BLENDED LEARNING: AN EU PROJECT ON CONTINUOUS VOCATIONAL EDUCATION USING MULTIPLE DEVICES**

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### **Introduction**

This ERASMUS+ project Technology Innovations in Blended Learning (TIBL) is a two-year project (2017-2019), aiming to develop high level continuous vocational education and training (C-VET) courses for training performed in formal and in non-formal C-VET education. These courses use blended learning (Adams Becker et al., 2017; Bates, 2015, Bates, 2016, 2017; Christensen, Horn, & Staker, 2013, Daniel, 2016; Christensen Institute, 2015; Ossiannilsson, 2017; Taylor, 2013) as a technology enhanced method and focus on the use of multiple devices, such as Smartphones and Tablets (used by the trainees in their everyday life) to develop professional competencies that will close the expectation gap between trainees and companies. The innovative approach in this project embraces the implementation of a trainee-focused pedagogical framework based on heutagogy (Blaschke & Hase, 2016; Hase & Kenyon, 2000), the development of an all-encompassing quality enhancement framework (including also the pedagogy approach), and the exploitation of various technical equipment (the multiple devices). The project is complementary to a Grundtvig Multilateral project by transferring the theoretical developed outputs to a practical implementation in a different (but similar) educational sector.

The partners of the project combine knowledge and experience from VET training institutions with the research and innovation potential of universities. In addition, a national organization for distance education is a partner.

The partners in the project are:

- The Fundación Escuelas Profesionales Sagrada Familia (SAFA), who also is the coordinator
- The European Foundation for Quality in Blended Learning (EFQBL), is a VET and trainers' education organization
- The Università Degli Studi Di Roma La Sapienza, DigiLab, specialized in multi devices
- The University of Aveiro that are specialized in innovation in technology enhanced training and the related pedagogy; and

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- The Swedish Association for Distance Education (SADE), who are experts in distance learning and quality enhancement frameworks.

The pedagogical framework includes as a new pedagogical approach the trainees view. The team focuses on the real needs, based from the current state of the art of literature, and proved by the feedback of the trainees of the pilot courses. The framework will combine active learning, micro learning, especially in the distance learning, and the use of multimedia, especially interactive videos (Peters, 2007). This approach is even described by Bergmann et al. (2017). Sung et al. (2016) mentioned that qualitative analyses of the use of multiple devices are still missing. Within the project currently used devices were analysed, and a list of features, mainly technic-based, were identified. This study is the bases of the development of multimedia-based material which will be able to be used on all multiple devices during the training. The study impacts as well into the implemented features of the Moodle (Moodle, 2018) platform which is used for the distance learning. The pre-decision has been made to use HTML5 as a page description language which is delivered by Moodle as a standard (Moodle, 2016). Quality related concerns are focused and based on the European Association of Distance Teaching Universities (EADTU) E-xcellence benchmarking tool (Roswell, Kear, Williams, et al., 2016; Ossiannilsson, Williams, Camillari, & Brown, 2015). In addition, current European frameworks are used as the Open Education framework (Inamorato dos Santos et al., 2016) and the DigComp2.0 for Citizen, and the DigCompEdu 2.0 framework (Redecker & Punie, 2017). The project has also its foundation in the outlines and trends of the fourth industrial revolution described by Schwab (2016) and the UNESCO guidelines for Education for all (UNESCO, 2015a; 2015b).

### **Aims of the project**

The project aims to develop C-VET training courses for training performed in formal and in non-formal C-VET education. C-VET in this context means continuous (or further) education of people working in a specific profession (Ng, Lam, Ng, & Lai, 2017). These courses use blended learning as a technology enhanced method and focus on the use of multiple devices, provide two frameworks (for the pedagogical training approach and the necessary quality enhancement) and supply trainers and training organisations in course creation by a special web-based tool. Three main aims will be addressed in the TIBL project, which all are based on principles defined in the call of the European Commission 2017 (European Commission, 2016), which are (a) enhancing access to training and qualifications for all, (b) Open and innovative practices in a digital era, and (c) equality for trainers and trainees.

The Intellectual outcomes for the project Technology Innovations in Blended Learning (TIBL) are:

- Pilot courses, developed and implemented in formal and non-formal C-Vet (continuous vocational education and training).
- A toolbox for trainers completed by a MOOC to assist trainers in course creation.
- A transferability and evaluation guide to enable the use of the findings also in other educational fields.

## **Addressed target groups**

The project addresses several defined direct and indirect target groups, which are:

- Trainees involved in continuous vocational education (C-VET) both in formal education and non-formal).
- Trainers responsible for courses in C-VET.
- Training organizations developing courses for C-VET.
- Small and media enterprises (SMEs) interested in innovating their internal further education.
- Decision makers, involved in training, and companies, which care for continuous professional development (CPD) for their staff.

## **Method**

The used methods for this project followed a classical way with systematic literature reviews on current international research and trends within the areas of the scope of the project. In addition to that, learners' needs, according to the target groups will be identified, and analysed. The consortium is using the new developed digital competence frame of the European Commission, the DigiComp 2.0 (2018); and Dig CompEdu (Redecker & Punie, 2017) and focus on the described key competences from three different areas, which are Communication and Collaboration, Digital content creation, and problem solving. The project is in its initial phase; hence all references cannot be cited in the scientific way in this proposal, references are listed to explain our theoretical approach.

## **Results**

The project is very much in its initial stage; however, the first initial findings and results are available. Initial results cover the development of the training considerations (based on the pedagogical state of the art), a study about the use of multiple devices for the training, mainly in the distance phase, the structure of the first pilot course, and a preliminary design outline for the MOOC, and the Toolbox, which will be developed throughout the project. The quality framework was also identified and implemented as well as the concerns of digital competences.

### ***The concerns of multiple devices***

The project is based on the principle that learners use their own devices. This covers the complete range of digital devices, starting with personal computers (for example in offices), laptops, notebooks, tablets, or smartphones. The consortium developed a strategy to deliver the courses in an interactive and multimedia-based way supplying the learners best. This needs several restrictions, for example for the use of smartphones due to the small displays and the resulting problems with interactive multimedia-based content. All proposed and used tools can be used free or are licensed under a CC license.

### ***Used frameworks for course development and course quality***

The project uses two frameworks developed in the European Community. These are the Excellence (framework for course development developed by the European Association of Distance Teaching Universities) (Ossiannilsson, Williams, Camilleri, & Brown, 2015; Roswell, Kear, Williams, Ossiannilsson, et al., 2016). This framework offers guidelines to management, curriculum design, course design, course delivery, and the support of staff as for students as well. This framework was originally developed for higher education but is adapted to VET education by the consortium. The other one is the DigiComp2.0 framework, briefly described below.

### ***The digital competence framework***

The DigiComp 2.0 framework was developed by the Joint Research Center (JRC), the science hub of the European Commission (JRC, 2018). It describes the necessary digital competences for European citizens (DigComp, 2017). As all people from the target groups (trainees, trainers, and finally the stakeholders from the small and media enterprises (SMEs) are in this group the consortium refers to this framework in all cases dealing with digital competence (Geetika & Venkatraman, 2017). This is for example the digital content creation (for trainers' trainers) but as well the information and data literacy (for trainees). All the considerations of digital competences are collected in the MOOC (for trainers) and used for the course creation. Even the DigCompEdu framework by JRC (Redecker & Punie, 2017) will be used.

### ***Pedagogical and training framework***

The development of a pedagogical framework best fitting to employed C-VET learners has been done by the consortium. This framework is published at the webpage as a first result (as an Open Educational Resource OER) and can be downloaded for free. When the EDEN conference is in June 2018 we are about to have some more results to present.

### ***Course concept for non-formal education***

With the umbrella organisation of the Sakralenergetiker in Austria the new training course implemented as a blended learning training was designed. In this course, all the relevant findings, frameworks, and innovations are used to create a modern C-VET (and as a follow up additional VET courses for the education and training of Sakralenergetiker. This profession is part of medical care and human therapy.

The project is expected to gain feedback of real VET learners involved in blended learning courses using multiple devices. This feedback is used as an outcome to the development of the trainers' toolbox. This toolbox will hopefully merge practical use and inhomogeneous technical devices (Sung et al., 2016) as well as the expectation gap (mentioned in the beginning) The specific proposal for training methods like the use of multimedia content, interactive videos based on micro learning will bring a better training environment and motivate the trainees in their working life and conditions.

## Conclusion

The first initial results point into the direction that the use of technical devices is standard in VET learning and humans expect to use it for their learning. For the course as such, it is difficult to estimate in an inhomogeneous group which devices to be used. The course creator must care for an overlapping average of the provided material covering all used multiple devices.

The use and the adoption of existing frameworks enables a high flexibility, uses knowledge and experience transfer from other European projects, but leads to an independent but well-fitting development of technology enhanced VET trainings.

The initial research even points to that the technical features are due to both the devices, as such but also to the used operating system. The used learning platform Moodle basically delivers content in a HTML 5 format which is displayed at all devices offering standard tools to display the content. Further research and tests are thus necessary to define precisely which material can be delivered and used by all devices. Other findings are the time factor in the learning process. Time must be used efficiently by VET learners. The use of multimedia in combination of workplace based micro-learning seems to be a promising approach. Following the approach of flipped learning for vocational and professional education and training (VPET) some considerations of Bergman will impact to the project, for example the use of multimedia based micro-learning or interactive videos.

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## QUALITATIVE LEARNING ANALYTICS TO UNDERSTAND THE STUDENTS' SENTIMENTS AND EMOTIONAL PRESENCE IN EDUOPEN

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### Summary

What emotional experience can students live in digital mediated learning processes? In this paper we connect Learning analytics and Grounded theory to analyse the emotional presence of students in 11 courses within EduOpen ([www.eduopen.org](http://www.eduopen.org)) MOOCs' platform. Namely, we analysed through a bottom up process and Nvivo 11 Plus software the forum dedicated to the students' self-presentation from all of the courses. By going ahead with the analysis, we defined a set of categories composed by a three-levels system. At a more general level we have the macro-dimensions "Sentiment about EduOpen" and "Emotions toward topics". Each of these dimensions is composed by a number of child" categories and subcategories (which are the nodes to Nvivo's language). After defining the entire set of categories and categorizing all the texts (which was a circular process), we run some graphs on Nvivo showing the hierarchical structure of dimensions, the relations among dimensions and sources, and the clusters of dimensions by coding similarity. Results show how some courses are more composed by negative or positive sentiments (both toward the topic or the logistic arrangement of the course) and how the motivations dimension heavily characterizes the broad emotional dimension of students. In an evidence based action-research perspective, these results give interesting suggestions to personalize the learning activities proposed to students by EduOpen.

### Theoretical framework

This contribution connects three different fields: the area of learning analytics, the area of education specifically interested in digital mediated learning processes, and the approaches focused on the emotional dimension in learning. Namely, learning analytics is the measurement, collection, analysis and reporting of data about students and the contexts they learn through. The aim of learning analytics is to understand, personalize and optimize learning and the environments in which it occurs. Learning analytics are mainly used in learning contexts mediated by the use of digital environments, since they can produce an amount of data about the traces each student or entire groups of learners leave online, successful activities, difficult experiences, and so on (Rienties & Rivers, 2014). In relation to the field of learning analytics, we stress the emotional dimension of learning as well. Speaking about feelings and emotions from a general and classical perspective, we can think that human beings can feel universal emotions, such as anger, disgust, fear, happiness, sadness, and surprise (Ekman, 1999) or joy-sadness, anger-fear, trust-distrust and surprise-anticipation (Plutchik, 2013). However,

we can refer to emotion and, specifically, to emotions and learning, after answering the question “How can we define and understand emotions at a more specific level?”. According to Zembylas (2008), there is no agreement about what an emotion is and is characterized by. Indeed, emotions can be understood at least through three different perspectives: (a) Emotions as private and belonging to an intimate experience, as defined by psychodynamic approaches; (b) Emotions as sociocultural phenomena, as understood by social constructionist approaches; (c) Emotions as described by interactionist approaches, which transcend the dichotomies (e.g. mind/body, individual/social) established in the previous two and aims at bridging their differences. However, even if there is no a common definition of emotions, authors claim that they are not separated from the learning context (Lehman, 2006; Lipman, 1991). Coherently to this, for example, communities of inquiry (Garrison, Anderson, & Archer, 2000) are digital mediated learning experiences characterized by the cognitive presence, the social presence, the teaching presence and the emotional presence (Cleveland-Innes, & Campbell., 2012). This last is understood as the “emotional expression part of being socially present online” (p.272). If we still stay at this general layer, we can connect the interesting about the emotional dimension and the learning analytics by referring to Sentimental analysis, also known as Opinion mining looking for both negative and positive sentiments people have about the digital environment they use. However, this connection does not suggest how we can understand emotions at a more specific level. As for this point, Cleveland-Innes and Campbel (2012) approach the emotional experience of students through Grounded theory, that is by doing a content analysis of texts, looking for contents about emotions and defining a grid of categories through a bottom up process (from the text to the categories).

In this contribution, we connect both learning analytics and grounded theory to analyse the emotional experience of students in an online learning context made by eleven courses. This integrated system allows us exploring sentimental and emotional dimensions at macro-, meso- and micro-levels of the context. At the same time, we also created a three-levels set of categories for the emotional analysis, composed by general dimensions, more specific categories and further subcategories.

## **Aims**

- To explore the emotional processes experienced by students during the participation in MOOCs proposed by EduOpen.
- To personalize the learning activities, according to students' emotional experience.

## **Context and data**

This research is supported by Unifg Tutoring – UniTutor project and the context of analysis is EduOpen, an international Moodle platform lead by the University of Foggia (IT). We can better describe the context by referring to the macro-, meso- and micro-levels composing it. At a macro level, EduOpen is realized by 17 Italian Universities and several foreign partnerships. It started in 2014 and is an action-research project periodically rearranged thanks to evidence-based methods. Until now, it involved more than 70,300 learners from all over the world and

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proposed 140 courses. Indeed, the activities of EduOpen are online courses loaded on the Moodle based platform. Through a micro perspective, we can describe that each course refers to a specific topic (e.g. math for beginners, animals, English, and so on), and is managed by a university teacher and an online tutor of the EduOpen team. Furthermore, at the end of a course, students receive a participation certification, an open badge or ECTS. More specifically, each course spends three-five weeks and is composed by:

- A self-presentation forum where students usually write down a post about themselves, the place they live, the wishes and expectations they have about the course, and so on;
- A number of MOOCs videotaped by the teacher and related to the topic of the course;
- Another forum where students can ask further explanations to the teacher;
- An evaluation section, where students fill in online tests during or at the end of the course.

At a meso-level, we can say that all of the courses are categorized in different fields (such as, Literature, Science, and so on), in several pathways (an ensemble of courses connected each other by a main theme) and/or in the catalogue that a specific University partner proposes. In this paper, data are characterized by the self-presentation forums of all the courses managed by the University of Foggia (IT). These are 11 courses and have involved 43345 students in total (10,277 of them completed the course they were unrolled in). Therefore, we especially look at the micro-level of each course and at the meso-level of the group of courses proposed by the University of Foggia.

### **Method of analysis**

According to both Grounded Theory and Sentiment analysis approach, we:

1. Created a first general grid of analysis, composed by the two general dimensions "Positive sentiments" and "Negative sentiments" referred to the learning experience in the digital context;
2. Categorization of the texts through qualitative content analysis (Mayring, 1997), by using Nvivo 11 Plus;
3. Generation of further dimensions and their specific categories, emerging from the interaction between grounded approach and theoretical concepts;
4. Team discussion about the building of the grid and the categorization;
5. Checking of the categorization according the team discussion;
6. Analysis of the nodes (the categories to the software) by using Nvivo 11 Plus.

### **Results**

During the analysis, we realized that the first version of the grid needed to be much more enriched. Therefore, we created a double grid, able to grasp three levels of the students' emotional experience in the University of Foggia EduOpen courses. In other words, we defined two general dimensions: (a) "Sentiment about EduOpen", grasping what students felt about

EduOpen, its services and the arrangement of the courses; (b) “Emotions toward topic”, observing the feelings about the topic of the specific course students participated in. That is, the first dimension is about the feelings toward the digital environment, the concept of EduOpen, the arrangement of the environment. The second one refers to the feelings about the topic of the specific course. Furthermore, as Figure 1 and Figure 2 show, the category “Sentiment analysis” is composed by two more specific categories: “Negative sentiments” and “Positive sentiments”. These, in turn, are composed by other two subcategories for each (moderately/very negative; moderately/very positive). The figure shows the hierarchical relation among “parents” categories and “child” ones too, as elaborated through Nvivo.

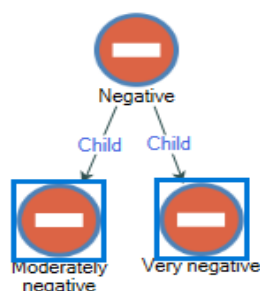


Figure 1. Negative sentiments to EduOpen child graph.

Negative sentiments have the two children nodes “Moderately negative” and “Very negative”

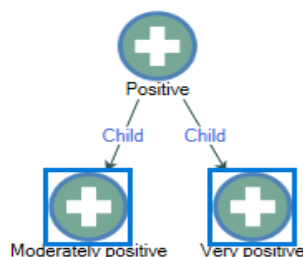


Figure 2. Positive sentiments to EduOpen child graph.

Positive sentiments have the two children nodes “Moderately positive” and “Very positive”

The dimension “Emotions to topic” was at the end shaped by a complex structure of categories. At a middle level, we grasped the three categories “Motivations”, “Negative sentiments” and “Positive sentiments” (not to be confused with the two namesake categories “Positive” and “Negative sentiments” about the digital experience in EduOpen already described). “Motivations” refers to a category exploring a more cognitive dimension, even implying the students’ expectations about the contents of the course and the reason why they are going to attend the course. Indeed, it is composed by seven specific or “child” categories. “Negative sentiments” is about the feelings students have against the content of the course and is composed by five specific or “child” categories. “Positive sentiments” is about the good feelings students have toward the content proposed by the course and is shaped by five specific or “child” categories. In Table 1, we describe all the categories composing “Emotions to topic” (a graph like Figure 1 and 2 would be more impressive, but we think the table is more effective).

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Table 1: Macro-, meso- and micro-level categories of "Emotions to topic"

Macro level category	Meso level category	Micro level category (and eventual description)
Emotions to topic	Motivations	Deepen knowledge (to go in depth in the topic the course refers to)
		Home learning (participate because you can attend the course staying at home)
		Innovative methods (to be tried)
		Mind training
		Old knowledge renewal
		Practical effects (in daily job activities)
		Support to learning (of other contemporary learning experiences)
	Negative sentiments	Disorientation
		Fear
		Feeling in trouble
Positive sentiments	Nostalgia (about past learning experiences on the same topic)	
	Sense of unfinished	
	Discovery and curiosity	
	Enthusiasm	
	Feel interest	
		Hope (to better understand the contents in opposition to past experiences)
		Passion

After creating the final grid of analysis by making the categorization, we checked them (the grid and the first categorization) by a team discussion, until we reached a total agreement about both. At the end, we analysed the nodes and their relationships with the sources (the texts of the forum) by elaborating some graphs through Nvivo 11 Plus. The following graphs (Figure 3, 4, 5, 6) and their respective descriptions show the analysis we made, which we will go back to in the conclusions as well. Figure 3 suggests that, in the general dimension "Sentiment to EduOpen", the category "Positive sentiments" is much more prominent than the which one about negative sentiments. Furthermore, the moderately positive sentiments are more present in the texts than the high positive ones. Figure 4, instead, shows what are the relations between nodes and sources. As it is visible, in eight forums referring to the respecting courses (Biochemical pills, Math for absolute beginners, Law history and philosophy, Animals, Knowing History, History of Italian literature, Course of general mathematics, Tourism marketing through digital media) students express both positive and negative sentiments about the structure of the course and/or EduOpen as a learning experience. Furthermore, in the document of "Pedagogy and education, basic concept" course there are just positive sentiments' references; whereas, in the course about Physics and Basic general pathology there are no sentiment expressions.

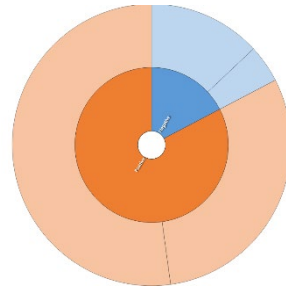


Figure 3. "Sentiment to EduOpen" hierarchical graph.

Dark orange section represents Positive sentiments in total, whereas the dark blue one represents Negative sentiments. The smallest light orange section is about the highly positive sentiments; the smallest light blue sections is about the highly negative sentiments.

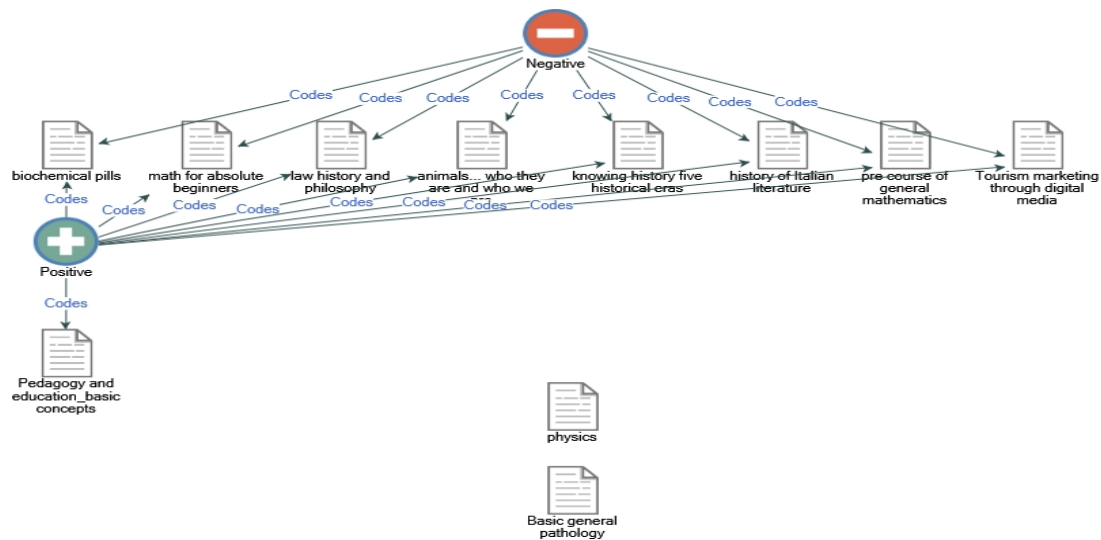


Figure 4. "Sentiment to EduOpen - sources" project map.

The red circle represents Negative sentiments; the green circle represents Positive sentiments. Arrows show the relation between each dimension and the forum of the specific course, that is if there are coded units of the text by using the dimensions.

What about the macro-dimension "Emotions to topic"? Figure 5 shows that the "Motivation" meso-category is the richest one, followed by "Positive sentiments" and then by "Negative sentiments", suggesting that the more cognitive aspects have a higher incidence in the texts.

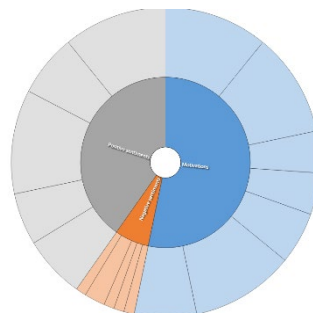


Figure 5. "Emotions to topic" hierarchical graph.

The blue section is about Motivations, the grey section is about Positive sentiments and the orange section is about negative sentiments toward the topic.

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Figure 6, instead, describes the connections between codes and sources. As it can be seen, the category “Motivation” is related to all of the sources, whereas the category “Positive sentiments” is used on all of the courses’ texts except than in “Physics”. Negative sentiments are involved in just three sources (Math for absolute beginners, Law History, Pedagogy and Education. Basic concepts).

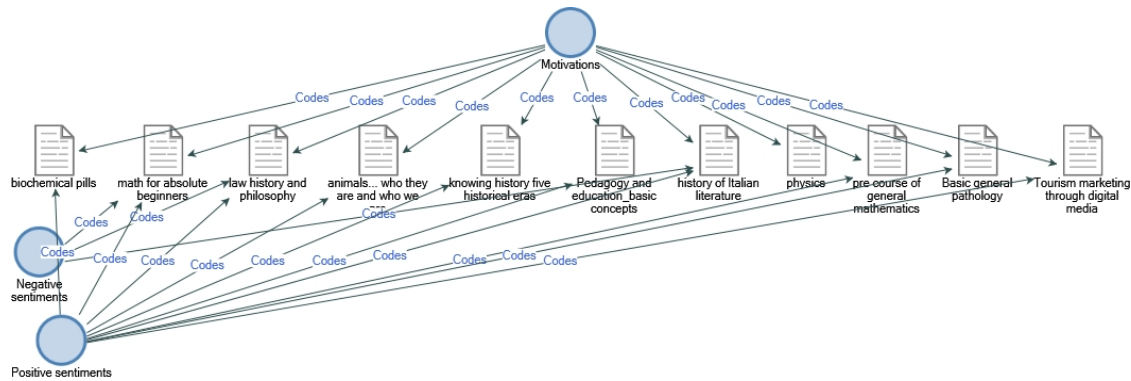


Figure 6. “Emotions to topic - sources” project map

With further analysis, the figures of them are not showed here because of the small space, we clusterized both sources and codes by coding similarity. As results, it emerged that “Motivation” and “Positive emotions” are more similar categories, and that “Physics” and “Basic genetic pathology” are the most distant sources form the others. These further results obtained by the cluster analysis mainly confirm the previous ones.

## Conclusions and implications

In this contribution, we made a sentimental analysis in terms of both negative and positive opinions students have about the learning experience they are going to attend or just began on EduOpen. We also realized a more specific emotional analysis about the feelings learners have for the specific topic of the course they choose. We used a grounded theory approach to grasp the set of dimensions, categories and subcategories about emotions arising from the texts through a bottom up research process. According to the main results, the emerging set of categories is a very complex one and is composed by some clusters of similarity coding. By looking at the hierarchical graph about sentimental analysis, we can see that in general positive sentiments characterize the learners’ perception about the experience in EduOpen. At the same time, the meso-dimension “Motivations” has a prominent space in the hierarchical graph about the emotions connected to the topic of the course. By going in depth in the categories, there emerges that some of them are about intrinsic motivations (e.g. to deepen the student’s knowledge) and others are about external ones (e.g. To have a support for the university exams). However, cluster analysis shows that this last category is quite similar to category “Positive feelings” in terms of coding similarity. It seems, therefore, that students attending the courses have different motivations to participate in them, but they also feel positive emotions related to such a participation. Particularly interesting are the courses “Pedagogy and education” and “Physics”. The first one, indeed, does not have negative references in the dimension “Sentiment analysis”, whereas the second one is coded just by using the category “Motivation”.

Furthermore, there are three courses having references about negative sentiments related to the topic. We find all these results very much interesting for different reasons. Far from generalize a so specific study, we do claim that the entire set of categories shows how complex is the emotional experience of students. This is not just due to the number of categories shaping the set, but also to the three levels characterizing it, the relationships among them and the contextualized value they have in the different educational experiences. These results can have implications in the arrangement of the activities and in the personalization of the learning process, since an organization taking care of the specific emotions students feel can make the learning aims more effective. At the same time, further more specific analysis can give justice to the complexity of the students' emotional presence. Indeed, next studies will analyse the possible statistical correlation in the relations codes-dimensions and codes-sources, and the direction of such relations. Furthermore, we will analyse the forums of other EduOpen courses in order to broaden the study to the macro entire context of EduOpen, and to create methodological tools connecting the usual learning analytics' quantitative perspective and the qualitative dimension shaping the emotional experience of students.

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## VIDEO ABSTRACTS FOR SCIENTIFIC EDUCATION

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### Introduction

Current research results are traditionally published in the form of conference proceedings or journal articles. These papers are often difficult to find or hidden behind the paywalls of commercial publishers and they are generally written in a scientific jargon, which is difficult to understand for the general public or even for scientists who are not from the same discipline. Science videos have an enormous capacity to bridge the communication divide between research and society. Due to low-barrier access, it allows researchers to communicate their research more effectively and open. “Web video opens a new form of public intellectualism to scholars looking to participate in an increasingly visual culture” (Young, 2008; p.1). A video forum has the potential to make the knowledge gained from scientific communication more useful and richer than before by giving viewers a deeper understanding of the experiential aspects (such as background, methods, and results) of the published contributions (Löwgren, 2011). This is also reflected in the fact that “Science and Technology” is the second most relevant topic on YouTube (Erviti & León, 2014), including channels from institutes like CERN with 84.000 subscribers and from NASA.gov with 139.000 subscribers (data retrieved from YouTube on January 31<sup>st</sup>, 2018.).

Online videos are a valuable information and learning resource for education and knowledge transfer, for the reflection of learning content or for knowledge verification (Zorn et al., 2013). Online videos are available regardless of location and time and can be accessed at any time as soon as there is a need for information. The user can adapt the speed of the information acquisition individually according to specific needs, repeat the content as often as required, skip irrelevant content and also breaks can be determined individually (Arnold et al., 2015; Börner, Schaarschmidt, Meschzan, & Frin, 2016; Kinash, Knight, & McLeal, 2015; Tillmann, Bremer, & Krömker, 2012; Tillmann, Niemeyer, & Krömker, 2014). Moreover, videos transport information both verbally and visually. In this way different learning types can equally benefit from videos and language barriers can be bridged. Further, they also enable authenticity and a feeling of proximity and personalisation to be conveyed (Lackner, 2014; Tillmann et al., 2014; van der Meij & van der Meij, 2015; Zorn et al., 2013).

This paper explores how particularly the genre of video abstracts can foster the scientific education and how scientists can be supported in communicating their research via videos. This includes the production as well as the publishing process, including thoughts on accessibility, citability and reusability of videos via online platforms, which are suitable for scientific work.

## Video Abstracts and Scientific Education

A wide range of formats of audiovisual media are being used in the area of research such as visualisations of simulations and models, recordings of experiments and technical procedures, recordings of conference talks, lectures and workshops. Especially short science videos (SSV) also called video abstracts have grown in popularity over the last decade (van Edig, 2016). A video abstract is the motion picture equivalent of a written abstract and can be defined as “peer-to-peer video summaries, three to five-minute-long versions of academic papers” (Berkowitz, 2013; p.1) that “describe dynamic phenomena which are simply too complicated, too complex, too unusual, too full of information to do in words and two-dimensional pictures” (Whitesides, 2011; min.0:54). Video abstracts can also help to communicate “the background of a study, methods used, study results and potential implications through the use of images, audio, video clips, and texts” (Spicer, 2014; p.3). “In just a few minutes of video you can present the motivation behind the research contained in your article as well as some of your ideas on the topic. You can also discuss the history of your area of research or your ideas on where this field is heading” (Kuemmerle, 2009). Video abstracts also have an impact on the usage of an article. Spicer (2014) showed in a study on the basis of the “New Journal of Physics” (published by IOP Science) that articles with a video were more likely to be downloaded than those which do not. “Of the top 25 articles with the highest usage, 36% had a corresponding video abstract” (Spicer, 2014; p.9). A video abstract is a useful tool to convert video views into online article downloads – especially if they are published in open access journals (Watkins, 2016).

Especially when it comes to keeping up with the growing amount of interdisciplinary research, short science videos are a very helpful tool to gain an overview on research from outside of one’s discipline (van Norden, 2015). “We see younger researchers using video abstracts to scan literature quickly,” says Cameron Macdonald, executive director of the Ottawa-based publisher Canadian Science Publishing (formerly NRC Research Press). Another benefit of creating a video abstract is to rethink one’s research results in another format. For this purpose, Dr. Whitesides of Harvard has all his students prepare three-minute, abstract-style oral summaries of their latest research (Whitesides, 2011). Short science videos also have a great potential to communicate science to wide audiences, which would otherwise hardly learn from the valuable research that is done. As an example Steve Maguire, a chemistry researcher and host of the YouTube channel “ScienceIsnotScary” explains everyday science in understandable terms (<https://www.youtube.com/user/ScienceIsnotScary>). In his short science videos, he demonstrates, that you don’t need to be a scientist to understand science.

This leads to the question of how scientists can be supported and learn how to communicate their research to a wider audience, so that people from inside and outside their field can be educated, informed and inspired.

## How to produce a Scientific Video Abstract?

The publisher Wiley has recognized the potential of video abstracts and developed a business model in partnership with Research Square (<https://www.researchsquare.com/videos/wiley>) that aims to outline the key findings of a published article in a dynamic video. Some authors also team up with filming companies in order to have a professional result. However, in most cases, video abstracts are produced on a low budget and in a relatively short period of time by the scientists themselves. This has become easy with direct access to production technology on smartphones and freely available editing tools. Authors can choose from a wide range of stylistic options: from simple whiteboard drawings and stop motion pictures to screen recordings, documentary scenes, interviews, slide shows and “talking heads”.



How dog brains process speech (Andics et al., Science, 2016)

Figure 1. Screenshot of the video abstract “How dog brains process speech”  
(source: How dogs brain process speech <https://youtu.be/N9QQxa6eLPc>)

This technology facilitates the production of a video abstract, which aims to transform the background and findings of a study into something comprehensible and attractive for everyone. Most commonly the authors avoid scientific jargon wherever possible. With the on-camera and documentary style video about research on dog brains, which was developed by Dr. Andics and his team in 2016, it could be demonstrated that it is possible to transmit a complex scientific message in a simple audiovisual format that reaches more than 400,000 viewers on YouTube. Cell Press authors often use the whiteboard drawing technique, which allows to create a step-by-step and easy to follow video. A good example of this is a video with the catchy title “The MutAnts are here”, which explains new results on the social life of ants in a very vivid manner (The MutAnts are here <https://youtu.be/M476cn6X5zM>). Paul Young’s (Department of Mathematics, College of Charleston) series of video abstracts for the Journal of Number Theory is an example of how to create a calm and laid back atmosphere when talking about a complex topic. He usually sits outdoors in front of the camera wearing a soccer t-shirt and gives a summary of his paper (Symmetries of Bernoulli polynomial series and Arakawa-Kaneko zeta functions <https://www.youtube.com/watch?v=0vQqfgrkX2k>).

More and more libraries, universities, researchers and even filmmakers are offering online guidelines and tutorials to help scientists communicate their research to fellow scientists or the general public. The Science Out of the Box series by Johns Hopkins University gives examples on how to explain academic principles by the means of video (<http://www.hopkinsmedicine.org/research/advancements-in-research/out-of-the-box.html>). The Observatory for Scientific Communication of the University Pompeu Fabra (Spain), teaming up with the Spanish Foundation for Science and Technology, published a guide on how to produce scientific videos (<http://asecic.org/wp-content/uploads/2013/09/video-cientifico1.pdf>, in Spanish). Impact story, which is a website that helps researchers go beyond citation rates to measure the impact of their contribution, offers a five-step process and several examples for creating effective research videos (<http://blog.impactstory.org/impact-challenge-video-abstract>). Karen McKee, also known as “The Science Videographer” is a retired botanist and oceanographer who has a blog and several tutorials on sharing scientific research through video (<http://thescientistvideographer.com/wordpress>).

Besides online programs there are also classroom workshops available. The Centre for Science Communication and the UNESCO Chair for Multimedia in Education (Eötvös Loránd University of Sciences, Budapest, Hungary offers a one-semester course specifically dedicated to teaching science communicators how to make scientific video abstracts ([http://ttk.elte.hu/Faculty\\_of\\_Science](http://ttk.elte.hu/Faculty_of_Science)). Libraries are also a valuable partner when it comes to promoting media literacy and supporting of scientific work (Plank, Molnár, & Marín-Arraiza, 2017). The Technical University of Denmark offers a workshop for its researchers to encourage them to produce video abstracts and increase the visibility of their publications (<http://www.bibliotek.dtu.dk/english/nyheder/2016/10/videoabstracts?id=4325fe2c-0b5a-48be-af6f-e8b33967636d>). Professional filmmakers from Filmjungle.eu (<http://filmjungle.eu>) teamed up with the German National Library for Science and Technology to conduct workshops on the production of video abstracts (<http://blogs.tib.eu/wp/videoabstracts/about-the-workshop>). The workshop includes the following steps: analysing elements and techniques used in popular video abstracts, writing a script, producing the video, editing the material, sharing and publishing a video including topics like open licences such as Creative Commons (<https://creativecommons.org>). The evaluation of the workshop confirmed the assumption that a professional guidance and an interactive concept enables scientists and PhD students to acquire all skills necessary to create a short science video – regardless of the topic or the author’s experience in filmmaking – within a single day, using smartphones and freely available software (Plank et al., 2017).

## **Where to publish a Scientific Video Abstract?**

With the increasing number of scientists creating short videos in a non-commercial style, the question of how to publish them effectively becomes more and more important. YouTube and Vimeo are the big players in this field. Cell Press was among the first publishers to realize the potential of video abstracts and launched a video portal back in 2009 to share video abstracts which were published on YouTube. From there the videos were linked and embedded in the Cell Press Video platform, which allowed for a better curation of the videos

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(<http://www.cell.com/video>). Now the channel features 400+ videos and viewing figures are over 100K and rising. A large number of scientific publishers like Copernicus Publications, IOP Science, Elsevier, Wiley and Taylor&Francis are offering an option for submitting video abstracts and link them to the article. Each publisher or journal that accepts video abstracts has technical guidelines posted online that specify file formats and other key technical information and often also tips for the production. There is also a number of open access portals like the free platform WeShareScience (<http://wesharescience.com>), which provides a place to publish, share, discuss, and create video abstracts. Videos on the site are searchable, organized by discipline, and there is an advanced search feature that allows you to search in the transcripts of the videos. The open-access video journal Latest Thinking (<https://lt.org>) offers video abstracts that are on average 10 minutes long and feature five chapters (research question, method, findings, relevance, outlook). Latest Thinking produces the abstracts in collaboration with the researchers and publishes them under a CC-BY 4.0 license. Repositories like Figshare (<https://figshare.com>) and Zenodo (<https://zenodo.org>) also support the publication of video as a research output. Videos are provided with a Digital Object Identifier (DOI), descriptive metadata, and retrieved authors' information from the Open Researcher and Contributor ID (ORCID). Publishers such as BioMed Central rely on Figshare for trustable video publishing.

However, when reliability matters, like in educational settings, YouTube might not be the best choice. Despite being an easy-to-use medium, there is no guarantee of long-term accessibility or preservation of the videos. Links to videos might not be stable and back-linking to the respective articles or other resources might not work anymore after a while. Libraries have always been an excellent partner when it comes to making knowledge available, accessible and searchable for the long term. Libraries can support the increased production and use of videos by offering reliable infrastructures and new services. An example of these services is the web-based AV portal (<https://av.tib.eu>) of the German National Library of Science and Technology. It is an open platform for sharing scientific videos predominantly from the fields of technology, architecture, chemistry, computer science, mathematics and physics. The platform currently provides approximately 13.000 videos under CC licences (January, 2018). All videos are allocated with Digital Object Identifiers (DOI) for easy and reliable citation. The portal's special feature are the semantic analysis tools, which enable to retrieve videos even if the search term is not in the metadata but in the spoken text, text overlays or images (Hentschel, Blümel, & Sack, 2013; Strobel & Marín-Arraiza, 2015; Waitelonis, Plank, & Sack, 2016). The portal is suitable for the support of active reception and learning processes, because it has a large number of interaction elements so that content and presentation sequence of videos can be individually controlled (Saubier, 2017). The visual table of contents provides additional interaction possibilities for browsing, relevant segments can be easily identified within a video, accessed directly and viewed in any desired selection and order. Besides, many videos are linked to additional material – e.g. conference proceedings, data sets or presentations – which can be used as additional educational resource. A short video shows the main features of the portal (<https://av.tib.eu/media/21256>).

## Conclusions

Initiatives to use videos for educational purposes have become increasingly popular in the current decade. Learners in both formal and informal contexts are part of a visual culture, which transforms videos into an appropriate tool for science communication and interpretation. In fact, a large number of YouTube users visit the platform to gather information about science and technology. As Young (2008) pointed out, that scholars need to participate in this increasingly visual culture and take advantage of the potential of videos for knowledge dissemination and transfer. On the other hand, educators and learners profit from the visualization of complex scientific experiments.

This paper presents video abstracts as a point of convergence between scientific communities, educators and learners. By means of different video techniques, scholars can communicate the results and the background of their study in a short video. Usually, the type of language is also simplified to address a wider audience. However, filming a video abstract does not appeal to many scientists due to the apparent difficulty of the task and the lack of academic recognition (Lê et al., 2015). Hence media literacy training initiatives as well as reliable services and infrastructures that are suitable for scientific work are needed. In this paper an approach was introduced that showed how different stakeholders like scientists, filmmakers and librarians can cooperate in order to foster science education beyond the ivory tower.

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## **USING A BLENDED BUSINESS DECISION SIMULATION (BDS) TO GAIN PRACTICAL BUSINESS EXPERIENCE**

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### **Introduction**

The world of today is facing complex and dynamic challenges, requiring a new kind of professional: one with theoretical knowledge, practical experience and significant problem-solving capabilities. Furthermore, the nature of work has also fundamentally changed in recent decades and one of the consequences in a global environment is projects becoming the dominant structural form of work organisations (Geithner & Menzel, 2016). According to Neck and Green (2011), educators have the responsibility to develop the discovery, reasoning and implementation skills of students so that they may excel in these highly uncertain environments.

However, such competencies can hardly be achieved in traditional ways of learning and a shift away from lecture-based to more active learning methods can foster knowledge generation and skills development (Geithner & Menzel, 2016). Equipping students to meet the challenges of tomorrow requires a shift to learning environments that actively involve students in problem-solving and critical thinking. Experiential learning (Brockband & McGill, 1998 as in Geithner & Menzel, 2016) is one way to address the above issues with simulations as being one mode of experiential learning. Furthermore, using a simulation to gain practical experience of real-world problems is an attempt to reduce the distance between theoretical knowledge (micro level) taught at University and what really happens in the workplace (macro level). Simulations may be particularly useful in situations where the curriculum is not able to incorporate practical business experience or internship opportunities. For the purpose of the paper, the operational definition for a simulation is derived from Hodkiewics (2015) stating that “a simulation is a dynamic, simplified and accurate model of reality that is a system used in a learning context”.

Against this background, we implemented and evaluated a simulation called the Business Decision-making Simulation (BDS). BDS creates a start-up business experience, which allows for business decision-making in a secure environment and allows for enterprise growth. The blended simulation presented a concrete non-digital presentation of the business world accompanied by a high digital online component. Thus, the aim of this study was to better understand and gain insight into the perceived key learnings as well as the perceived value of taking part in the BDS as a replacement for an internship or practical experience in a small business. It is important to note that the focus of the study was not to determine if knowledge transfer occurred when using the simulation, a study done previously by Le Roux and Steyn (2007).

The participants that took in the BDS were a third year HE student group in an entrepreneurship degree. Data for this study was gathered through written reflections of their key learnings as well as the perceived value of the BDS as a tool to gain practical business experience. The main contribution of the paper was to describe the ability of BDS to allow students, who did not have business or start-up experience to apply thinking processes necessary to start and grow a business, muster resources, make decisions and solve problem in a secure business environment. Moreover, the BDS provides an opportunity to integrate theory and apply it in a simulated business environment, while developing skills and competencies also valued in the workplace. Identifying the key learnings gained from taking part in BDS as well as the perceived value as a replacement for practical in business experience or internships helped us to better understand how to address the need for practical workplace skills.

In view of the potential contribution of BDS, the following two research questions were formulated to guide the research:

- What are the key learnings students derived from taking part in the simulation?
- What are the perceived value as a replacement for practical in business experience or internships?

The rest of the paper will present theoretical evidence, research methodology, findings and discussion of findings as well as the limitation and recommendations for further research.

## **Literature review**

### ***Simulation as an experiential teaching method***

In their future workplace, students need to work under uncertain and complex conditions for which they are not necessarily adequately prepared (Geithner & Menzel, 2016). Simulation as an educational tool provides an opportunity for interactive and experience-based learning and are valuable because it combines input, application, reflection and feedback, moving away from learning by listening to learning by doing (Geithner & Menzel, 2016). The business decision-making simulation (BDS) used in this study forces participants into decision-making processes from start-up to growth. It is a shift away from the lecture-based education to a more active learning method, theoretically grounded on Kolb's experiential learning theory (Kolb, 1984; Kolb & Kolb, 2010). Both Dewey (1938) and Kolb (1984) agreed that education is accomplished through experience and reflection and that knowledge can only be created by transforming the experience. Experiential learning as a learning theory is defined as gaining knowledge through practical experience. Experiential learning occurs within the simulation, and reflective practice becomes embedded in the experiential learning process (Le Roux & Steyn, 2007). Two major types of experiential learning exist namely field-based learning and classroom-based learning. Field-based learning includes internships, practicums, cooperatives education and service learning. Classroom based learning includes role play, games, case studies, simulations and presentations (McCarthy & McCarthy, 2006; van Oordt & Sullivan, 2017). Kolb (1984) identified four phases in this experiential learning process. The first phase namely "concrete experience", relates to the student's active participation in the start-up and growth process and

is a representation of a real-world system constructed to study some aspects of the system or the system as a whole (Cooper & Schindler, 2003). The second phase “reflective observation” refers to the student’s experience reflecting on the process and application of new knowledge acquired. The third phase “abstract conceptualisation” refers to the students realising, absorbing and reaching conclusions on the outcomes of the reflection phase. The fourth phase “active experimentation” refers to implementing what the student has learned from the previous experience within a new experience (van Oordt & Sullivan, 2017). In addition to Kolb’s (1984), Bell, Kanar, and Kozolowski (2008) identified four structural features of simulations in relation to the learning process namely content, interactivity, communication and immersion. *Content* refers to the information available in the simulation, it allows for low risk participation and feedback on performance. *Interactivity* allows for competing, collaboration and interactive features to engage learners in the learning process in an attempt to gain their attention and interest. *Communication* refers to the degree of interaction with the community around the table. *Immersion* refers to what extend the students are involved in the learning process. Being emotionally involved in the simulation experience has shown increased learning (Lovelace et al, 2016). These benefits have a positive effect on learning and the students’ reaction to the training (Bell et al., 2008; Lovelace et al., 2016). In the revised classification of Bloom’s taxonomy (Krathwol, 2002) a two- dimensional framework, *knowledge* and *cognitive* domains emerged which forms a very useful taxonomy table to classify objectives, activities and assessments. However, referring to Krathwoul’s (2002) *affective domain* where a person’s affect towards an object passes from a general awareness level to a point where the affect is internalised and consistently guides and controls the persons’ behaviour (Seels & Glasglow, 1990; p.28) is relevant to the outcome of a simulation.

Educational games and simulations have a long history in management education (Hodkiewicz, 2015; p.456). The use of games and simulations in education supports a constructivist view in which learners develop their own sense of the world and actively participate in the discovery of solutions (Hodkiewicz, 2015; p.456). Simulations are a valuable game educational tool that encompasses an inter-active, experienced-based learning and a valuable educational tool (Geithner & Menzel, 2016). However, games and simulations are often treated as similar activities or conceptual distinctions are made between a game and a simulation based on learning rather than actual concepts of the game (Saive, Renaud, Kaufman, & Marquis, 2007). The definition of a game is a fictitious, whimsical or artificial situation in which players play in a position of conflict. Rules govern the games, which gives structure to their actions in view of the objective or purpose to win. The definition of a simulation states that it is a dynamic, simplified and accurate model of reality that is a system used in a learning context. These attributes of a simulation are essential to its use in addressing educational objectives and allowing learners to study complex and real phenomena (Saive, Renaud, Kaufman, & Marquis, 2007). Thus, the BDS used in the third-year entrepreneurship is a simulation and not a game based on the following attributes: It is a simplified, dynamic and accurate model of a real start-up and growth experience and allows for decision-making in a secure practical learning environment. Simulations have many benefits. Students are more involved, the simulation offers a space of freedom where mistakes can be made without negative consequences; it is a

hands-on approach which allows for problem-solving, decision-making, critical thinking and taking personal responsibility for the outcome (Palmunen, Pelto, Paalumaki, & Lainema, 2013; Geithner & Menzel, 2016).

In South Africa, training for a professional qualification such as engineers, accountants and doctors requires practical and pervasive competencies. However, in a general business degree it is limited due to the time constraints of the degree. Furthermore, class-room based case studies do not put the student in real time practical experience allows the student to make immediate decisions. Using a blended simulation exercise opportunities of real-time experiences, involving decision-making and problem-solving are presented. Therefore, Garrison and Kanuka's (2004) approach to blended learning that focuses on the thoughtful integration of classroom face-to-face experiences with online experiences remain valid. Their emphasis is on the successful integration of the activities from the two main delivery modes, face-to-face and online. According to Paechter, Maier, and Macher (2010), students preferred the online environment for practicing the skills of their subject and monitoring their own learning processes and preferred the face to face environment for acquiring new skills and concepts and application of knowledge.

## **Methodology**

Aligning course outcomes with real-world experience called for an open and creative research approach. A pragmatic epistemology using qualitative research methods presented a suitable method as it solves problems, uses what is useful and focuses on improve learning outcomes (Anderson, 2013).

## **Context**

The study was conducted in an Entrepreneurship module in the B.Comm degree at the University of Pretoria. Thirty-one students were enrolled in the module. The simulation ran over a one-day period in a training facility on the university campus with two facilitators that guide the participants. An attempt was made to give the students a practical real-world business experience in order to bridge the gap between theory and practice and to enable a better understand of all the contingencies that may occur in a normal business cycle. A business start-up simulation called Business Decision-Making simulation (BDS) provided the opportunity to start businesses (one or many) in a business community of five people and grow their businesses (bigger or more). The blended format of the simulation includes face-to-face participation with an online component to secure information on complex constructs such as positioning to compare offerings of well-known businesses, banks and fast food outlets. The simulation was therefore a concrete non-digital presentation with a high digital component. The BDS creates an environment where the learning process started by having an experience within the simulation arrangement, underpinned by theoretical inputs as and when required, the opportunity to apply the newly acquired knowledge and continues with reflection on experiences during and after (adapted from Geithel & Menzel, 2016). These learning activities aimed to apply, invent, generate new ideas, diagnose and solve problems (Biggs & Tand, 2007).

### ***Simulation Design***

BDS used in this study, was first designed for teaching entrepreneurial skills in high schools. The success of BDS then accumulated and was used in training start-ups to enable real-time decision-making experiences through the venture life cycle from start-up to growth. BDS creates a safe environment that allow for the complexities of starting a business, mustering of available resources as well as growth the business. The reasons for using simulations are vast, ranging from actively involving the student, helping them to apply theory to practice and to create a social context to operate in. The simulation catered for exposure of participants to all the questions and decisions associated with a business start-up. It challenged the thinking underlying the start-up process (Le Roux & Steyn, 2007).

The BDS allowed for a focus on practical start-up experience with continual decision-making opportunities. It models start-up and growth of a venture taking the participants through the venture life cycle stages while focusing on learning by doing. The BDS resembles a monopoly type board and participants could move their pieces around the start-up opportunity lane of the board, as well as through the trade lane, using the throw of a dice to determine how far each piece may move at a time.

The aim was to start a business or businesses and trade to generate profit. The students also had a balance sheet exercise to determine each participant's liquidity led twice during the simulation. During play, an income and expense statement was kept to record all transactions. The player with the premier balance sheet (measured by net asset value and return on investment) at the end of the game was the best performer.

At the start of the simulation, each player receives limited resources in the form of cash, a pension, credit (home loan) and randomly dealt market share cards. The markets share cards were colour coded to relate to the same colour business. There were three different businesses, each representing different turnover rates and profit margins. A complete business that can move to the trading lane and make sales consisted of a concept (idea/opportunity), facility, equipment, distribution channel and expertise. Each card represents one element of what was necessary in the real world to be able to start a business.

During the start-up phase and once participants have started trading, the simulation followed a real-world scenario with strikes, liquidity issues, competition and several other contingencies. When questions arise on issues such as market share, strategic issues, cash flow and leverage of resources, the play was halted and a short interactive lecture is given on the theory which supported the issue. Once feedback and reflection on an issue were completed, the game resumes until another important issue arise. Thus, through trial and error, the participants received hands-on experience supported by theory. This allowed for a much deeper learning experience than a standard lecture or stand-alone simulation (without a facilitator) might have provided. These interactive sessions and immediate opportunity for feedback and reflection lead to opportunities to alter chosen decisions, behaviour and strategies after reflection on the new information given by the facilitators. As the simulation progresses issues that were more complex, were introduced. Students were required to go online to determine, positioning,

marketing issues as well as evaluating their offerings to what was currently already available in the market. The simulation ended off with a debrief that was largely dependent on questions seeking a reflective response. This is in line with the views of both Kolb (1984) and Bell et al. (2011) discussed previously.

### **Data**

Students reflected individually on their perceived key learnings and the perceived value gained from the intervention. The data was collected after completion of the blended simulation. Participants reflected on the first open-ended question namely: what is the key learnings gained from taking part in the simulation? The written reflections for the key learnings were transcribed and grouped. The first round was inductive, allocating codes, the second cycle consisted of creating code families, where related groups were code according to emerging themes. To ascertain transparency and validity the codes were checked first by the author, then reviewed by two experts' researchers. Minor changes to the naming of the themes were made. The second question namely: hat was the practical value gained from taking part in the blended simulation? The responses were also transcribed and grouped to determine if the participants perceived the simulation as a way to gain practical real world experience.

### **Findings and discussion of findings**

The findings report on the perceived key learnings derived from taking part in the simulation as well as the value of BDS to simulate real world or practical business experience. Five themes were identified as the perceived key learnings from taking part in BDS and three themes for BDS as a replacement for in business or internship experience. The five themes emerged during the coding process for key learning gained from BDS: *money matters* receiving 37 responses, *affective awareness* 34, *operational issues* 21, *collective measures* 20 and *negotiation skills* receiving 17 responses.

#### ***Money matters***

Money matters, which consist of money issues focusing on the inflow and outflow of money, spending cash flow and costs. Students reported that, "keeping an eye on money flowing in and out of your business is very important. You need to spend money to make money. Cash is king in a business but you need to borrow to grow".

#### ***Affective awareness***

Affective awareness is a retrospective process and consists of soft issues such as how to handle pressure, builds relationships, perseverance and dealing with competitors. Students reported that, "you need a tough skin to handle the disappointment in the simulation. People will hurt you and your business for their own benefit by luring away your expertise. The simulation taught me patience, perseverance and dealing with frustration".

#### ***Operational issues***

Operational issues consist of decision-making, sales, the importance of market share, the concept positioning and many more. Students reported that, "informed decision-making is key

## Using a Blended Business Decision Simulation (BDS) to Gain Practical Business Experience

Ingrid le Roux

to business success and is very complex. You need to understand the importance of market share in your business – without people buying from you, you are not making sales”.

### *Collective measures*

Collective measures consist of knowing your competition, networks and economic opportunities. This is an important economic principle insight. Students reported that “forming networks are important and beneficial to your business. Knowing the competition is beneficial for the business”.

### *Negotiation skills*

Negotiation skills consists of forming networks and the ability to negotiate. Students reported that “forming networks is important and beneficial for your business. I practised my negotiation skills in the simulation and it made me realise how important it is in a work environment”.

The following three themes emerged during the coding process for BDS as a replacement for in business experience or internships: *business experience* received 31 responses, *strategic thinking* 27 and *entrepreneurial thinking* received 18 responses.

### *Business experience*

Business experience consists of in-business experience, insight into the day-to-day running, between practice and theory; standing in the shoes of the business owner and feeling the consequences of your decisions. Students reported that, “it was a practical hands-on business experience and helped us to see how theory plays out in a real business. I believe I gained practical experience of how a business works, what issues are at play and how my decisions affect the business”.

### *Strategic thinking*

Strategic thinking consists of operational planning, strategic issues, overcoming obstacles to success and experience planning to grow. Students reported that “it forced us to think about different strategies to overcome obstacles and mistakes. The ‘one fits all principle’, worked. It is a fun way of learning what is important in a business, market share, target market as well as strategic positioning and how quickly things can change”.

### *Entrepreneurial thinking*

Entrepreneurial thinking consists of different thinking, owner versus employee, textbook versus practice and thinking out of the box. Students reported that “they think differently about business after the simulation. The simulation forced you to be innovative, find information online and read the market. I thought like a real entrepreneur because it was a realistic business simulation. I had to negotiate, make decision and dealt with the mistakes I made”.

It is evident that BDS incorporates not only Kolb (1984) phases of experiential learning but also the four structural features of Bell et al. (2002). BDS created opportunities for a concrete experience, knowledge reflections and change the way the students do business, by understanding new and complex concepts such as market share and positioning. Students were

allowed to implement new knowledge and during the learning process. Furthermore, students used the available information and sourced new information online, collaborated with the players around the table to form a business community, negotiated with the other businesses for resources and possible partnerships. Thereby causing the students to be emotionally involved in the process. Having to deal with mistakes, failed partnerships, negotiations as well as decision not necessarily having the perceived effect, is valuable on the knowledge, cognitive and emotional domains (Krakwohl, 2002). Students learned from their mistakes, reflected on the mistakes and decisions that allowed for critical thinking and the formation of new concepts. Furthermore, on an emotional level, they need to deal with people, work on soft issues like trust and accept failure. Working face-to-face, taking into account the economy developing round the table, having to negotiate for resources, find information online to distinguish their business from others was perceived as the most important feature of BDS. BDS helped to increase comprehension of the complexities of the business and the various processes, transactions and operations involved (Palmunen et al., 2013).

## **Conclusions**

The paper set out to determine the key business learning derived from taking part in BDS as well as the value of BDS as a practical tool instead of an internship. BDS as a simulation allows participants to take control over their learning process, get the opportunity for hands-on decision-making with real-time information, increase engagement in the learning process and acknowledge the positive and negative experience of decision-making in a realistic context. To answer the main research question, BDS can be used as a tool to replace replacement in-business experience or internships if the latter are not available to students. BDS is acknowledged as an effective tool for teaching content, knowledge and achieving learning goals set out by the lecturer (Lovelace et al, 2016). It is a method of instruction that incorporates practice, feedback and play over a period, in a secure environment which positively affects performance outcomes (Johnson & Rubin, 2011). Students needed to make a series of decisions within a dynamic complex environment that is represented in the simulated context. Furthermore, BDS provided a live exercise conducted in a real time in a safe environment (Balci, Authur, & Ormsby, 2011). As one of the male students reported:

*“BDS is the first hands-on real business experience I was involved in during my three years at university. It was practical and I gained insight in the processes and activities of a business. Far better than learning from a case-study.”*

The study has implications for both educators and practitioners. Involving students in a real-time business simulation, such as BDS, gives students an opportunity to experience business through the life cycle from start-up to growth. It helps students not only to master theory but experience the decision-making and issues of a real business. The study, therefore, confirms the notion that where internships are not an available option BDS can assist in providing students realistic workplace skills.



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## **A TALE OF TWO SIMULATIONS IN HIGHER EDUCATION: EXPLORING THE BENEFITS OF A BOARD GAME AND AN ONLINE SIMULATION**

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### **Introduction**

While games and simulations have been around for a long time, they are increasingly being incorporated into higher education and corporate training, and are particularly popular in the business disciplines. Blended learning allows the enrichment of lecture-based courses through physical face-to-face, computer-based and web-based games and simulations that make unique contributions to the learning processes. Developing custom simulations are time consuming and expensive, and need to be evaluated and improved in several cycles before implementation. Buying off-the-shelf simulations and games are convenient, but they can be quite expensive and cannot be customised for a local context. As with many new technologies, the hype or novelty effect sometimes eclipses the real value. In this study, students in different academic years in the same B Com degree participated in two simulations of professional practice in the Accounting sciences. The research question is: what was the learning value of two different types of simulations for students with diverse learning proficiencies?

### **Literature**

#### **Games**

The essential attributes of educational games include the following: “player or players, conflict [or cooperation], rules, predetermined goal of the game,... artificial ... pedagogical nature” (Sauvé, Renaud, Kaufman, & Jean-Simon, 2007; p.248). Procedural simulations usually contain simulated physical objects, like virtual or token money, because the learner has to imitate the actual procedures of using them to engage in the required procedure. When the user engages with the required actions, a live facilitator or a computer program can provide feedback or further guidance. If the main objective of the model or activity is motivation, it is usually classified as a game or drill. Game motivational techniques include competition, goal setting, scoring, fantasy, surprise, uncertainty and relevance (Alessi & Trollip, 2001). Simulation games meet the definition of a simulation, as well as that of a game (competition, rules, winning and losing). Table-top board games are a good way of incorporating workplace (like accounting or tax) skills and learning the application of theory in the workplace in an undergraduate business course (Fouché, n.d.; Pelser-Carstens & Blignaut, 2018). Such learning games encompass real-world activities that enrich the classroom environment by supporting experiential and

problem-based learning activities and encouraging learner-centred approaches and motivation to learn (Pelser-Carstens & Blignaut, 2018). In many simulation games student groups function like in a real work situation rather than as competing teams. Pelser-Carstens and Blignaut (2018) found that students using a board game enjoyed the social aspect of the board game most, followed by gaining subject knowledge, soft or technical skills and group work and effective functioning the least. Carenys, Moya, and Perramon (2017) found that accounting students enjoyed playing a videogame about the content more than engaging with a comparable simulation. More important is the finding that the cognitive learning gains from the videogame and the simulation were equal (Carenys et al., 2017).

### **Simulations**

“An educational simulation can be defined as a model of some phenomenon or activity that users learn about through interaction with the simulation” (Alessi & Trollip, 2001; p.213). Simulations are by definition based on an internal model, differing in that aspect from games. Essential attributes of simulations include a model of reality defined as a system; a dynamic model; a simplified model; and a model that has fidelity, accuracy and validity,... [to] address directly the learning objectives” (Sauvé et al., 2007; p.251). Scenario-based training can be effective to develop complex skills that are needed in the workplace (Carenys et al., 2017; Saurin, Wachs, Righi, & Henriqson, 2014). A simulation should be based on the identified skills, work challenges, activities and scenarios encountered in reality. Using instructors to play a role in monitoring and steering scenarios, can be impractical and expensive, hence the advent of interactive digital simulations. Autonomous training interventions like business simulations simulate a real environment and characters, while integrating the knowledge, skills and attitudes needed in the training method. Such simulations also facilitate the transfer of those skills to new situations (Alessi & Trollip, 2001; Asiri, Greasley, & Bocij, 2017; Saurin et al., 2014). Online simulations generate high levels of engagement (Carenys et al., 2017). Fidelity refers to how closely a simulation imitates reality, and affects the learner’s performance during the simulation as well as the application of knowledge to new situations. Novice learners initially learn better from lower fidelity simulations that are less overwhelming, avoiding excessive stimuli (Alessi & Trollip, 2001; Huang, Johnson, & Han, 2013). An experienced learner or expert learns most during a simulation with higher fidelity, or a simplified model that is perceived to be similar to the performance environment in key aspects. Such advanced learners achieve better transfer of learning if the perceived fidelity is high enough and they are suitably motivated, see Figure 1 (Alessi & Trollip, 2001). An overview of research on business simulations and gaming confirm their importance as powerful teaching tools, their flexibility to teach diverse subjects and skills, and their relationship to performance (Faria, 2001).

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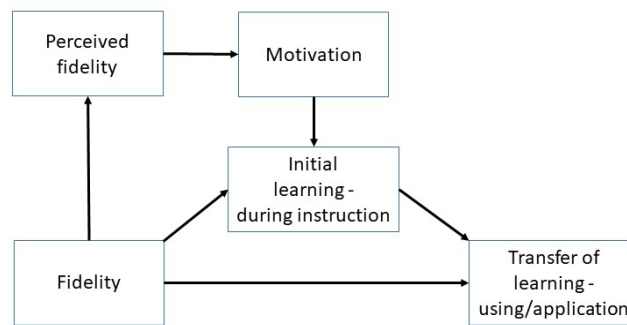


Figure 1. Transfer of learning: from Alessi and Trollip (2001; p.235)

### Context of study

The simulations were deployed in the Economic and Management sciences faculty at the University of Pretoria, a large contact university that encourages blended learning. Both the first and third-year students were in the more challenging chartered accountancy/auditing stream of the bachelor of commerce. The table-top board game, *Commercium*<sup>tm</sup> (Fouché, n.d.) was developed in this country and simulated the roles and transactions a professional accountant would do. The game aimed to familiarise first-year students with the practical context of the accounting profession, and was strongly recommended for the 165 students those who did not take accounting at school. Most of them participated voluntarily in this annual event on a Saturday two months into the academic year. Students played 24 rounds in their teams, competing with other teams to make profit. They had to complete and submit the concomitant documentation afterwards for bonus marks.

The web-based audit simulation was a compulsory component of blended learning for the 601 third-year auditing students with a duration of several weeks. The simulation was developed and hosted overseas, and used per licence. Students worked in groups with a virtual client, interacting with avatars and providing auditing services to a simulated firm. More information is available on the AuditSim website. The simulation continued over several weeks, and students got marks for completing key documents. Only 20% of these students indicated that they play computer games, which does not echo student profiles elsewhere in the world (Huang et al., 2013). Figure 2 shows the spread of students across academic performance in the two groups.

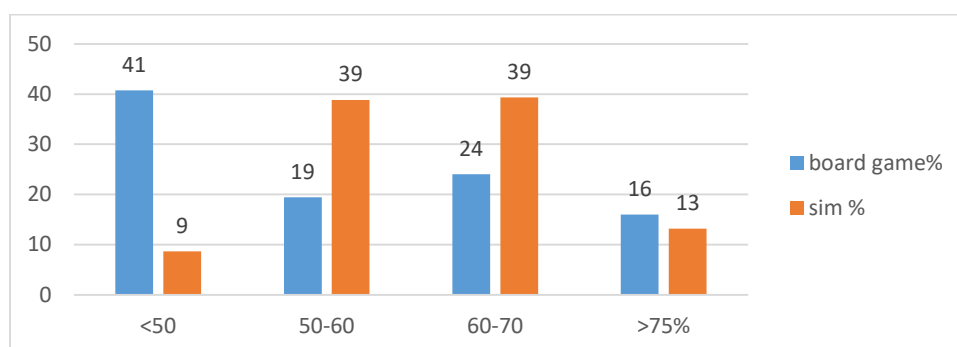


Figure 2. Distribution of student academic performance in the two classes

## **Methodology**

A mixed methods study was performed on data collected using two electronic surveys hosted in Qualtrics™ and linked in the students' online classroom. A hundred and eight first-year students who participated in the board game completed the survey in the year of the study, containing two questions that were analysed. In the first question they could select any one or more of five given statements. An open-ended question also invited them to describe the single most important benefit of the game. Responses were grouped into self-reported performance brackets. Content analysis using Atlas.ti™ was applied to the anonymous qualitative board game feedback, coding and grouping codes according to themes. From the 601 third-year students, 371 of completed the questions in this study. Responses were grouped according to student grades in the subject prior to doing the simulation. Descriptive statistics are presented of the responses that were weighted according to the 5-point Likert scale (1 = *strongly disagree* – 5 = *strongly agree*). Ethics clearance to use the data for research was obtained by the respective lecturers of the courses.

## **Findings and discussion**

### ***Board game played by first-year accounting students***

#### *Board game itemised question*

The question was the following: Please tick all the boxes that describe your experience of the Accounting Board game – (you can tick more than one). Responses were grouped according to the student grades they reported at the time. Figure 3 shows the percentage of students in these groups who selected each statement.

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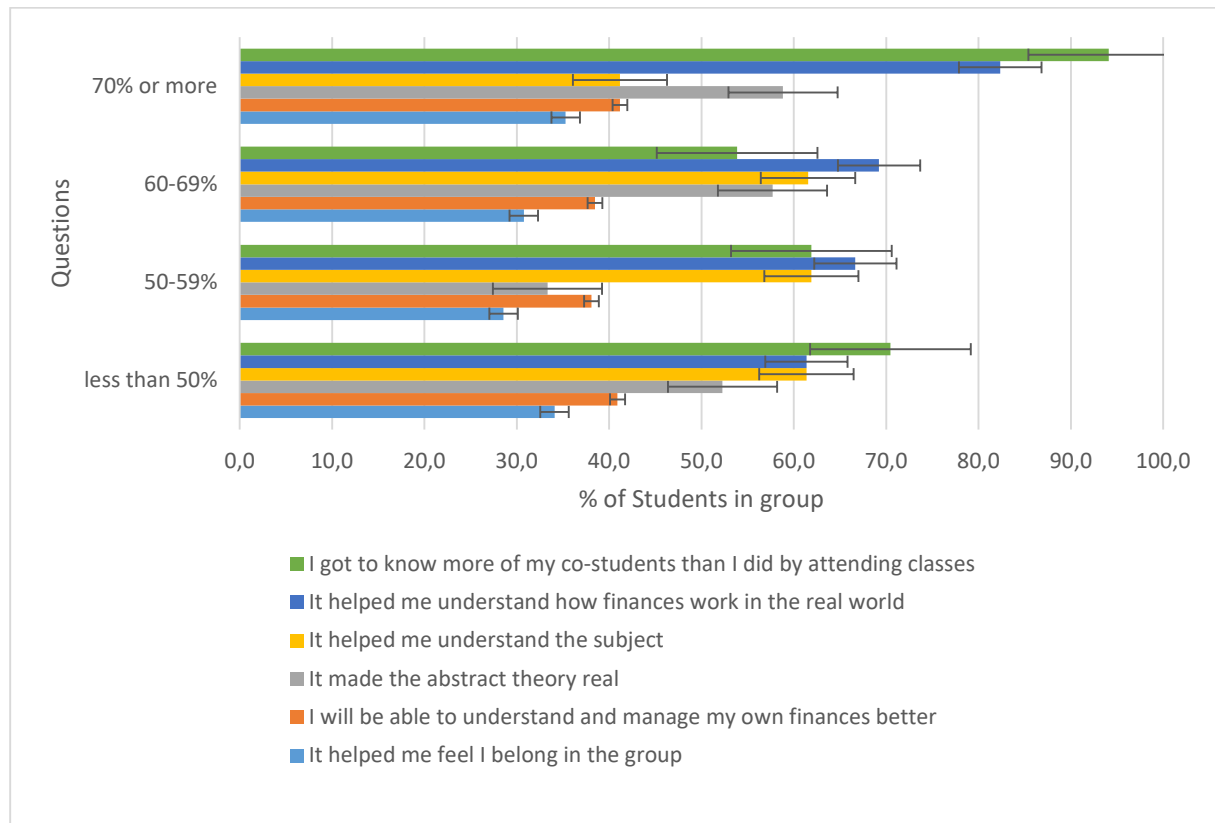


Figure 3. Experience of the Accounting Board game by academic performance: statements chosen.

In the table-top board game, getting to know their co-students obtained the highest mean rating by the class, selected by 68% of all participant students. Understanding how finances worked in the real world, was the second most popular statement of how students experienced the board game. Chosen by 94% and 82% of the 70+ students, those two were by far their top statements. Between 54% and 70% of the rest of the class chose the first item and 61% – 69% the second one. With 58% of the whole class selecting *better understanding* of the subject as overall third, it only attracted 41% of the 70+ students, while around 60% of the other students ticked this box. The simulation made abstract theory real, according to 51 % of students. There was likewise no great variation among groups (mean 39.8%) in how they learnt to understand and manage their own finances. The lowest rating was found in how the games *helped them feel they belonged in their groups*, varying between 28% and 35%. Considering the diversity of the class, not choosing their own team mates, and competitiveness between teams could contribute to this lower rating, in spite of students getting to know everybody.

### Board game open-ended question

The responses of students with different levels of academic performance were coded qualitatively into 25 codes, and grouped into five themes, as shown in Figure 4. Some of the general comments made by students about the game day include: interesting, extremely fun, exciting, informative, a summary or overview of how enterprises operate. They “got experience of actual transactions. It made accounting seem real”. About working in groups: “since we were competing with the other group one had to always be on point by strategising, learning from

the other group and assisting each other where needed. Since we had never spoken to each other it has increased our network of friends” They mentioned competition, team spirit, rewards. Unintended outcomes included: “now I am assured that I chose the right course”. The open question was: In one sentence, what was the most important thing that the Accounting board game helped you with?

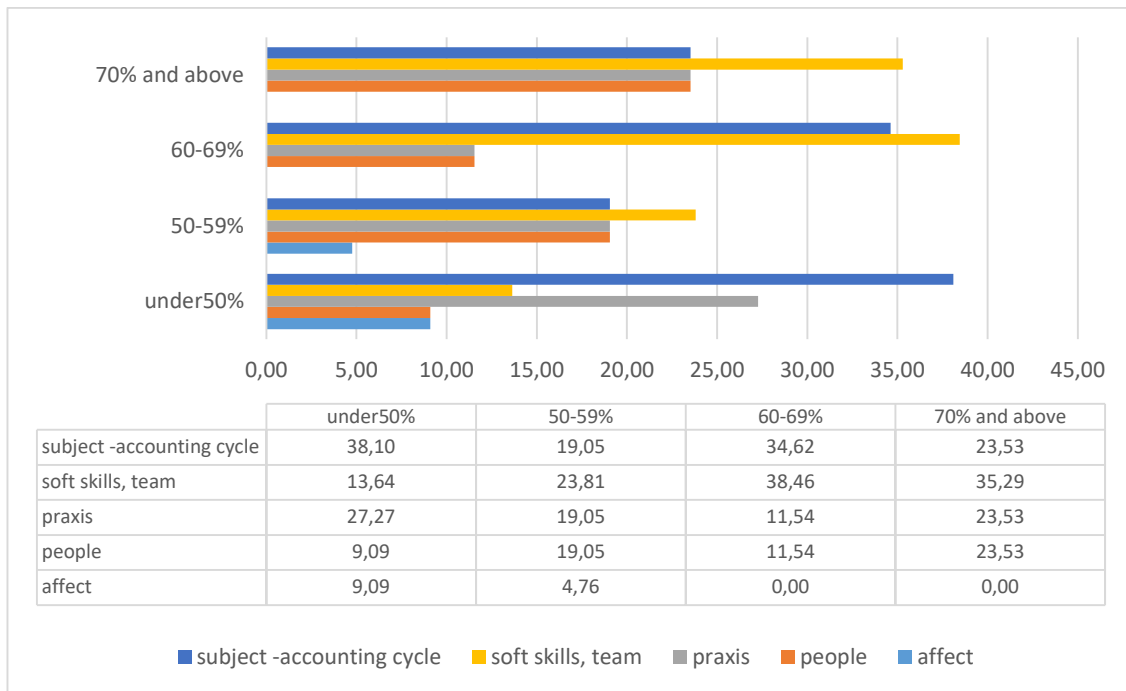


Figure 4. Describing the most beneficial outcome of the board game: Themes from content analysis in performance layers represented as percentages

Figure 4 shows the performance segments on the vertical axis and the % of first-year students nominating benefits of the board game on the horizontal axis. Those codes were grouped into the five themes as shown in Figure 4. There was great variation in how students experienced the benefit of the accounting content or how it related to the real world in the board game. The under 50% students (the largest group) found the content-related aspects most beneficial, and more so than any other group. The importance of application in practice varied greatly between groups, but its salience was either similar to subject content, or lower. The combined soft skills, that encompassed workplace related skills, teamwork, understanding people and affect for the subject, shows an increasing trend as marks increased, with nearly 60% of the top-performing students describing one of those skills as the greatest value gained from the board game.

Comparing the findings from the quantitative and qualitative questions, confirmed the social and subject content constructs in the groups. While the lower performing students found all aspects of the board game valuable in the quantitative items, they singled out understanding content as the most beneficial to them in the qualitative feedback. Conversely, the highest performing students did not find the content related facets (*understanding*) particularly valuable, signifying a better pre-knowledge of the subject. The social and soft-skills aspects of the board game that was unique to the delivery mode, overall contribution to the whole class,



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and this became more pronounced the higher the students' previous marks were, strongly evident in qualitative and also suggested in the quantitative question about learning to know their peer students. Notably, group and team-related activities were seldom rated as the most beneficial aspect of the game.

### ***Audit simulation – findings by knowledge levels***

*Simulation – responses to scaled questions grouped by five themes, compared by academic performance*

After the online audit simulation, students completed the questionnaire containing thirteen questions that directly related to the online simulation. The questions were grouped into five themes and the average rating for each calculated (maximum rating being 5), broken out into the same performance categories used for analysis of the board game data. The *subject* knowledge theme had a high average rating that increased among the lower performing students. Figure 5 shows that most elements of the simulation were perceived more positively by lower-performing students than particularly the highest performing ones, particularly affect (enjoyment of the simulation) and subject understanding, increasing with lower grades. The lower performers were also more positive about *Sim*, a multifaceted theme unique to the online delivery mode (online feedback, clear presentations, appropriate media and learning more than in traditional classes). Contributing to the *Sim* theme, students rated the use of media as highly appropriate. *Praxis* (learning about the audit process, insight into real life audit, putting classroom theory into practice) was overall the most beneficial contribution of the simulation, as was the intended objective of the simulation. *Soft skills* referred to professional skills, discussions with the group, decision making and open discussion, and were well and uniformly represented. The *praxis* and *soft skills* themes represent transfer of learning, that could have been affected by perceived fidelity of the simulation and resulting motivation (Alessi & Trollip, 2001; Huang et al., 2013).

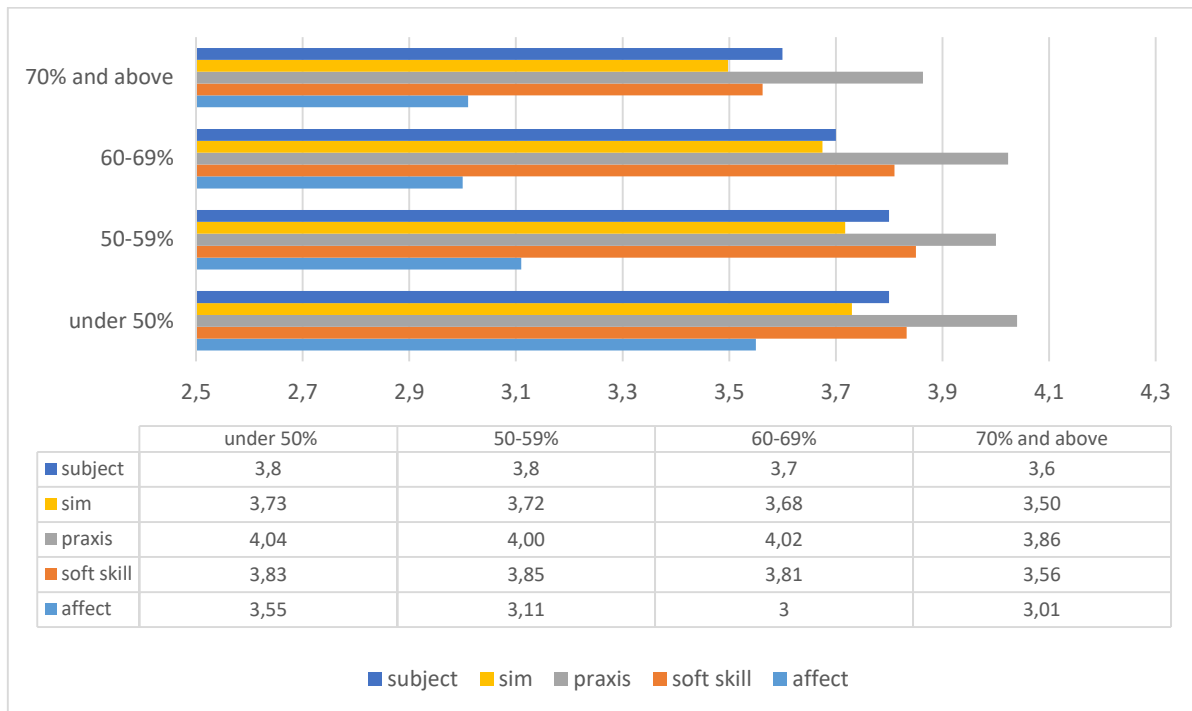


Figure 5. Themes grouped from scaled items on simulation in performance layers

### Comparing themes across simulations

The board game in a face-to-face setting was above all successful in allowing students to know each other and developing soft skills and teamwork, particularly among the top-performers. Transfer of knowledge to be used in a real practice was second for all students, with better understanding of the subject important for lower performing students. In the web-based simulation the subject knowledge component was generally only third in importance. The transfer of knowledge to workplace practice was the top affordance of the simulation for all students, falling in line with research by Carenys et al. (2017) finding that online simulations are more effective than games in transferring skills to the professional world. This is not surprising, considering the higher fidelity perceived in the online environment, that could increase motivation to participate and increase learning during the simulation, that could lead to higher transfer of learning (Alessi & Trollip, 2001). The affect increased in lower performance groups in both the board game and the online simulation, and was more prominent in the online simulation (Figure 5) than in the board game (Figure 4). Affect could have had a positive effect on motivation and hence transfer of knowledge, making this an important component of an online simulation, as suggested in Figure 1.

## Conclusions

In a holistic picture of two simulations in the same field, some tentative generalisations can be made. For students on the lower performing layer of a class, it seems that both the board game simulation as the online simulation was valuable in understanding the subject better, more so than for students who were performing well. The higher performing students gained valuable acquaintance with peer students in the board game, a unique affordance of the face-to-face

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mode of interaction. The lower performing students enjoyed the online simulation more than the high-performers, and evaluated the web-components more positively than the higher performers. The third year students as a group found the most value in the theory-praxis aspect and learning about the professional process. The praxis in the board game was not perceived as vividly, having a lower fidelity, but was more enjoyable. Transferring learning to the workplace, was achieved equally well for lower performing, *novice* as expert, high performing students, signifying that the simulation's fidelity was pitched at an appropriate level.

Incorporating simulations have benefits for educators. "The majority of students, irrespective of ICT adoption profiles, their gender or population groups agreed that the learning value of an online simulation was more beneficial than traditional teaching methods" (Beukes, Kirstein, Kunz, & Nagel, 2017). Both simulations, one containing game elements, and an online simulation of practice, successfully achieved their respective aims regarding the subject and theory-praxis bridge, while also achieving extra-curricular outcomes emanating from their delivery mode (contact or online), and were suitable for the respective academic stage of the students. Both simulations particularly supported the lower-performing students with understanding subject concepts and motivation.

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## **ASSESSING THE IMPACT OF VIRTUALIZING PHYSICAL LABS**

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Hellenic Open University, Greece*

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### **Summary**

Virtual laboratories are the new online educational trend for communicating to students practical skills of science. In this paper we report on a comparison of techniques for familiarizing distance learning students with a 3D virtual biology laboratory, in order to prepare them for their microscopy experiment in their physical wet lab. Initial training for these students was provided at a distance, via Skype. Their progress was assessed through Pre and Post-tests and compared to those of students who opted to only prepare for their wet lab using the conventional face-to-face educational method, which was provided for all students. Our results provide preliminary answers to questions such as whether the incorporation of a virtual lab in the educational process will improve the quality of distance learning education and whether a virtual lab can be a valuable educational supplement to students enrolled in laboratory courses on Biology.

### **Introduction**

Laboratory skills have always been a key pillar of Natural Science Education and, almost by definition, are acquired through experience (Waldrop, 2013). A traditional way for obtaining them is to practice in a physical lab by following the trial-and-error method. Unfortunately, nowadays, such a method has become time consuming and prohibitively expensive as the trainees have to interact with sensitive and expensive laboratorial equipment (Zafeiropoulos, Kalles, Sgourou & Kameas, 2014; de Jong, Linn & Zacharia, 2013; Weller 2004). On the other hand, practicing new skills only once, and after a brief face-to face tutorial, as is usually the case in the conventional lab instruction method, can lead to low retention time of the acquired competencies and also to serious safety issues. Having in mind that the most important factor for success in lab exercises is preparation, finding a technologically modern and convenient way for preparing students for their experiments in physical labs could be probably a robust solution for breaking the practical barriers of cost, safety and time in educational institutes (Bonde et al., 2014). Simulation based learning environments have great potentials for improving students' knowledge on scientific subjects (Makransky, Thisgaard & Gadegaard, 2016; Brinson, 2015). Several studies have shown that in physical labs unprepared students are preoccupied with technical and manipulative details and direct their cognitive resources towards irrelevant activities (Chandler & Sweller, 1991). As a result, they do not get the best possible learning outcome from their experimental exercises (Hofstein & Lunetta, 2003). On the contrary, by performing virtual experiments in privacy, without time and space restrictions or

preoccupations with safety issues, students gain the required experience and basic information for a successful performance in subsequent physical laboratory experiments (Hoffler & Leutner, 2007).

In distance learning education, students who enrol in Biology laboratorial courses can still experience the undisputable benefits of the physical lab, but less often. In this case, their preparation, in the sense of being familiarized with essential concepts and practical issues, prior to the physical lab, would be ideal. Hellenic Open University (HOU), an institution that is mastering the distance learning education seeks new ways to communicate laboratorial skills to its distance learning students. Based on the idea that learning is an active, interpretive, iterative process (Tobin, 1990), an interdisciplinary scientific team in HOU has recently developed a 3D game-like virtual Biology laboratory, called OnLabs. OnLabs provides a realistic 3D laboratory environment which simulates biology experiments, like light microscopy, and allows students to learn by interacting with virtual lab instruments and equipment (Zafeiropoulos & Kalles, 2016).

In this paper, we are investigating the possibility of redesigning the curriculum of a Natural Sciences module by incorporating OnLabs related activities in the educational scenarios. To that end, we evaluated and compared the learning progress of three groups of students enrolled in an undergraduate program of Natural Sciences in the HOU. The students in these three groups have chosen to either participate in a Skype session, where OnLabs is used as an educational preparation tool for their microscopy exercise, or to stick to a conventional preparation.

## **Method**

The sample comprised an entire class of 43 third year undergraduate distance learning students enrolled in the first cycle of a Biology laboratorial course, during the summer 2017 semester, in HOU. The 43 students were randomly divided into three groups in order for each group to conduct the microscopy experiment separately, in prescheduled dates.

## Assessing the Impact of Virtualizing Physical Labs

Evgenia Paxinou et al.

No	Steps on Teaching Procedures
1	The biology text book is sent to all students via mail
2	PowerPoint slides are uploaded in the university platform giving additional information on microscopy
3	The 3D virtual lab OnLabs is uploaded in the university platform
4	Three weeks prior to the physical lab, the <i>skype-tutor</i> sends to all students an e-mail invitation for participation in a <i>Skype session</i>
5	Students who are interested in the skype session, declare participation to the skype-tutor via e-mail
6	The skype-tutor sends to the participants a formal invitation for the skype session via the communication platform <i>Skype for Business</i> . The session is scheduled to take place 1-2 days prior to the physical lab
7	A week prior to the skype session, the skype-tutor sends an e-mail to the participants explaining in details the steps to be followed for connection to Skype for Business
8	A week prior to the skype session, the Skype-tutor sends an e-mail to the participants explaining in details the steps to be followed to download OnLabs on their PC or Laptop
9	The Skype-tutor urges the participants, via e-mail, to test their networks and check their connection to Skype for Business platform
10	The participants attend one hour Skype session. In this session the skype-tutor uses PowerPoint slides to present the principles of microscopy and the parts of a photonic microscope. Finally, she performs a complete microscopy procedure using OnLabs
11	The participants are disconnected and they perform, on their own, a complete microscopy procedure using the <i>Instruction Mode</i> of OnLabs
12	The participants fill in a questionnaire to evaluate their skype experience and also OnLabs. They send the questionnaire back to the skype-tutor
13	All students appear to the biology physical lab on the scheduled date
14	All students were given a written test, the <i>Pre-Test</i> , to determine their baseline Knowledge of microscopy
15	All students attend a half an hour face-to-face tutorial on principles of microscopy
16	The lab tutor performs once, a demonstration of a complete microscopy procedure with a photonic microscope
17	All students were given a second written test, the <i>Post-Test</i> , to reassess their knowledge of microscopy. The questions in Post-Test are exactly the same as the ones in Pre-Test
18	All students fill in a questionnaire to evaluate the face-to face tutorial
19	All students use their own photonic microscope to practice on microscopy for half an hour
20	All students fill in a work sheet to evaluate their gained experimental skills

Figure 1. Steps followed in traditional microscopy teaching method (1,2,3,4,13,15,16 and19) and steps followed in our enriched, with OnLabs, educational scenario (all steps from 1 to 20). Steps 14,17,18 and 20 are the assessment steps followed by every student

Three weeks before the students' appearance in the physical lab, an e-mail invitation for survey participation was sent to all of them, via the university platform, fully explaining the project and also its research aims. Briefly, with this, invitation students were asked to choose between the traditional teaching method, which includes a face-to-face tutorial and a live demonstration of a microscopy procedure, and the innovating method that includes in addition, the use of a virtual lab, of OnLabs. From the first group 7 out of 16 students were interested in using OnLabs as an extra educational tool for their preparation in microscopy, from the second group 9 out of 13 students and finally from the third group 6 out of 14 students.

In Figure 1 we present both the steps of the traditional microscopy teaching method and the steps of the proposed educational scenario that includes using OnLabs. As Figure 1 notifies, all students followed the conventional educational method (steps 1,2,3,4,13,15,16 and 19), and the assessment procedure, (steps 14,17,18 and 20). Only those who responded to the survey invitation followed, in addition, steps 5,6,7,8,9,10,11 and 12. The OnLabs experience is incorporated in the new scenario, through a Skype session (step 10). The Skype environment is presented in Figure 2.



Figure 2. Screenshot from the Skype session on microscopy, using the simulation environment of OnLabs

The objective of this study is to assess whether learning simulation could increase students' understanding of microscopy. For this assessment we took into consideration the students' grades in Pre and Post Tests (steps No 14 and 19 in Figure 1). At this point it is essential to mention that there is a fluctuation in test difficulty. Both Pre and Post-Tests given to the first group are of low difficulty, those given to the second group are of medium difficulty whereas those administered to the third group are of high difficulty. Although a microscopy expert can easily evaluate the difficulty level of a relevant test, for the estimation of the difficulty of the questions in Post and Pre Tests, we used the probabilistic approach of Item Response Theory (IRT) named Rasch Model (Rasch, 1960). The Rasch model uses the following probability function to estimate the probability of a student to get the question  $X_j$  correct:

$$P(X_j|\theta, \beta_j) = \frac{1}{1 + e^{-(\theta - \beta_j)}}$$

where the parameter  $\beta_j$  is the difficulty of a question in a test and  $\theta$  is the ability of a student to answer correctly to a question of difficulty  $\beta_j$ . In order to use the dichotomous Rasch model we represented each question of a test as a binary variable, so that a value of 0 indicates a wrong answer and a value of 1 indicates a correct answer. For a group of  $y$  students to who we administered a test of  $z$  questions, we created a vector of  $z$  binary variables to represent the responses given by each student. A data file in a CSV format was created containing  $y$  vectors, each of size  $z$ . For our data analysis we used R, an open source statistical analysis language (Kabacoff, 2011) and more specifically, the TAM package (Robitzsch, Kiefer, & Wu, 2017).



## Results

The difficulty parameter  $\beta_j$  of the IRT approach takes value in the  $(-\infty, +\infty)$  range, as shown in Figure 3, with 0 indicating Medium Difficulty.

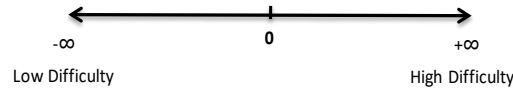


Figure 3. The Difficulty Scale

Table 1 presents the means and the standard deviations of the difficulty of the questions in each test. With the Rasch model the difficulty of each question was estimated based on the students' answers. Table 1 provides evidence that the tests are designed in augmented difficulty from 1<sup>st</sup> to the 3<sup>rd</sup> group of students. Students' ability was also assessed but it is not shown in this study (Paxinou, Sgourou, Panagiotakopoulos & Verykios, 2017).

Table 1: The average of the difficulty of the questions in Pre and Post-Tests in all three groups of students

	Average of difficulty of questions		
	1 <sup>st</sup> Group	2 <sup>nd</sup> Group	3 <sup>rd</sup> Group
Pre-Test	$-1.807 \pm 1,277$	$-2.026 \pm 1,256$	$0.035 \pm 1,041$
Post-Test	$-3.064 \pm 1,233$	$-2.608 \pm 1,440$	$-0.822 \pm 1,309$

According to Table 1 all Post-Tests seem to be less difficult compared to their corresponding Pre-Tests, something that was expected, as Post-Tests were administered right away after the face-to-face tutorial. We used the Classical Test Theory (CTT), also known as the true score theory (Gulliksen, 1950) to assess students' learning outcomes. The average of the scores in each test, and in each group, is demonstrated in Figure 4.

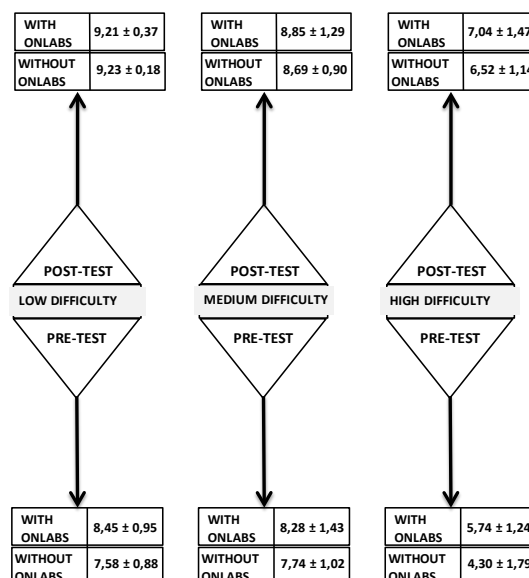


Figure 4. Averages and standard deviations of students' score out of ten, in Pre and Post Tests of low medium and high difficulty, with or without the Skype session with OnLabs

Depending on Figure 4, our first general observation is that the With-OnLabs students had better scores on their Pre-Tests, in all three groups, regardless of the test difficulty. This remark indicates that the With-OnLabs students were better prepared on microscopy. After the face-to-face tutorial the scores in Post-Tests are almost equal for all students in the 1st and 2nd group. This highlights that the knowledge given by the lab-tutor, filled successfully the knowledge gaps for the Without-OnLabs students when their tests were of low or medium difficulty. In the 3rd group, where both Pre and Post-Tests are the most difficult, the With-OnLabs students were not only better prepared with the Skype session, but had also higher scores in their Post-Tests.

In step No 12, (see Figure 1), the With-OnLabs students expressed their opinion on satisfaction, interest, confidence, understanding and cognitive load items using a 5-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) in a questionnaire with names, based mostly on the ARCS-model (Keller, 1983). The responses were analysed with the statistical analysis language R and the overall conclusion drawn is that the digital learning material provides an efficient, interesting and innovative learning situation, something that is visualized in Figure 5. As it is presented in Figure 5(a) all the With-OnLabs students, except one, believe that a Skype session could be part of their learning procedure. Furthermore, Figure 5(b) presents that the majority of the With-OnLabs denotes that a Skype session should precede every exercise in the physical lab.

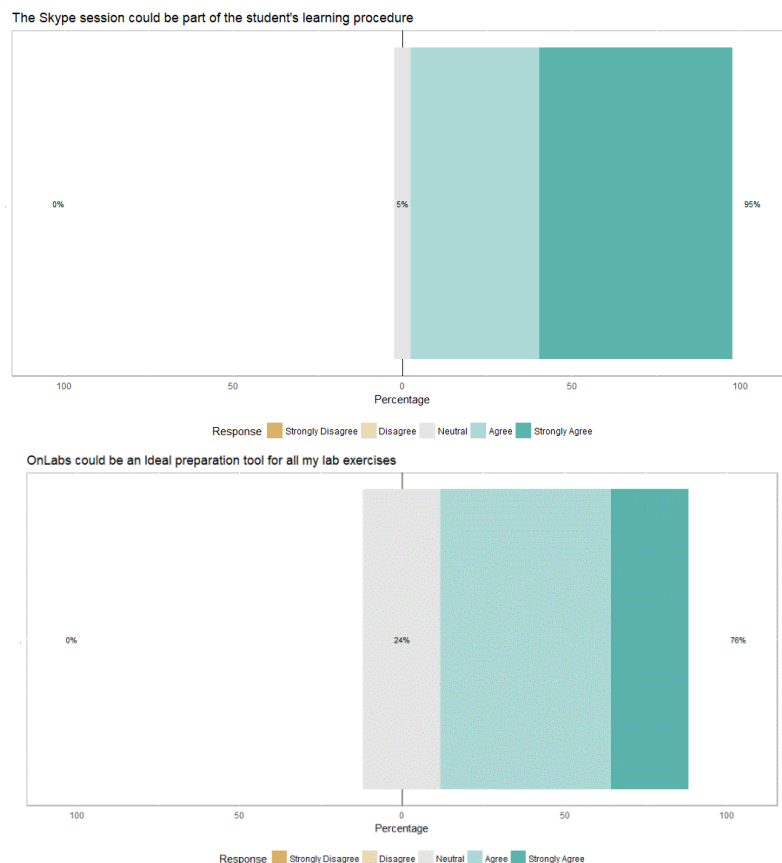


Figure 5. With-OnLabs students' opinion in the following statements: (a) The Skype session could be part of the student's learning procedure; (b) OnLabs could be an ideal preparation tool for all my lab exercises

## Conclusions

In the current study, two educational methods, applied on distance learning students for their preparation on microscopy laboratorial experiment, are evaluated and compared; the conventional face-to-face lab tutorial method and our proposed educational scenario enriched with a Skype session and a 3D virtual biology laboratory, called OnLabs. Our evaluation is based on the assessment of students' learning outcomes on Pre and Post-Tests. The Pre-Tests scores proved that OnLabs experience gave higher baseline knowledge to those students who were involved, in all groups. The Post-Tests scores showed that the face-to-face tutorial improved and equated students' understanding of concepts concerning microscopy in the 1<sup>st</sup> and 2<sup>nd</sup> group whereas in the 3<sup>rd</sup> group, where the difficulty of the tests was the highest, the With-OnLabs students have better grades than the Without-OnLabs students. Future research should replicate the results of this study with a larger student population, in a wider selection of educational institutes and in different modules, (such further studies have been already scheduled or are in a negotiation phase). We also plan to assess the retention time of the gained knowledge in the two different educational methods, to address aspects of longer-term educational design.

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## COMMUNICATION AND INTERACTION IN A BLOG-BASED LEARNING SPACE

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### **Abstract**

This study is an exploratory case that follows one course offering in an attempt to trace the way the space either constrains or enhances communication and participation in an open, online course offered using a variety of social networking tools. As social technologies are designed with an *architecture of participation* how the learners use the spaces afforded to them, to both communicate with each other and engage with the learning content were examined. Content and structural analysis were conducted of blog posts and comments using a modified coding scheme based on the Community of Inquiry (CoI) model to look for patterns of participation and cultural production.

### **Introduction**

Formal online learning often takes place in highly structured learning management systems (LMS) or virtual learning environments (VLEs) that are designed to manage, in one space, all of the materials and resources learners need to participate in a course. The use and integration of social or Web 2.0 technologies such as wikis, blogs, and social media, into educational practice has been increasing as instructors try to design more open, participatory environments. What defines these tools is their ability to make the digital practices accessible and participatory, and their focus on creating social connections between users, in what O'Reilly (2004, as cited in Hemmi, Bayne, & Land, 2009) terms an "architecture of participation". The ability for learners to create, remix, interact and participate in digital cultures is attractive to educators who follow contemporary socio-cultural pedagogies (Bayne, 2010). As these social technologies are co-opted into educational practice, they redefine the spaces where learning takes place, and new cultural, pedagogical and social practices will emerge or need to be developed to inhabit them.

Goodfellow (2008) adopts Gunawardena et al.'s (2003) definition of culture to be, "A system of knowledge, beliefs, behaviours and customs shared by members of an interacting group, to which members can refer, and that serve as the basis for further interaction" (p.556). Using this interpretation Goodfellow and Hewling (2005) argue that virtual learning environments can be seen as places where social and cultural production processes occur in their own right, encompassing not only the visible interactions and negotiations of communication, but also a range of activities that also include invisible factors mediated by background technologies, institutional policies and practices and wider discourses on online learning. Hewling (2009) also emphasizes that technology, due to its unpredictability and interactive relationship with the

different elements of the learning environment, is an important cultural player and should be a factor that is considered in examining these systems.

If the learning spaces created using social technologies are impacting on the learning culture, through ways that can redefine pedagogical practices, social interactions and institutional norms, how do we start to explore them? Particularly as we co-opt social technologies into our online teaching practice to open up boundaries, do they support an architecture of participation and how do learners use these spaces, to both communicate with each other and engage with the learning content?

This project used methods to look at both historical traces of activity (visible messages) and the “physical” course structure (technology/content) to consider the following research questions:

- What effect does the learning space have on the learning interactions in an online course?
- In what ways does technology act as a barrier or enabler for learner’s interaction/communication?
- How does learning in an open space shape the communication practices and participation in the course activities?

## **Examining Learning Spaces**

When we examine our processes and practices in networked learning, the conception of the learning space itself is often overlooked. As Chism (2006) points out, as educators “we often fail to notice the ways in which space constrains or enhances what we intend to accomplish” (p. 2.3). Most research that implicates space has focused on traditional F2F classrooms, and little attention has yet been paid to the structure of the learning spaces in virtual or online environments. Bayne (2008) points out that current studies have generally been focused on instrumental functionality and affordances, rather than an exploration of how the VLE can define the information and pedagogic practice. In these virtual spaces how do we begin to explore both the text-based, visible practices and the more invisible patterns of social interactions that occur?

The traditional LMS or VLE adopted by higher-education institutions, either corporate (Blackboard, Desire2Learn) or open-source (Moodle), are often characterized as being inflexible, “walled-in”, and closed (Godwin-Jones, 2012). They are usually password protected, boundaried to other web applications and people, rigid in their structure and navigation. As Godwin-Jones (2012) points out they offer uniformity and stability, preferred by IT support structures and institutions, but offer little in the way of technological literacy for students in an increasingly digital world. In her visual analysis of one LMS, Bayne (2008) concludes that the characteristics of stability, hierarchy, continuity and conservatism, leaves little room for teachers or learners to construct creative pedagogies that interact with current digital technologies. On the other hand, social technologies are characterized as being open, distributed, collaborative, networked and user-defined (Hemmi et al., 2009) and as Potter and

Banaji (2012) point out there is a “raft of enthusiasts” exploring their uses in new participatory cultures and literacies.

One type of social technology that has been widely adopted in educational practice is the blog. As Jones and Alony (2008) point out, they are often a type of personal online journal that links to other blogs and topics, often other bloggers, and these interconnections create what is known as the *blogosphere*. Blogs have a capacity to allow for both self-expression and social connectivity, and past research has shown that introducing blogs can support self-directed learning (Roberston, 2011), facilitate discussion (Ellison & Wu, 2008), reflection and emotional expression (Deng & Yuen, 2011) and support feelings of community and belonging (Top, 2012). Other studies though, such as O’Donnell (2006), highlights gaps identified by educators between expected versus actual outcomes of blogs and identify drawbacks such as poor facilitation of discussion, technological barriers, assigned blog writing being “forced” and too high a focus on the personal (p.10). Deng and Yuen (2011) found that blogs are mainly a tool for personal broadcasting, and though they were valued for their social facility, they only supported a limited degree of social interactivity and potential for extensive and dynamic dialogue.

Hemmi et al. (2009) reported that social technologies when co-opted and repurposed for formal teaching provided means for collaborative modes of inquiry, group self-regulation, and self-explanation but that they perhaps sit uncomfortably, are “strange and troublesome”, within traditional higher education practices. Saadatmand and Kumpulainen (2012) found similar results as learners in Open Networked Learning Environments reported that though the introduction of many tools and choices in activities was motivating and engaging, it was also disruptive and time consuming and required a high level of technological competency. As Ross and Collier (2016) point out there is still an uncertainty and messiness that we face in using these emerging technologies, a sense of “not-yetness”, and there is a need to explore these spaces from a learning context, examining learner perceptions of their use and how we as educators can more effectively incorporate them into our practice.

## Methods

### ***Study Context***

The case examines an open, online course in a post-graduate certificate in online teaching and learning. The courses in this programme are directed to both K-12 teachers and post-secondary teachers interested in bring learning technologies into their classroom practice or offering courses in an online or blended environment.

The course design draws on social-constructivist philosophy, where learners are critical, collaborative, and creative participants in the social construction of knowledge. One of the goals of the certificate is to provide educators with the technical and pedagogical expertise to use educational technologies, so learners are encouraged to explore social technologies so they can critically assess and reflect on their use for their own practice. As a traditional commercial Learning Management System (or VLE) might impede the integration of personal content and

Web 2.0 tools, an open-source system (WordPress MU) that could be adapted to provide a more flexible learning space was adopted.

The course blog site consists of the course content, space for instructor posts, and links to student blogs. Each week's activities consist of student blog posts on their personal blog sites, and include responses to questions/readings, collaborative small group projects and reports, creation of media or other teaching materials, reflective writing or other. Assignments and a final project are also posted to the blog, and students are encouraged to explore and use a variety of different social technologies in their exploration of the course topics. In this offering, seven participants enrolled in this course, but as a few of the students in this course were enrolled in multiple courses, there was evidence of *cross-cohort* communication between the courses.

### **Methodologies**

A case study approach was chosen as cases have been shown to “investigate and report the complex dynamic, and unfolding interactions of events, human relationships and other factors in a unique instance” (Cohen, Manion, & Morrison, 2007; p.253). To explore both the visible and invisible processes at work in virtual environments, this project used a modified virtual ethnographical approach (Hine, 2005). Open and accessible historical web-based content were explored using, a modified form of web-sphere analysis (Schneider & Foot, 2005) combining both content analysis and elements of structural analysis of the linked course website.

A Community of Inquiry (CoI) scheme adapted by Heckman and Annabi (2006) was adopted to explore cognitive and social practices and interaction evidence, but as limitations were encountered after initial analysis, was expanded to include issues around technology and elements of discourse responsiveness called “communication and common ground” from Xin and Feenburg's (2006) framework for “engaged collaborative discourse”. As the intent of this paper is to trace the elements and development of practices and determine how the learning space may have been a factor influencing the development of communication norms, the coding that emerged borrowed elements from different frameworks.

### **Data Collection and Analysis**

A total of 91 student posts, and 11 instructor posts were added to the course space over the term. As activity over time was an important consideration, posts, associated comments and media from weeks 1, 3, 7 and 11, which provides evidence over the duration of the whole course, were collected and then coded using a combination of the predetermined categories and emerging themes. A total of 38 blog posts and their associated media (video/audio), and 61 comments were coded using Atlas Ti. All student content was anonymized.

The course space was examined to look for linkages and patterns in course communications, and to determine what design factors might impact on the ways that course participants communicate. The space was explored intuitively, and though structural/feature analysis methods identified by Schneider and Foot (2005) such as number of pages, hierarchical ordering, and linking were examined, other structural elements such as flexibility (integration



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of content/media, visual design), physical elements (posts/comments length, location, connections), and spatial relationships (communication, site elements and configuration) were explored for effect on communication and interaction patterns.

Ke and Hoadly (2009) point out that one of the limitations of researching online communities is that the data collected are limited to the online activities. In this case, the interactions of learners outside the course space (in other social tools such as synchronous chats and social bookmarking sites), and those with the course instructor, are missing. Further data, such as interviews with instructors and students would provide more insight into their perceptions of identity, reflections on the influence of the learning space (open/closed, formal/informal) on cultural processes and perceived benefits/drawbacks of using social technologies in formal educational settings. The cohort size of seven, as well as the course content's proximity to the subject being studied, also limits the studies ability to be generalized, but it does provide novel insight into the methods used to explore social technologies as course delivery platforms.

## Findings and Data Analysis

### **Structural Analysis**

The structural analysis highlighted some of the difficulties students would encounter when trying to interact with both the content and with each other on the course blog.

- To interact with activities or each other students need to visit multiple spaces (the course blog, their own blog, and other students' blogs, other tools/spaces see (Figures 1). Based on student feedback many found this disorienting and confusing.
- The current course configuration is not optimized for displaying images and other embedded content, providing flexible organization of posts (other than chronologically) or providing structured space for extended discussions. Many non-textual items did not fit within the *space* and were difficult to engage with in a meaningful way.
- Posts are privileged over comments, unlike in threaded discussions where users can add new topics, in a blog the post takes up a central space, and comments are relegated to the bottom and are often hidden. Potter and Banaji (2012) characterize blogs as *performative spaces* where students are productively engaged with words, images, sounds and making connections. It characterizes the blog space as an individual rather than collective space. Of note is that the average post was 350 words, and comments 100 words.
- The disconnected and disparate spaces create a pattern of discourse that is *one-to-many* that not only focuses on the individual and not collaborative processes, but may also allow for conversation threads to be lost and abandoned.

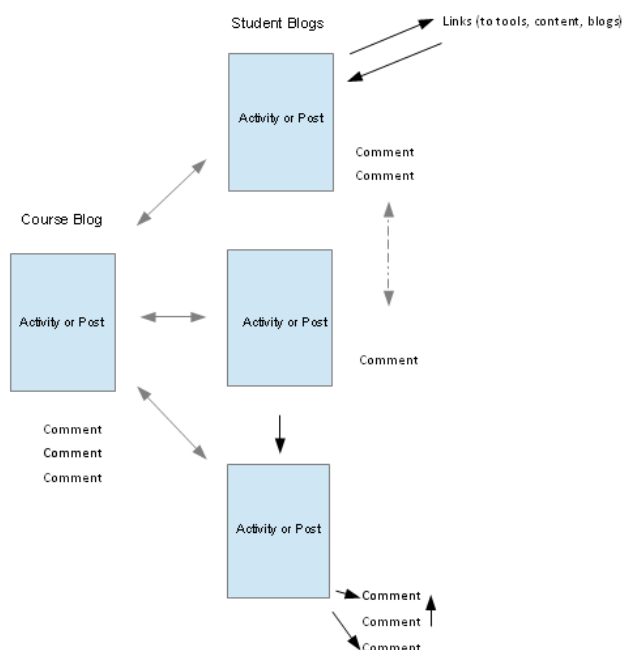


Figure 1. Participation Pattern for Blogs

**Content Analysis**

In the first week student communication focused mostly on social processes and particularly on establishing identity (see Table 1), which MacFadyen (2009) and Hewling (2006) identify as integral to the establishment of learning culture. Of the 74 entries recorded in the first week, over 40 were concerned with establishing identity, either through self-disclosure, sharing of educational or professional experiences, providing salutations or setting the climate for the course. All posts contained a photo, personal or of family, and many presented details of life outside the educational experience. There was evidence of customization of personal student blog spaces, with different themes, organization, tagging, and links to other sites.

Table 1: Participation patterns by week

Week	Blog Posts				Comments				
	Total	Social Processes	Cognitive Processes	Teaching	Total	Social Processes	Cognitive Processes	Teaching	Technology
1	14	8	7	2 (1, 1)	60	56	8	17 (7, 10)	14
3	9 (2*)	1	7	2 (1, 1)	17 (1 outside expert)	15	6	7 (3, 4)	4
7	6	0	6	1	13	12	11	4 (2, 2)	1 (instructor)
11	3	0	3	1	2	2	2	0	

\* Collaborative Posts

For some learners’ technology use was also a way to establish emerging online identities, for example using the tool Xtranormal to add gestures, movement, and humour into their online introductions, moving away from text to a more *embodied* sense of self. Those learners newer to technology, responded with admiration and support, and these early adopters developed an

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early cultural practice of “bringing technology in” to the course. In week one, 20 posts/comments were concerned with technology, either about introducing new tools, discussions about the best uses of tools to help in teaching, as well as self-organization and study, and a majority of the learners participated in these discussions, including some from other courses in the program. In the first week an active community is emerging, sharing experiences, particularly educational and professional.

By week three new patterns emerge, as students spend more time engaged with the cognitive processes and less with social processes. 7 of 9 posts are related to cognitive processes, with these focused on course content and activities, which is to be expected. The learners use the comments for social check-ins (rather than making a post) and so combine the social processes of complimenting, referring, and encouragement, as they also engage with the intellectual content in the post. In this stage and beyond, patterns outlined in Xin and Feenburg’s (2006) “engaged collaborative discourse” might be expected, as learners move to deeply examine the course concepts. At this point however, the emerging learning culture shifts somewhat, and the structures imposed by technology perhaps start to impact on practices.

By week three there is evidence of strong cognitive engagement within the blog posts. Of the three main categories of cognitive presence identified in the CoI model, the posts represent a high level of intellectual engagement, as all were coded as either *analysis* or *integration*. The posts consistently use traditional formal academic writing, which includes evidence of consideration of course concepts, reflection on professional practice, and integration of resources and academic references. At the same time, the responses to these posts are mostly exploratory (rote factual responses and information exchange) which are at a lower engagement level. At this stage of the course, you might expect that the discourse would proceed according to Xin and Feenburg’s (2006) process of intellectual engagement and communication, which has three stages: topic initiation, multi-logue, and common-logue. In the initiation phase a topic is introduced and participants respond with their perspectives, thoughts and ideas. In the multi-logue the discussion moves beyond clarification or sharing approaches, to convergences of opinion, with participants agreeing and disagreeing, clarifying or elaborating, reflecting, justifying or putting forth solutions. In the common-logue the group should work to a consensus or decision through synthesis and integration. In this case, the posts act as topic initiation, and though most comments start to move into the multi-logue stage (they offer points of agreement, elaboration, reflection and justification), there is often no follow-up or further engagement beyond this. Of the 20 comments coded for *prompting* which was used to identify comments that would function as a way of “furthering the conversation”, less than half received an answer. So though there is a high level of intellectual engagement with the course topics, these are mostly at the individual, rather than the community level, and collaborative engagement within the course environment decreases.

In week eleven there are only two posts, which is a dramatically decreased level of engagement. This could be attributed to many factors (fatigue, as this week follows the submission of a major assessment, lack of engagement with the course topics, or other), but lack of engaged collaborative discourse might be one. In the final week, all students contributed a final reflection

and post, and most expressed enthusiasm for the overall learning experience, as well as support for each other's contributions, so a return to the cultural practices established earlier in the course (support, encouragement, engagement) is in evidence.

The student questionnaire feedback supports the findings above. Though overall, the students rated the course structure and learning activity design positively, many indicated that it was very time-consuming to visit every student blog, there was not enough collaboration, and suggested a need for a central space for discussion. They also commented that inconsistent participation from other learners made it difficult to participate in some of the collaborative activities. As one student claimed "there is still a need for tools for activities for collaboration and presentations – we had many disjointed things happening in many places and most tools had weaknesses."

## **Discussion and Reflection**

Though social technologies are embraced by educators for their ability encourage participatory, collaborative and creative pedagogies, they can also provide barriers to the very processes and practices we want students to embrace. In this study, the learning space shaped the participation patterns in such a way, that individual engagement with course content and activities was favoured over collaborative engagement with fellow learners. The blog postings all showed a high level of cognitive engagement with the course concepts, and often followed a more formal academic writing format. As Hemmi et al. (2009) point out "the use of new digital media does not necessarily, it seems, determine new ways of writing or being within academic programmes" (p.27), particularly when they are embedded within the formal structures of the institution which requires formal assessment and evaluation of student work.

In this case it was evident early in the course learners were willing to participate and share in developing a learning culture that was supportive, engaged, and open, but in the end the demands of formal academic writing, the performative elements of the post, and the barriers imposed by the virtual space may have hampered their ability to sustain active levels and patterns of participation and engaged discourse. This seems to contradict the notion that social technologies support an "architecture of participation", and in co-opting social technologies for use in formal learning, there is a risk of recreating the rigid structures and hierarchies of the bounded and "walled-in" spaces of more traditional LMSs. If the LMS/VLE is the "nexus of social and cultural" processes then educators need to pay close attention to not only what is happening, but how the space can constrain or enhance what can be accomplished. To develop innovative pedagogies that embrace the capabilities of social technologies, further research will need to focus on the interrelations between what Hewling (2009) terms "all the players" in the online space – technological, social, and cultural – to establish an ideal configuration.

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## ONLINE GROUP LEARNING IS DEEPLY GROUNDED IN SHARED KNOWLEDGE AND SPACE

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### Introduction

Group learning via a 2D platform (e.g. Moodle or similar) has long been part of daily learning practice. Unfortunately, this solution leads to *text-based* or rather *text-heavy* interactions: you need to be able to write well and better still, enjoy *interacting by writing* and not every student does. Moreover, text-based interactions are good for inquiry tasks, but they are ineffective and inefficient for problem-solving tasks. In fact, experience has shown that the interaction required for collaboration is lacking or inefficient, especially in cases where the main task, like in projects, consists of collaborative problem solving. Therefore, it is not surprising that students use 2D platforms solely as a storage space for documents, quite never for collaboration. There is a lack of online team interaction (Bettoni, 2003) and the question is why. We think that flat platforms do not meet the requirements of rich collaborative interactions online. So, which are these requirements and how can we better support online group learning to fulfil them? For answering these questions, we propose 3 steps: first, clarifying what we mean by *collaboration* (and its relationship with knowledge), secondly developing a deeper view of the role of space in the process of knowing and thirdly a better understanding of the true potential of 3D platforms.

### Related Work

Ten years ago, it was unclear which enhancements were needed to make a 3D collaborative virtual environment a good platform for serious online collaboration (Bainbridge, 2007). Surprisingly, this is still the case today. 3D virtual spaces are still in their early phase of development and little research exists about their use in learning and working (Vartiainen, 2015; p.142). By examining the methodological and theoretical choices of empirical studies on 3D virtual environments (3D VE) and focusing on social and group phenomena (Sivunen & Hakonen, 2011), the authors were able to identify four major trends. First, attempts to demonstrate the applicability of real-life, social behaviour norms in 3D VEs. Second, a lack of work group studies using 3D VEs. Third, the micro-level treatment of social phenomena and groups at the expense of broader phenomena like leadership. And fourth, a lack of covering theory relating to group processes in 3D VEs. In fact, most research performed on 3D VEs has been game-based and few empirical studies have been published on their professional usage (Bosch-Sijtsema & Sivunen, 2013). Despite this lack of research, 3D VEs provide several very interesting opportunities for learning and working groups (Bosch-Sijtsema & Sivunen, 2013). For this reason, it would be interesting to continue a strand of research that was started about

ten years ago during the Second Life hype but was abandoned after the decline of Second Life (Schmeil & Eppler, 2008; Eppler & Schmeil, 2010). It developed a systematic description and classification of collaboration patterns (group interaction scripts) in 3D collaborative environments. By providing reusable patterns that leverage the ample possibilities only 3D virtual environments offer, this research sought to help facilitate and enhance team collaboration and collaborative learning.

## Collaboration is Based on Shared Knowledge

As a starting point for clarifying the term collaboration, we suggest distinguishing it from the term cooperation. Practitioners often use the two terms synonymously but experience shows that they are not synonyms. Sometimes definitions explain the difference through the degree of *alignment* in working together (“Collaboration is very similar to, but more closely aligned than, cooperation”, Wikipedia). But this also does not bring more clarity; it just introduces the new question of what *closely aligned* means. Cooperation can be defined by considering that working together is accomplished by a division of labour among participants in which the task is split into pieces and each person is responsible for one piece (see Roschelle & Teasley, 1995; p.70). The main success factors of cooperation then are subject matter competence of the individuals involved to ensure that they deliver a high level of quality. Collaboration is different: the task remains as a single unit; each participant works on it and is responsible for it as a whole. He or she cannot pull out because then the task as a whole will be jeopardised. Moreover, during collaboration, individuals are “mutually engaged in a conscious, continuous effort to construct and maintain an underlying shared knowledge structure as a basis for accomplishing their task.” (Bettoni et al., 2016; p.159; based on Roschelle & Teasley, 1995). The task is always accomplished by all participants; and more importantly: since they work on it as a single task unit, also knowledge should be a unit: precisely that knowledge unit that is needed to do and associated with the task unit. To obtain this, the participants have to share their knowledge and this sharing of knowledge becomes all the more important. The main aim here is to build up a knowledge resource or knowledge structure that is common to all participants in the collaboration.

## Presence Model of Knowledge Sharing

Now the question is how to implement knowledge sharing and specifically the sharing of tacit knowledge (Kharabsheh et al., 2016) in an online group learning situation, which is collaborative in the sense that we have defined. The model that we suggest here assumes that a successful knowledge sharing experience occurs through the integration of three essential elements: cognitive presence, social presence and leading presence (see Figure 1). This approach is inspired by the Community of Inquiry (CoI) framework, a process model of the collaborative construction of knowledge in a community of learners (Swan, Garrison, & Richardson, 2009). *Cognitive presence* is defined as the extent to which participants of the collaboration succeed in constructing and sharing knowledge (meaning) through sustained interaction and reflection. *Social presence* is defined as the extent to which participants of the collaboration succeed in projecting their personal characteristics onto the group (team, community), thereby presenting



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themselves to the other participants as “real people”. Finally, *leading presence* is defined as the design, facilitation and support of cognitive and social presence (of the related processes) for achieving personally meaningful and organisationally worthwhile collaborative outcomes.

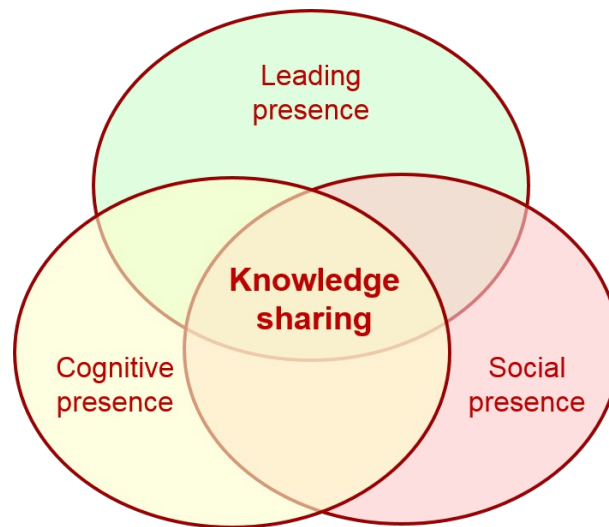


Figure 1. Presence model of knowledge sharing (adapted from Garrison et al. 2009).

Realizing and integrating these three kinds of presence in an online setting, requires six groups of e-skills:

1. Co-constructing knowledge online: (a) shared language, (b) shared content / storage, (c) co-planning, (d) co-solving, (e) co-writing.
2. Negotiating meaning online: (a) reification, (b) participation.
3. Projecting oneself into an online group: (a) expressing emotions, (b) open communication (mutual awareness, recognition), (c) group cohesion (empathy, participation).
4. Managing online collaboration: coordinating, organizing, designing, planning and assessing the collaboration.
5. Supporting cognitive and social online presence: (a) giving feedback, (b) fostering reflection, (c) balancing cognitive and social presence.
6. Facilitating online interaction.

## Sharing Knowledge is Deeply Grounded in Space

Space, in the context of this paper, means simply “the three-dimensional extent in which objects and events have relative position and direction” (Encyclopedia Britannica, 2004). In existing “flat” platforms, only experienced users are able to effectively and efficiently use the available communication and collaboration tools; in all the other cases (the majority), interaction is rather absent, and this is of course a big problem for online collaboration. One reason for this absence of interaction is that, on flat 2D platforms, users cannot interact in their usual, *natural* way. Fortunately, in the last 10-15 years, continuous advances in computer technology have led to the availability of sophisticated platforms that support the replication on screen of three-

dimensional physical spaces, movable objects, movements, navigation and communication between digital representations of humans (Schmeil & Eppler, 2008). On these 3D platforms there is evidence that interaction becomes much more intense and collaboration easier (Burton et al., 2010; Burton & Martin, 2017): why? Could it be that space itself contributes to these improvements? But how? Following our “presence model of knowledge sharing”, we try to answer this question by splitting it into the three more specific questions, one for each of the three elements of the model.

### **Cognitive Presence**

First, which is the role of space in *cognitive presence*? At the beginning of his theory of mental activity, Kant explains: “Space is a necessary a priori mental construct, which underlies all outer perceptions (Anschauungen)” (Kant, 1787; p.38) and knowing, he adds later on, always requires a combination of perception and conception (ibid. B 74). Thus space will be contained in any knowledge item and consequently also in any human thought. Many examples taken from modern science and from daily life also provide evidence for this view. In an interview from 1916, Albert Einstein tells Max Wertheimer that he thinks in images and feelings and very rarely in words (see Wertheimer, 1959; pp.213-228). In a letter to J. Hadamard, he wrote that the elements of his thought were “of visual and some of muscular type” (Hadamard, 1945; pp.142-143). A part of the motor system, so-called mirror neurons are involved in understanding the actions and intentions of others (Ferrari & Rizzolatti, 2014). In the method of loci, a mnemonic method (known from Ancient Roman rhetoric), each item to be remembered is placed in space along an imaginary route, at familiar locations. Moreover, visual metaphors and figurative language are widely used in communication to facilitate the understanding of abstract ideas. Finally, if knowing is inseparable from activity and context (situated cognition) then the related knowledge “is stored not in the form of answers, but in bit and pieces of the experience we have accumulated” (Dixon, 2013). Hence, a subsequent question or problem will be answered or solved by pulling together suitable bits and pieces, thus constructing knowledge in the moment and in a way which will also be situated in (influenced by) space, time and experience (de Michelis, 2016).

### **Social Presence**

Second, what is the role of space in *social presence*? A first component of social presence is the ability and confidence *to express emotions* like closeness, warmth, attraction. Other examples of emotional expression that contribute to social presence in a group are humour and self-disclosure (Garrison et al., 2000). Humour, in particular, decreases social distance and can as a result act as an invitation to start a conversation. A second component of social presence is *open communication*, like for example mutual awareness, which tacitly indicates interpersonal support, acceptance of the other, encouragement and based on these type of expression, contributes to building group cohesiveness. Recognition is another example of open communication, achieved by explicitly expressing appreciation and agreement as well as complimenting and encouraging others. Finally, group cohesion is also an indicator of social presence. It appears in activities that build participation and empathy, thus helping participants

to see themselves as part of a group, not only as individuals. These three components of social presence are all related to space in the sense of “what connects and separates” (de Michelis, 2016) the persons involved. Thus, space appears to be essential as the medium that enables social presence. If space is so ubiquitous both in cognitive and social experience, then in online situations where people need to interact (learning, working), we could make collaboration more efficient and effective by providing spatial clues. This requires an appropriate design of the collaboration event (meeting) which makes sure that people and activities use spaces and movements. It also requires a suitable three-dimensional technology, for example a desktop-based 3D Virtual Environment providing places, buildings, rooms, background objects, fixed and portable objects (whiteboards, tables, etc.), audio and video communication and avatars able to navigate the environment and come together.

### **Leading Presence**

This is how we come to the third question: what is the role of space in *leading presence*? A first component of leading presence is *collaboration management* which is concerned with coordinating activities, organizing group events, encouraging participation, assessing the needs of the group and the success of the collaboration, designing and maintaining the online environment. A second component of leading presence is *facilitation*. The leader tries to be neutral and not to use the decision-making authority accorded by the formal position. His/her main task is “to help the group increase its effectiveness by improving its process and structure” (Schwarz, 2005), like in group facilitation. Finally, a third element of leading presence is *support* in reflecting on the state of cognitive and social presence, providing feedback and helping the group in balancing the other two kinds of presence in order to achieve the planned objectives. When a leader designs a new collaborative online session, he or she must define *what* the next step in the problem-solving process will be (a matter of methodology), *why* this step is important (a matter of value) and *how* participant will actually perform the step. This is where space comes in: the leader has to determine *how* participants will *interact in space* so that both cognitive and social presence will be suitably supported and the work will be accomplished effectively and efficiently. This includes determining, for instance, arrangements of space (which rooms, which board and which panels positioned where on the walls or in the room), which movements in the rooms would be useful and when to undertake them, how to distribute the *boundary objects* of the interaction, etc.

### **The QUBE System**

QUBE is a commercially available example of a 3D system that is suitable for supporting collaboration events, which are consistent with our presence model of knowledge sharing. The QUBE system is composed of three basic elements: learning, doing and technology. Accordingly, there are three basic design principles of QUBE. First the *learning* element has to be designed as a collaborative activity with people interacting in space; secondly the *doing* element consists of real work scenarios as goals towards which the collaboration has to be oriented (like in project-based learning); and finally the virtual environment (the *technology* element) must provide *spatial* functionalities which enable both the learning and the doing. It

is essential to take seriously the fact that here *system* refers to the unity of the three constitutive elements of learning, doing and 3D technology. With software alone, without the other two elements, the system is empty and useless: like a violin when you do not know how to play it.

A typical session on QUBE, for instance a meeting, begins with a session facilitator welcoming the participants as they arrive in the space. Each person in QUBE is represented by an individual avatar, a simple box figure (like LEGO mini figures, but gender-neutral) which provides enough of a human form to foster the needed identification. Using your avatar, you are able to communicate with other people just as you would in the real world. You can move around in the rooms of a building, physically interact and work shoulder to shoulder, literally brainstorming with other people by means of whiteboards and sticky notes. The facilitator welcomes each one individually and makes sure that they are ready to start. Then the avatars can visit the collaboration space room until the meeting starts. The room has been carefully prepared in advance before the first meeting and will remain available in future. Boards, tables and chairs needed during the meeting are available on the walls and on the floor. Tools called PETs (Performance Enhancing Tools) are guidelines or procedures about how to accomplish a task and can easily be replicated on a whiteboard or panel when needed; each PET is linked with a specific documentation which describes “what is it?”, “why do I need it?”, “when do I use it?” and “how do I use it?”.

Regularly scheduled problem-solving and decision meetings with a project team are the most important requirement for collaboration effectiveness and efficiency (Gordon, 1977). On QUBE these meetings, called *drumbeats*, eventually receive the high consideration that they deserve. During a meeting participants can split into subgroups and move to an area in the same room provided with chairs and round tables and sit down here when they want to discuss something, for example how to proceed when dealing with the specific question they have selected to work on (cognitive presence, leading presence). Once they have decided this, they can move to another area of the space and gather in front of a huge whiteboard, with sections separated by panels. At tables and within panels, the subgroup members will only hear each other talking, without noise from other subgroups (a feature that is quite impossible in a real room). Shortly before the time assigned for the work in subgroups has elapsed, a signal (flashing room light) lets the groups know that soon they will have to return to the plenary group, usually gathering in a circle in the middle of the room. Here the group performs a so-called spin-casting (social presence): each team member in turn has the opportunity to give brief feedback about the work carried out in the small groups (insight, remarks, questions, learnings, etc.). This sequence of interactions in three steps (plenary with a PET, work in subgroups with various PETs, plenary feedback by gathering in a circle) can also be applied during any phase of the collaboration. At the end of the meeting, a PET called RAPID will help the whole team to define the next steps and related tasks and plan when and who will accomplish them after the meeting (leading presence, social presence).

## Conclusion

In collaborative learning, all students work on the same, single task that remains a unit instead of being split into pieces, like in cooperation. Thus the knowledge required for accomplishing the task must also become a unit and for this, students need to mutually engage in a conscious, continuous effort to construct and maintain a shared knowledge structure suitable for the task. This is not easy to do, especially for tacit knowledge, among other things, because of the essential role that presence plays in collaboration as we have defined it. According to our *presence model of knowledge sharing*, the integration of three essential elements is required: cognitive presence, social presence and leading presence. In each of these types of presence, space has a great influence: it is contained in any knowledge item (cognitive presence), is essential as a medium enabling social experience and needs to be taken into consideration when designing how participants will interact (leading presence). As a consequence, in online situations where students need to interact (group learning), we could make the learning more efficient and effective by supporting it with a system which provides spatial functionalities and interaction methods which are consistent with our presence model of knowledge sharing. The system that we have presented, QUBE by Pentacle (UK), fulfils these requirements thanks to an appropriate design of its three basic elements: learning, doing and 3D technology.

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## OPEN DATA FOR LEARNING: A CASE STUDY IN HIGHER EDUCATION

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### Introduction

Nowadays there is increasing public pressure to open the data generated by public administration and the scientific system, being these activities maintained through public funding (Zuiderwijk & Janssen, 2014). In fact, the so called movement of “Open Data” embraces a philosophy of democratization of knowledge that can be considered in line with the prior movements of Open Access and Open Science. The most enthusiastic discourses on the availability of data and the feasibility of appropriation by the civil society are based on politic ideals as empowerment, public engagement and political monitoring, from one side; from the other side, big (open) data can be the base for new business models and crowd-work models towards economic development (Baack, 2015). However, this utopia could be hindered by an already well-known problem in the digital society: the need of skills and knowledge to navigate within the digital abundance that is continuously produced by the digital and open world. Some have compared the problem of appropriation of open data to the phenomenon of digital divide (Gurstein, 2011). As Zuiderwijk, Janssen, Choenni, Meijer, and Alibaks (2012) claimed, for the access to open data become civic monitoring and empowerment, it would be necessary for citizens to have minimal skills that lead them to understand which are the social problems monitored through data and to read the eventual representations already available to formulate new questions (Zuiderwijk et al., 2012). And this would be the lowest level in the analysis and use of public data, if we consider the several data transformations undertaken by statistical experts and researchers (Janssen, Charalabidis, & Zuiderwijk, 2012). This situation is highlighting the fact that the potential embedded in open data could not be directly transformed into effective practices. Several areas of social sciences have started to study the Open Data movement, spotting several problems and opportunities for development: Economics (innovation processes, business models and crowdwork based on open data); Political sciences (e-Government and Open Government, digital citizenship, civic engagement); sociology of science and information sciences (Open Data within Open Science, access to public scientific knowledge, new forms of scholarship in the digital era). However, the issue has been little explored from a pedagogical point of view, that is, the several formal and informal learning processes that could be based on Open Data (Davies, 2010; Raffaghelli, 2017). With some experiences and debates that pioneered reflections, like Atenas, Havemann, and Priego (2015) and their framework for Open Data as Open Educational Resources, the topic’s boundaries are still to be defined. In spite of this situation, there is another area of studies that is growing consistently and could bring some light: I refer to the studies on *data literacy* (Stephenson &



Schifter Caravello, 2007) as a base to deal with Open Data. Yet data literacy studies have focused more the definitions of what should be included in this type of literacy, or whether it is a part of information literacy or numeracy, or if it should be considered separately; experimental studies or action research on practices leading to achieve it, are much less frequent (Gould, 2017; Vahey et al., 2012). The panorama seems to require further educational research: from the emerging professional profiles and specialist competences required in the highly qualified positions of *data scientists*; to the basic literacies to deal with data as part of basic and higher education. Educational research should cover areas as competences' frameworks that should the levels of mastery for the several educational levels as well as methods to develop data literacy as life skill as well as highly specialized professional competence. Aligning with the idea of macro, meso and micro dimensions of learning (EDEN Annual conference 2018, Genoa Call – [http://www.eden-online.org/2018\\_genoa/call/](http://www.eden-online.org/2018_genoa/call/)), the topic could be explored from the macro level of Open Data as Open Educational Resources: the libraries, their classification and curation; the meso level could focus the problems of learning design and the connected pedagogical methods to adopt Open Data; and the micro level would relate the impacts on data literacy achieved through the use of Open Data. Therefore, in this paper, my aim is to reflect on the problem of data literacy as one of the frontiers of numeracy in the context of higher education and particularly regarding educators as professional category being formed. Hence, I will introduce a case study generated in this context as a mean to reflect over two issues: Firstly, the issue of data literacy as part of academic skills, attempting to understand the several difficulties and motivations leading open data exploration by university students that are not expected to master Statistics or Data Analysis as part of their professional competences; secondly, I wish to reflect on the several problems faced to design for learning with Open Data.

### Data literacy: A brief background

The skills required to work with math concepts as well as for very basic statistical elaborations as part of basic education and as life skill has always been present in the educational debate. However, the frameworks place the areas of knowledge in diversified ways and the terms adopted encompass polysemy. The concept of numeracy appeared first in 1959, year in which the report Crowther (UK) included this term in the general context of basic literacy. Along its history, the term acquired several meanings and entered in national guidelines for literacy, taking into account the growing importance of STEM studies for the productive systems and for innovation. The term initially spotted math competence, that is, the progressive ability of counting and undertaking simple arithmetical operations not only in scholastic contexts but also as part of daily life. With its growing relevance, the term was included in the famous international studies PISA – Programme of International Students' Assessment – and later on in the PIIAC – Programme for the International Assessment of Adult Competencies – (OECD, 2012; 2017) being defined as: critical reasoning; communicating, modelling, problem solving, representing with numerical information; using the symbolic, technical and formal language of the mathematical operations; use of instruments connected to mathematical operations. In the more recent definitions of PISA and PIIAC there is a clear attempt to move beyond the concept of mathematical skills as knowledge of formal procedures within arithmetical and algebraic

operations, towards applied concepts in authentic environments requiring problem solving skills. Moreover, according to Gould (2017) in the contemporary society it is necessary to achieve skills to interact with statistical information, more and more present in all sort of textual reports, magazine articles and other social productions. This author mentions the *statistical literacy*, which in the literature is considered within numeracy but as specific area where some of the problems are: to understand the concept of sampling and error sampling; the differences between correlations and causality and the risks of assuming the first as the second; the difference between descriptive and inferential statistics. However, the same author prevents that currently the term *statistical literacy* could be insufficient to cover a number of phenomena. In fact, on the basis of new forms of data collection based on crowdsourced and digital data, the paradigm of inferential statistics is giving way to new forms of data analysis based on algorithms and the concept of Bayesian probability. Algorithms that aggregate news and product's preferences, are based on decision trees and Bayesian probability models; they are a daily, yet often unknown, users' experience. Hence, Gould points out that the term of *data literacy* could cover better these emerging phenomena. Actually, in the Canadian report of 2015 promoted by the National Council of Human and Social Sciences on *data literacy*, the term is defined as the ability of gathering, managing, evaluating and using data in applied contexts, through critical lens (Ridsdale et al., 2015). This skill can emerge in specific contexts both at an academic level (manipulation of data for academic communication purposes); and at a professional level, when data is used to inform processes and decisions (more essential) or to generate products and services (advanced level of innovation). The different existing definitions coincide on the following key elements of *data literacy*: extraction, management and processing, ethical and critical approach to data handling. According to a literature review by Maybee and Zilinski (2015), on the basis of the analysis of 8 frameworks for data literacy, the following elements can be identified: (a) Awareness: Understanding data and its role in society; (b) Access: Understanding how to identify, locate and appropriately use datasets and databases (i.e. a collection of structured data); (c) Engagement: Evaluate, analyse, organize and interpret existing data. Make decisions based on data; (d) Management: Plan and manage data, including organization and analysis, security protocols for data storage, sharing data, and data-driven documentation; (e) Communication: Synthesize, create visualizations and data representation; (f) Ethical Use: Identify diversified data sources, in particular data from human and social activity, considering the risks of managing such data. Understand the issues implicit in the use of data; (g) Preservation: Be aware of long-term practices of storing, using and reusing data.

In line with the above mentioned research, the very recent European debate on the Digital Competence, with the framework DigComp 2.1. (Carretero, Vuorikari, & Punie, 2017) has focused data literacy. The concept of Digital Competence, already present in the prior framework of Key Competences for Lifelong Learning from 2006 (European Commission, 2007), recalls the importance of the skills to live in a digital era. However, while the first framework (2006), as well as the framework DigComp 2.0 never included the idea of skills to handle data, the latest version of 2017 (2.1) introduces the component of "data literacy" together with the information literacy dimension.

### ***Data Literacy within formal learning contexts***

Having analysed briefly the debate on the existing frameworks to assess data literacy, let me introduce the universe of educational practices aimed at teaching and learning this complexity. Within basic K-12 and Higher Education the panorama appears fragmented. While it is clear the central role played by math and statistics, mediated by technological tools, today the reflection is going towards the need of analysing phenomena, understanding their chaotic nature, and hence build/use the necessary to make the disorder to become structured data. Moreover, data can be placed into *narratives*, taking care of their aesthetics in visual representations and critically understanding the socially constructed nature of data. It is worth mentioning that in the US, for the K12 the NGSS – Next Generation Science Standards, 2013, cited in Bowen and Bartley, (2014) – points out the importance of public science, open inquiry and crowd science, as it is presented in the case of Gould (2017). This last author proposes the case of *participatory sensing*, based on the concept of “Internet of Things” (IoT); in this case the students were invited to analyse the data collected by terminals that collect environmental information. The schools (30 classes) collaborated with the University of Los Angeles (Department of Computer Science, Department of Statistics, and the Graduate School of Education and Information Sciences). While undertaking these activities, the students were learning about citizen science, the importance of responsible research as well as rudiments of data science. The students interacted with data through the own mobile devices and shared the data to understand environmental issues, like garbage recycling. The data collected was transformed in numerical and categorical variables, as well as open text. To the data collected the students applied types of analysis like descriptive and inferential statistics, as well as CART, (classification and regression trees), as the simplest models to apply, to understand data transformation and analysis. In this experience the effort was put on leading the students to see how data emerges from collaborative, citizen science approaches; the data treatment was based on constructions that interest the same engaged groups, through procedures that are mostly post-hoc. In this sense, data literacy lying behind the experience went well beyond the mathematical and statistical skills necessary to read and process data. The skills required started with data collection and ended with *data storytelling*; the ultimate goal was to show the complex socio-cultural nature behind every information constructed and communicated through data. In this same vein, Mulligan attempted to reflect on the basis for data literacy in primary education (Mulligan, 2015). Another interesting, integrated case for primary and secondary instruction is that of Urban Data Games, led by the Department of Math, Informatics and Technology at the Open University of UK (Wolff, Kortuem, & Caverro, 2015). In this project the aim was to develop the competences to live in “Smart Cities”, as living environments to be read and interpreted. The assumptions in this project were the following: engaging students in data handling, within an authentic socio-cultural context of action (the Smart City they live in), through a gamified learning approach, push the students to use math, statistics and informatics in integrated ways. According to the authors, the students were able of achieving not only significant information which enacted them as engaged citizens; they were also practicing skills that align with the national standards in STEM (<http://www.nationalnumeracy.org.uk>). Wilkerson and Laina (2017) instead analysed the cognitive processes relating interactive

visualizations of data in kids aged 12-13. When these students were exposed to geographical and ecological information, the expected cognitive processes were: (a) formulation of hypotheses or recovery of hypotheses formulated in considering past activities with non-interactive graphs; (b) mathematical ideas (trend, distribution, quantitative inference, measures of central tendency or dispersion, etc.); (c) focus on the graphic aspects of representation (axes, labels, position, colour form and other visual properties of the data represented which indicate aspects to be interpreted); (d) focus on textual aspects (captions, narrative text surrounding a graph); (e) questioning the reliability and the origin of the data (if the data were collected reliably, questions on sampling, reflection on the collection context or sample characteristics); (f) Local / global tensions (similarities between “local” specific data and generalizations towards universal behaviours); (g) Interpretative report with personal experiences of the student. While the initial cognitive processes (a to d) were more frequent, the students showed some difficulty in passing to the deeper and critical forms of cognitive interaction with graphs. Once again, in this study it is possible to observe the complex nature of data literacy, and the need to integrate more technical skills (in math and statistics) with holistic and situated forms of cognition based on data.

In Higher Education, the situation is similar, and data literacy is claimed to become an important issue within academic skills. Frequently, data literacy is associated with information literacy, becoming a matter of librarians. For example, Carlson, Fosmire, Miller, and Nelson (2011), at the Purdue University, pointed out the importance of skills to conduct e-research tasks. According to the authors’ position, digital data coming out from open science could be adopted by students in inquiry processes within formal learning activities. However, it emerged the need to train these specific academic skills. The topics for this type of training should come from the cycle of scientific information: searching and retrieving scientific information (and hence knowing Boolean operators, metadata, scientific databases and open datasets portals); appropriate data management (privacy issues, storage and back-ups); data cleaning and data elaboration within the limits of a scientific discipline; file formats allowing basic and advanced statistical operations not only by the same student but also by communities of unknown users (data sharing); data visualization and reporting. The authors concluded that these abilities imply, among other skills, a good knowledge of economic, legal, social and ethical aspects surrounding the core of math, statistic and digital competences. In a sectorial study, Stephenson and Schifter Caravello (2007), concluded that the development of abilities inherent to data literacy require cross-disciplinary approaches. For these authors, the operationalization of constructs in science encompass form of information transformation from textual and conceptual to mathematical and statistical reasoning, but the awareness of these pathways of transformation are crucial to speak of data literacy. The above considered background oriented hence the learning design I will introduce in the following paragraph, including the educational aims and hypothesis to build *data literacy* in university students coming from the disciplinary field of Education.

## **Method**

### **Case study**

The present paper is based on a case study, a method that encompasses careful analysis of events and narratives regarding a specific subject of study tightly connected to contextual conditions (Yin, 2009). In fact, the case hereby introduced regards the adoption of Open Data as resources for learning, within a specific context of higher education: the course “Learning Design in Adults’ Education”, devoted to students of the 3<sup>rd</sup> year of the Degree of Educational Sciences at the University of Florence (6 ECTS, First Bologna Cycle). Eighteen students (11 Female and 7 Male) took part at the experimental learning activity. It is important to mention that the Degree’s curriculum offers little opportunities to the students to achieve statistical skills and to analyse quantitative data. Likewise, the professional profile is focused on competences relating the educational relationship and educational activities on the field. The interest on learning design and other processes supporting the documentation of pedagogical practices is emerging and being discussed, but there are no cross-curriculum activities. The course was a special occasion for students to understand the learning design concepts and techniques to apply them in adults’ education. Moreover, the course was based on an exploratory learning architecture, which main method was a *project-based learning*. In detail, along each learning module the students were supposed to apply their knowledge, in teams, on the following integrated assignments: “A1) Identifying an adults’ educational problem and establishing the learning needs; A2) Macro-design (overall project’s aims, goals, learning and evaluation strategies – high granularity level); A3) Micro-design (session-by-session specific goals, learning activities and assessment activities – low granularity level); A4) Implementing and Evaluating the designed educational interventions”. The activity relating the use of Open Data was placed as the 2<sup>nd</sup> learning unit within the Module of Learning Needs’ Analysis (A1). This learning unit covered several instruments to explore socio-cultural contexts where an educational project aimed at adults as target, is to be developed. The aim of the specific learning unit on Open Data was to understand how this type of resource can help the educator in analysing the adults’ learning needs. In fact, Open Data can be considered an important resource to understand scenarios of intervention, from the international to the local context. Moreover, it could be used as part of educational interventions aimed at civic participation. The educator can explore Open Data analysing learning scenarios and methods of intervention in connection to an educational problem; as well as the recognition of the policy making context and documentation. Open Data could bring key information about learners’ situation and needs beyond the general policy reports. Table 1 introduces the micro-phases of the learning unit, which was implemented in along two sessions of two hours (4h total). During the first session, the 1<sup>st</sup> phase was covered completely, and the 2<sup>nd</sup> phase was launched. During the second session, the 2<sup>nd</sup> phase was accomplished and the 3<sup>rd</sup> was launched and concluded. The first phase consisted mainly in presenting the concept of Open Data and self-evaluating data literacy. The second phase was aimed at exploring data in a sort of “data expedition” (the term was coined by The Open Data Institute – <https://theodi.org>). The third phase focused the reflection on the experiences as well as the presentations (including tables and graphics) made by the students. Along the phases, the data was collected through the structured self-evaluation form, and by audio-taping the

sessions’ interactions. Moreover, the teacher adopted a digital notebook where several observations and impressions along the two sessions were collected. In the case of the 2<sup>nd</sup> session, the notes were mainly based on the students’ interactions with the Open visualizations and datasets, as a sort of *user-experience*. As for the Self Evaluation form as instrument to collect information on the self-perceived data literacy, it consisted of a rubric with four types of ability and five ordinal levels of mastery. The four types of ability were: Data searching and retrieving (going from finding reports integrated with statistics to searching complex files as datasets); data extraction, in the sense of getting the data as raw material that can be directly handled or that requires processing and polishing in order to prepare it for specific types of analysis; data collaboration, as the ability to arrange data (in local or through the cloud) and manage collaborative processes of data analysis; and data storytelling, as the ability to introduce data effectively in narrative texts to carry out specific messages. The five levels were: no competence, basic, intermediate, advanced and highly advanced. However, as in most self-evaluation tools, the students were provided with specific statements of what being “highly advanced” or “not having competence at all” meant (cfr. Self-Evaluation Form at <https://goo.gl/forms/3uQWz5IJfARndz1S2>). At every level, the required knowledge on instruments to handle data as well as the creative abilities to generate visualizations and to communicate through data were explained. Moreover, the levels were concomitant with data literacy frameworks: the highest level could be associated to a technical profile or a professional profile adopting daily data in several ways, and the lowest levels (basic) introduced very basic abilities taught within compulsory education. In addition, there were open questions asking “how did you achieve this ability/knowledge” to contextualize the self-perceived ability and control bias in self-evaluation. The rubric ended with a final question on the interest towards further training, which indicated specifically the topics and tools. Again, the fields spanned from “no interest at all” to “want to achieve advanced knowledge and instruments”.

Table 1: Learning Unit on Open Data – Phases, Resources and Activities

Phase	Resources	Activities
1- Self Evaluation	Presentation & Instructions <a href="https://goo.gl/9pkofu">https://goo.gl/9pkofu</a> Self-Evaluation Form <a href="https://goo.gl/forms/3uQWz5IJfARndz1S2">https://goo.gl/forms/3uQWz5IJfARndz1S2</a>	1.1-Data Literacy Self Evaluation 1.2-Discussion: How data literate I am? How data literate I should be as educator?
2- Data Expedition	PIAAC – OCSE Open Data Instructions & Access: <a href="https://goo.gl/1FWYFo">https://goo.gl/1FWYFo</a>	2.1-Exploring PIAAC Open Data visualizations 2.2-Exploring PIAAC Raw Open Datasets
3- Open Data for educators’ professionalism	Presentation guidelines <a href="https://goo.gl/aahccT">https://goo.gl/aahccT</a>	3.1-Presenting the data selected in the context of learning needs’ analysis 3.2-Reflecting on the value of Open Data for educators’ professionalism

## Results

In this section the results of the learning activities are presented according to the data collected along the three learning unit's micro-phases. The first micro-phase yielded information relating the participants self-evaluated skills, as well as some interesting reflections on Open Data within the educator' baggage of knowledge and skills. As for the self-evaluated skills, the data collected was synthesized through descriptive statistics which are presented in the Figure 1. It appears that the students declared themselves generally at the level of no competence, or basic competence. Moreover, most students connected their knowledge and skills with the first phase of data literacy, namely, *data search*, with 6/18 at basic level and 7/18 at intermediate level; also only in this level 3 students acknowledged an *advanced* competence. It emerges that the poorest skill is *data extraction*, where most students perceive no competence (15/18). For data collaboration and data storytelling, the situation is analogous: half of the students consider to have no competence (9 and 8/18 respectively) or basic competence (7 and 9/18 respectively). We conclude from this briefly depicted situation that the students feel unskilled to deal with data and that they are able of performing very basic operations, mostly connected to a culture of reading printed reports with statistics, with rather static visualizations and tables (data search that lead to *packaged* scientific communication or policy reports). This information was confirmed by open questions in the form. However, the students expressed a rather shy interest in training. To the question which is your interest in learning about data and Open Data, only one student replied to be willing to learn on "advanced instruments"; 16/18 expressed interest on "basic instruments" and 1 was "not interested at all". This situation could encompass a belief that data activities are far from the students' professional identity in construction.

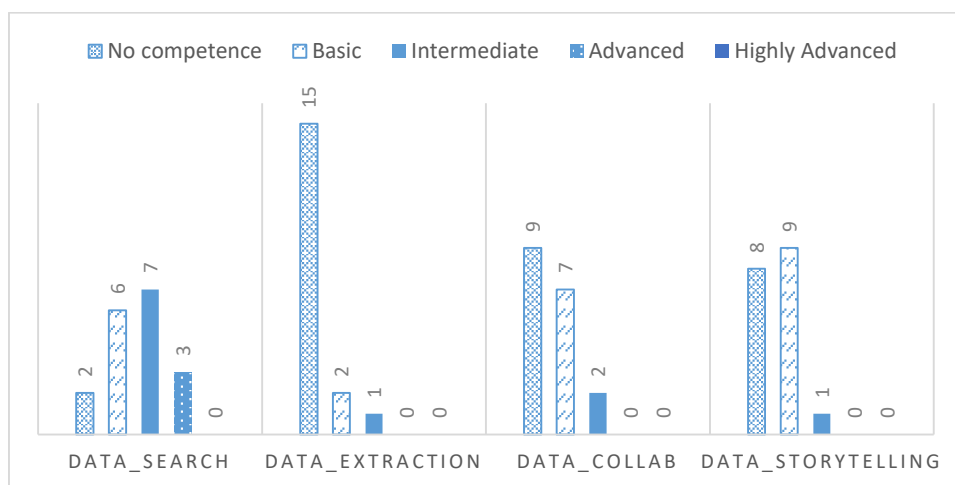


Figure 1. Students' self-evaluation of their data literacy skills

After self-evaluation, it followed a discussion based on the questions: How data literate I am? How data literate I should be as educator? The students pointed out that:

- They felt surprised about the several levels of knowledge required to deal with data.
- They felt generally unprepared to deal with data.
- While a group of students were eager to understand more on open data and to become more data literate, another discussed that this is necessary up to a certain point, as

educators, since they did not see advanced phases of data analysis as connected with the core of skills required for their professionalism.

Regarding the second phase, Table 2 introduces the main issues yielded after the *user-experience* within the PIAAC open data sites. It was possible to observe that the experience of interacting with data was a hard task to accomplish. While at the end of the activity most students acknowledged the relevance of open data in society, the groups that faced more issues in analysing and using data consider that there is always need of “mediation”, that is, experts working in the field of statistics that arrange data for “final consumption”. However, half of the class was enthusiastic about the potential of Open Data in society, and for them as educators. Not surprisingly, these students were those able of extracting personalized graphs and to generate their own data tables.

Table 2: Students’ user-experience within the PIAAC open data site

Activity: Data expedition	Positive experience	Negative experience
2.1- Exploring PIAAC Open Data visualizations	<ul style="list-style-type: none"> <li>- Most students liked the possibility of adjusting graphs as they selected skills and countries.</li> <li>- Half of the class was able of extracting visualizations useful to support their claims on adults’ education needs.</li> </ul>	<ul style="list-style-type: none"> <li>- One group (5) got frustrated for the data was “superficial” and the type of visualization did not encompass freedom to interact with data in search of what they needed really.</li> <li>- Most students required teacher support to understand the concept of “dynamic visualization”</li> </ul>
2.2- Exploring PIAAC Raw Open Datasets	<ul style="list-style-type: none"> <li>- Two groups were able of creating new tables extracted from raw data (.csv)</li> <li>- The students understood the concept of open data and how they could enable the user to generate original representations.</li> </ul>	<ul style="list-style-type: none"> <li>- Most students felt the task was difficult and required support to operate with the raw datasets.</li> <li>- Two groups only “looked at data” but were unable of editing raw data and generate new representations.</li> </ul>

As for the 3<sup>rd</sup> phase, it was interesting to see the students’ commitment to understand the several representations selected according to every specific project. Four educational problems were proposed by the four groups: two of them relating adult learning in elder life; and the other two regarding adults’ education for inclusion. The four projects adopted the open data collected as part of the analysis of adults’ basic skills that should be considered as part of adults’ education in the above mentioned cases. Particularly, they handled variables as sex, age, country and life skills (literacy, numeracy and digital skills, in social and working contexts). Ordering the students’ reflections throughout the macro, meso and micro dimensions of learning in the digital landscape, the picture obtained was interesting.

As for the *Macro-dimension*, including the structures and access to Open Data as Open Educational Resources, it should be considered that Open Data portals are still “messy” and mining data requires careful attention and expertise in order to obtain relevant results. Moreover, the generalist nature of OD portals attempts against the very specific needs of data



search by the educators while writing and application or exploring a social context to elaborate an educational project. As for the *Meso-dimension*, relating learning design, OD require several tools to introduce them successfully to the learners, according to the expected levels of data literacy. These instruments can go from the teacher presentations and exemplar cases, to worksheets and guided practice in interacting with OD portals. With regard to the *Micro-dimension*, that includes the impact of OD on data literacy, training educators to understand the available data, and to mine open data portals, should be considered as part of the basic competences to design educational interventions, as well as to document them. In fact, an important discussion about the data handled by adults in several life situations emerged. While one group pointed out that refined data portals are still far away the literacies of many of the adults they encountered in educational accompaniments, with adults at social risk, another group emphasised the problems arising while handling information where data was present. The exemplar case brought by this group related elders' health care, and the need for them to understand their own data (digital devices for health monitoring) as well as reading minimal data produced by the health care system (epidemiological information). Most educators should accompany elders in continuing learning on these new life skills and they felt unprepared for that situations. As a result, the students' also reflected and acknowledge the importance of their own data literacy to guide others' learning on data and particularly Open Data.

### Conclusions

In this paper, I presented a case study on using Open Data for learning in Higher Education. The educational problem I attempted to explore could be connected to the new sets of skills required to participate in a society were not only the digital component, but also the digital data generated and available through several ways are shaping the social fabric. As educational researcher committed with Open Education and interested on new social phenomena emerging in a digital society, my initial motivation was connected to understand whether Open Data can be adopted for learning purposes, triggering forms of reflection and awareness on data-driven processes and hence on own data literacy. However, this type of endeavour led me to focus my research questions in the context of intervention. As teacher at the undergraduate level, I wondered which are the current levels of data literacy in undergraduate students and to which extent data literacy is needed as part of emerging professional profiles. Moreover, as educator committed with training a new generation of educators, my interest went on the direction of discussing with the same students how important Open Data, and the overall data literacy could become for their professionalism. These issues led me to understand the macro-meso-micro structure of the educational problem ahead: while understanding how and if Open Data as available, authentic and rich resources could be placed at the macro-level of learning in digital contexts, the expected outcomes for undergraduate students and the context of higher education; and the specific problem of Open Data for educators, belong to the meso and micro-level. The results in this case study showed that while Open Data offers exceptional opportunities to the society, their only presence may not trigger virtuous practices immediately. At the macro-level, the action taking implies forms of reflection on formal, informal and non-formal learning with Open Data. At the meso-level, it seems that every group and educational

level, from the whole citizenship and workers, to school and university students require tools to scaffold their experience with Open Data. Therefore, at the micro-level, to promote data literacy it is necessary to design for learning with Open Data, and to search for the appropriate methods to support the students in their journey from no competence or very basic data literacy levels, to more advanced stages. Moreover, it is important for the students (and for all lifelong learners in general) to become aware and to discuss which are their own expectations of data literacy, that is to say, to which extent do they feel necessary to understand data and particularly Open Data. In this regard, more empirical research, beyond the existing frameworks is necessary. The directions for research are doubtlessly connected to action research (more educational experiences systematized and shared), but also to the validation of schemes of educational practice through theoretical reflection or hypothesis testing. Moreover, ethnographies of use could be important to understand the forms of appropriation and the difficulties that hinder it. All in all, a long (but exciting) way to go.

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## **DIGITAL TOOLS IN THE SERVICE OF SOCIAL MEDIA – OPPORTUNITIES AND ROLES OF EDUCATION AND CONTENT SUPPORTED BY MOBILE COMMUNICATION DEVICES IN SUPPORT OF INFORMAL EDUCATION AND DIGITAL COMPETENCES DEVELOPMENT**

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### **Introduction**

In today's digital environment, new methods of education (Ollé, Papp, Lévai, Tóth-Mózer, & Virányi, 2013) have emerged from web 2.0 and e-learning 2.0. New Media (Forgó, 2017) systems also significantly transform the learning environment. We have come to the latest achievements of Digital Pedagogy 2.0 (Benedek & Molnár, 2016). The new types of platforms that emerge as a continuation of this trend go even further, just beyond the existing technologies. In addition to the earlier services, they help to navigate through large data sets and focus on mobile technologies.

### **New ways of learning in the information society**

The beginnings of the information society can be traced back to the emergence of broadband Internet connections. It is the time from when the computer network is present both in physical and virtual space. In this environment, the amount of information is constantly growing, more and more users connect to the network through their smart devices. The students become members of online communities. The more content and services move to network environment, the more effectively it transforms the world of education. In the information society, as opposed to the modern industrial society, there is a need to acquire and apply knowledge immediately, and practical know-hows quickly becomes obsolete. In the context of the information society, the nature of knowledge becomes practical, multimedial and transdisciplinary, while the same time it is interactive too. There is also a change in the pattern of knowledge acquisition, ways of learning, lifelong learning becomes dominant, with non-formal learning (Benedek & Molnár, 2014) and crowdsourcing getting more and more popular.

According to Ropolyi (2006), the book was the information source of the modernizing world, whereas today, the masses prefer specific, individual forms knowledge acquisition. It is important to emphasize that in information age knowledge is gained on a wider horizon.

## **Digital media content for learning**

Manuel Castells (1996) points out three major trends that dominate new media:

1. Mass media is largely concentrated in the hands of international media companies that are both globally and locally embedded. This is characteristic of television, radio and print media. Opposed to it, new media lacks this type of concentration.
2. Communication channels are digitized and interactive in the network society. Accordingly, the world's advanced societies are increasingly turning away from mass media and are oriented towards personalized individual new media content.
3. Due to the new communication technologies, a new type of medium has emerged a horizontal communication network. New forms of communication on the Internet flourish: blogs (web log), vlogs (video log) and podcasts (internet radio shows). On the web, these individually-supplied, and mostly free content is easily accessible to anyone, while their producers are able to remain independent from traditional media companies and governments.

From the perspective of the education, several opportunities open up for personalized content development and dissemination.

## **Social media in education**

In the field of internet, the emergence and today's dominant position of Web 2.0 brings to life new forms of communication, digital media and learning platforms. In the context of blogs, wikis and social networks collective wisdom is born and user-added value allows students to become informal teachers. In order to maintain the attention and interest, we need to take the curriculum where the students are, that is to social media. A new community-based learning model has emerged. Teachers for example, create their own Facebook groups and communicate with the students through these. Often curriculum is shared – but its sources are not always verified.

Since 2000's, the emergence of mobile communication and smart devices gradually changed the way space and time were handled and sensed by students. In this context, the most important element is the interaction, as well as the proactive user behaviour, which also requires extraordinary activity from users. While push media assumes a one-way, asymmetric, individual-to-mass communication process where the user (viewer, reader) scans the information, pull media will deliver information according to the user's own interest. This change was largely supported by smartphones

The communication patterns associated with learning have also changed. Likewise, media consumption has also changed. While in the early 2000s, family members gathered in front of the television to listen to and see the news, in the 2010s everyone is using their smartphones individually. From the point of view of learning, this is important because, as a result of the proliferation of such mobile devices, learning becomes highly individualized. Everyone has

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their own screen – and at the same time everyone shares online a community experience. Learning supported by mobile devices takes place with informal tools and platforms, while a substantial part of the curriculum is not created in academic environments (Benedek, 2016; Benedek & Molnár, 2017).

### **What has proved to be successful and unsuccessful?**

Although ICT technology can no longer be said to be new, as it is already present since the late 1990s, it is still in the experimental phase. One reason for this is that there is a continuous change, it is in perpetual beta. New platforms that support different types of communication processes require different acceptance strategies. There are too many platforms to be used. MySpace supported sharing of video materials, Pinterest supported visual learning, while recently users have migrated to Instagram and SnapChat. But another example of a fad is augmented reality. First the gaming console manufacturers (Sony, Microsoft) announced a range of accessories and teachers hoped for a transformation in the education. For science subjects such as physics, chemistry or biology this multimedia and interactive demonstration technology proved itself. However, it is still sporadically used by teachers and students. Supported by AR, the physical world can be expanded with virtual elements (e.g. 3D models, videos and animations) that merge into the real-life environment using cameras and screens. Thus information is displayed with the help of a mobile phones, a computer screens or special visors.

However, over the last few years, the mainstream gaming industry has given up on AR technology, and now smartphone manufacturers have been trying to integrate it. At the same time, the presentation of the curriculum was hardly affected by AR, and it is still only a pilot phase.

Likewise, the one dominant social network remained to be Facebook. So, those who created groups on Google+ have migrated over time to Facebook. The same thing happened with local community sites, for example with Hungarian iWiW. Although SNSs are similar in design, they differ in functionality, so students basically need to adapt to a new system every time they want to communicate and collaborate with their peers.

### **Experiences with mobile devices and social networking sites in education**

As the consequence of the integration of online networks and digital technologies into everyday life, the mechanisms of information acquisition and learning have radically changed. Consequently, there is a need for users to quickly acquire knowledge and information, often without questioning its source. The reasons include the transformation of reading habits, the need to access the knowledge as quickly as possible while applying the BYOD logic (Szűts, 2014). Such an environment has become an educational one and often primary source of information, in which the students feel at home. Using social media and mobile platforms is intuitive – rather than using LMS systems (for example Moodle). Multimedia and

communication interfaces also support learning. These tools and platforms often have no institutional cost. The advantage of BYOD is that students use up-to-date, well maintained tools, but this also has a number of disadvantages. While technical issues are solved by administrators in the institutional environment, in case of BYOD there is no official help to be used. Internet access is also provided by institutions, but Wi-Fi systems are often not prepared to handle such a large number of devices. Online cloud platforms provide necessary storage. With normal usage, unlimited storage is available free of charge or at extremely low cost, however there are data security issues. This information does not exist on the servers of the particular institution and as such has many risks. Data handling issues found in Facebook's practice are described in the story of Cambridge Analytica (Grewal, 2018), (Benedek, Molnár, & Szűts, 2015). The company unlawfully accessed users' data and used them for political campaigns. In the case of online curriculums, the risk is even larger, the more influential institutions may gain insight into the operation, strategy and sensitive information of other, less data protective institutions. Many eligibility, personal data and intellectual property regulations need to be taken into account when HEI-s are using the clouds, so in non-formal ICT-supported learning, emphasis should be placed on this issue as well. Even more it is not always clear who is in possession of the content, so there are more uncertain references that often lead to false information.

Not only the social media sites are popular in education and training, but also the dedicated quiz applications such as Kahoot or Quizlet. However, it has several risks as smart devices often mislead students' attention.

## **Empirical Survey**

In a research conducted in May 2018, authors carried out a cross-sectional survey, which was implemented using a quantitative-based questionnaire survey often used in pedagogical research methodology. As an exploratory tool the authors used the Google Drive online questionnaire form (<https://goo.gl/forms/7ITJgodHdIZVpNqq2>), while respondents' results were processed using simple descriptive statistics with text and graphic analysis. The focus was on the role of digital media, including smartphones as mobile communication tools, the role and use of social media, as well as the assessment of usage habits. During simple random sampling, a total of  $N = 47$  evaluable answers were received in first phase of the survey. The target group consisted of students who attend part-time training at Budapest University of Technology and Economics, on the one hand, and full-time economics and engineering teacher students on the other. The questionnaire contained a total of 22 items, with the exception of one they were all closed question. For the reasons of brevity, only the most important issues will be presented in this chapter.



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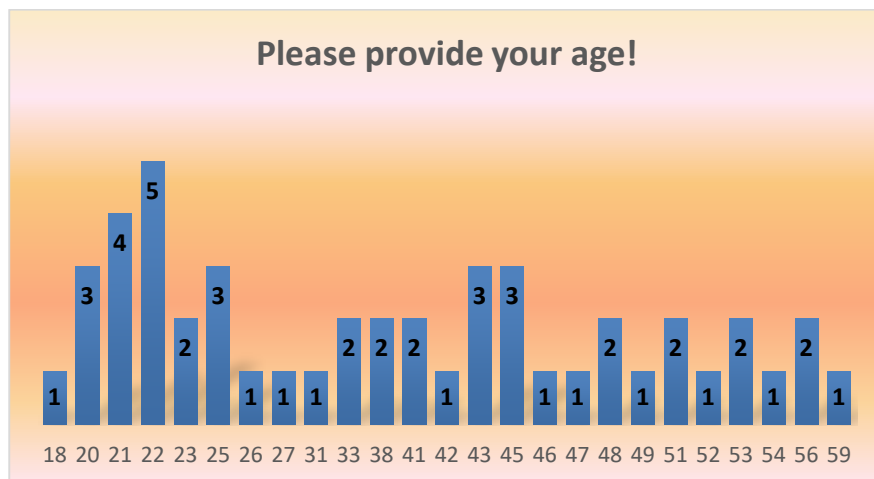


Figure 1. The age distribution of respondents (own chart)

The diagram above shows the age distribution of respondents, which means that 35% of people surveyed are under the age of 25, this showing the dominance of Y and Z generations in the survey. The 26 to 60+ year old were represented roughly equal.

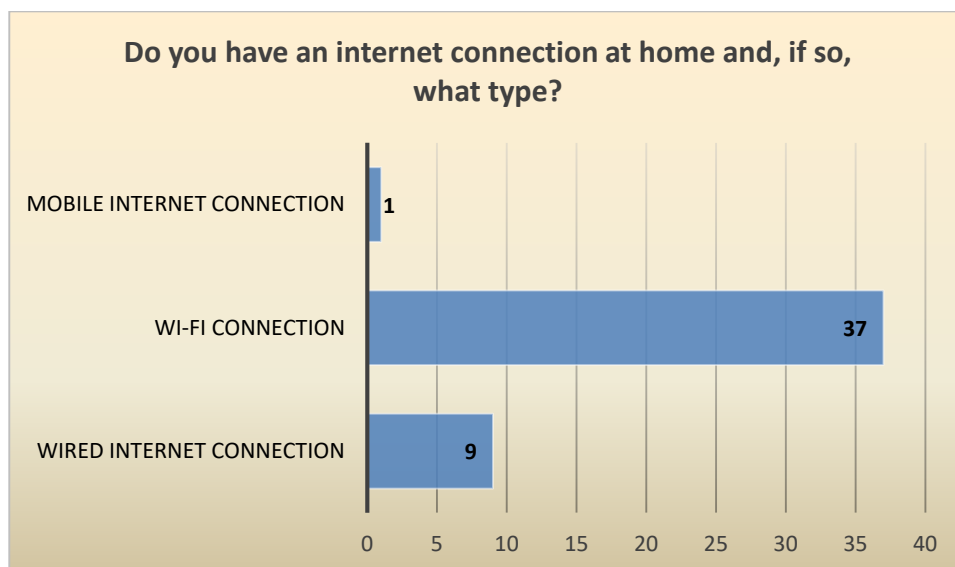


Figure 2. Types of Internet connections and its distribution (own chart)

The following figure illustrates the types of Internet connections and its distribution. According to the answers received, 79% of respondents (37 respondents) use mostly Wi-Fi, while the remaining wired internet connection 20% (9 respondents) and 0,2% use mobile internet connection.

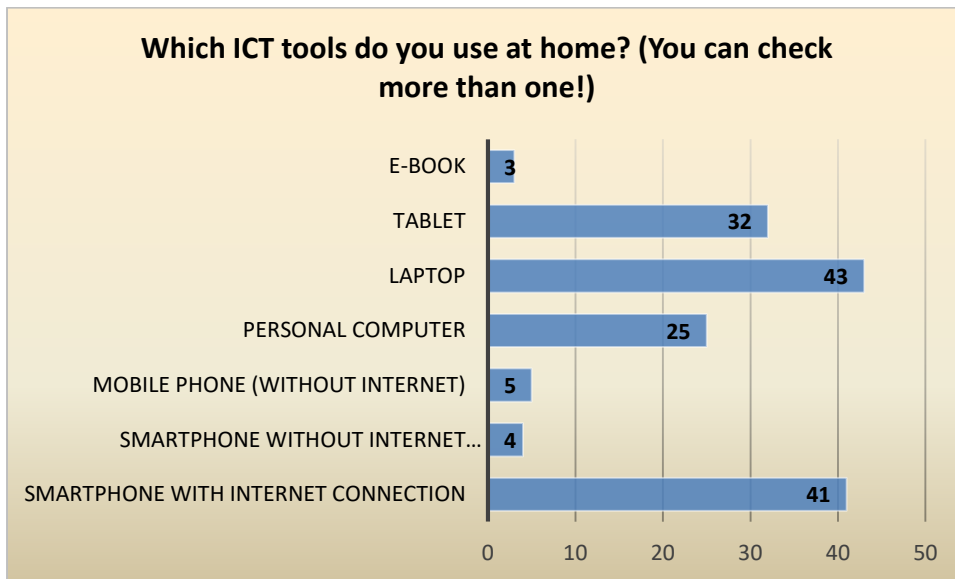


Figure 3. The distribution of ICT use at home (own chart)

The diagram above shows the distribution of ICT use at home, according to which 43 respondents use primarily their laptops and 41 answers use smartphones with internet connection. A further 32 respondents use tablets, and 25 still uses the desktop PC the most.

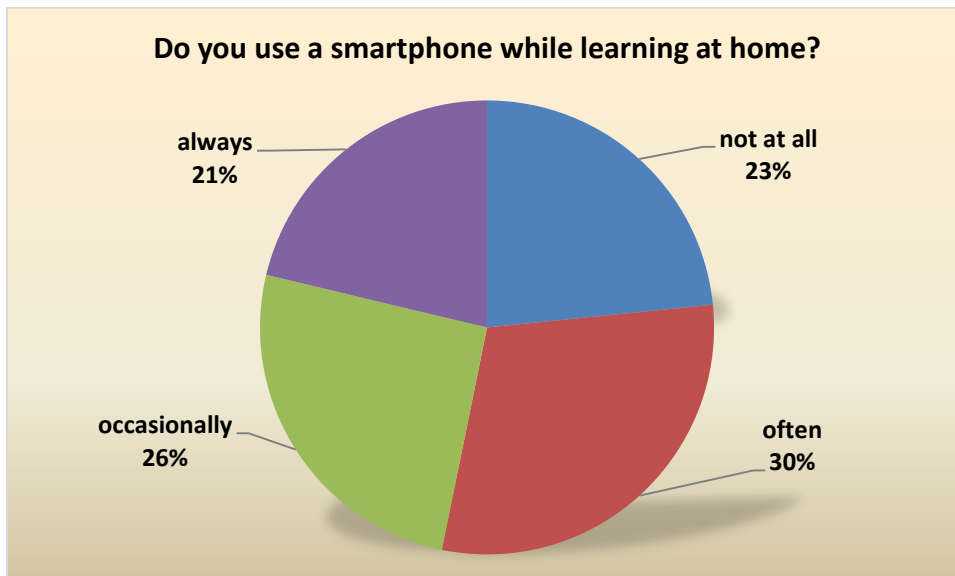


Figure 4. The distribution of use of the smartphone for learning purposes (own chart)

The figure above shows the use of the smartphone for learning purposes, where 30% of the respondents often use it, and another 26% occasionally use it for this purpose. 23% of respondents not at all use it. Budapest University of Technology and Economics does not prohibit use of mobile phones during lectures.

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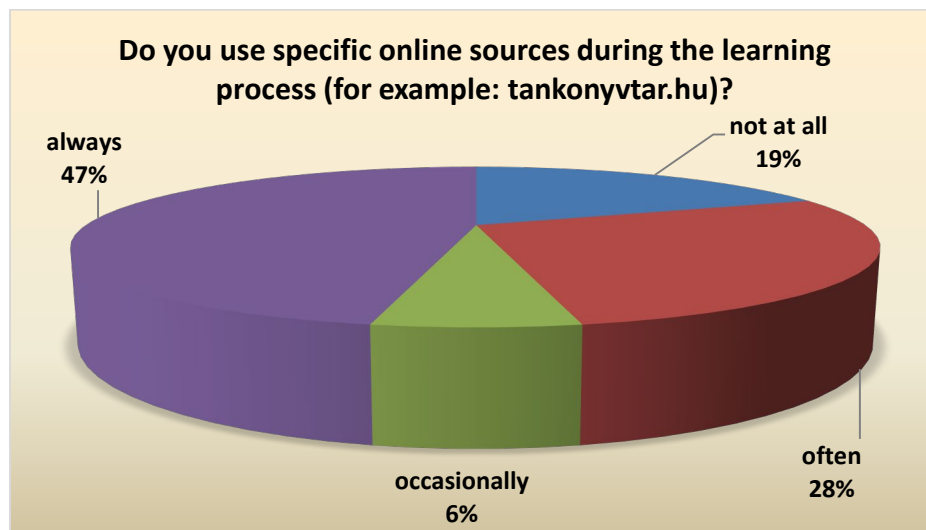


Figure 5. The distribution of usage of online web services (own chart)

The diagram above shows the distribution of usage of online web services. Almost half of the respondents (47%) of respondents always use these types of online resource, while 28% often use this option. Another question was about the use of LMS systems, which is used by 80% of the respondents. 77,5% of respondents are members of a closed Facebook study group. Finally, 75% of respondents are confident that their data generated and stored among the framework of social media data is safe.

## Conclusions

Today, the use of mobile technology, digital as well as social media has become more and more common among users. This hypothesis is supported by the results of the empirical research presented in this article. Numerous Hungarian and international surveys have come up with similar conclusions based on which new methodology solutions based on mobile and proprietary tools can be implemented into the education system. Due to the openness of students towards the new solutions, online services, social media in general, professional forums and LMS systems can be used in engineer, economist teacher training. The findings presented in this paper may be suitable for the practical implementation of the innovation both on micro- and mezzo-level when determining the methodology and use of digital curriculum.

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## **USING SOCIAL MEDIA PLATFORMS IN THE UNITED ARAB EMIRATES TO CREATE ETHICAL, CULTURAL AND SOCIAL AWARENESS THROUGH EMOTIONAL INTELLIGENCE PRINCIPLES**

*Maya AlHawary, Hamdan Bin Mohammed Smart University, United Arab Emirates*

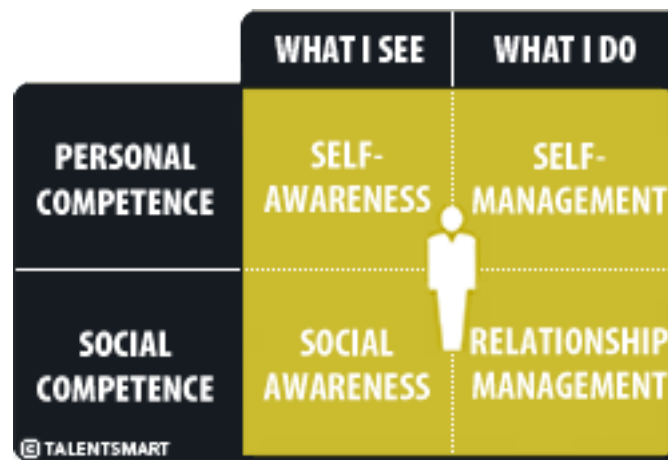
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### **Introduction**

Research over the years (Goleman, 1998; Salovey, 2000; Mayer et al., 2000; Higgs & Dulewicz, 2003) has provided an interested focus on the significance of Emotional Intelligence (EQ) and work success in leadership and managing others. There is a noticeable rise on the subject since the last decade. These studies show the higher the EQ levels in leaders and employees the higher the organizational Return on Investment (ROI). The construct EQ was discovered in the 1990's and has since grown in understanding both personal and professional development. Daniel Goleman defined EQ as a set of standards of emotional and social skills. He goes on to describe it as 'the skills or competencies to be able to know one's own emotions, manage one's own emotions, self-motivate as well as recognize others' emotions and handle relationships' (Goleman, 1998; p.93). Since then, the construct has received widespread international attention and the United Arab Emirates platform is no exception. In another research, in 2003, comparing intellectual, emotional and managerial intelligence, Higgs and Dulewicz found that the combination of emotional and intellectual intelligence was a better forecaster of achievement than either of them alone. Their findings prove that, in the ability to identify and understand one's emotions, leaders are able to practice meaningful work that make participants effective and efficient as well as happy and fulfilled. Another literature review shows that internationally EQ can be broken down into five main principles and those are: self-awareness, self-control, adaptability, empathy and conflict management (Mayer, Salovey, & Caruso, 2000).

The first skill involves self-awareness. This skill entails the individual being able to accurately know and evaluate their emotions. The second skill concerns the individual being able to explain this emotion. "For example, anger may occur in a situation that is deemed unfair, but happiness is not as likely to occur in that same situation. In this scenario, the individual would need to understand what types of emotions normally occur in similar situations and may rely on past memories to assist their judgment". (Ravichandran, Arasu, & Kumar, 2011; pp.157-158). A third skill entails using emotion to help one's judgment and memory having social awareness and this means the ability to express emotions occurring according to certain contexts. This skill also needs the individual to understand and analyse emotions clearly in a wider context. Basically what is crucial is "recognizing the rules of emotional expression and being able to appropriately label emotions" (Ravichandran, Arasu, & Kumar, 2011; pp.157-158). Emotional building and controlling of social skills involves being able to assess and adjust one's

demeanour and the demeanour of others. An individual using this skill will be able to subside their own anger will be able to assist in comforting others who are distressed.



*Emotional intelligence is made up of four core skills.*

Figure 1.

In the UAE, thus far, barely any research has been attempted to measure the impact of Emotional Intelligence (EQ) qualities in leaders and its relationship to employee satisfaction and thus the ROI of the organization. From the literature review in the UAE gathered thus far, there seems to be a strong connection between employee job advancement and production and the level of a manager's Emotional Intelligence. Articles spanning from 2005 till 2017 specifically suggest that institutions in the UAE could benefit by improving EQ skills in their leaders as the question of what predicts professional success has become very crucial, especially when considering the fast development and the subsequent demands of an academically successful Emirati workforce. The significance of this question becomes even more evident when one takes into account the country's efforts to challenge the issues of the Emirati youth and prepare them for the new UAE National Agenda initiatives. The UAE Vision announced by His Highness Sheikh Mohammad Bin Rashid Al Maktoum targets the UAE to become among the competitive and most recognize countries in the world by the Golden Jubilee of the Union year 2021. Turning these aims into reality, its pillars have been divided into six national priorities and those areas are to do with society and preserving identity, building a strong knowledge economy, world-class education, world-class healthcare and a sustainable environment (Vision 2021, United Arab Emirates).

Since, human beings are leaders by default in their own right; the idea is to create content in the form of micro-learning videos in an attempt to promote the significance of emotional intelligence in people's lives whether at home or at work. Simply, EQ is the ability to understand one's emotions and explain them clearly before interacting with society, then understanding other human beings and learning new social skills to handle other people surrounding you. So, in an attempt to contribute to the UAE's ethical, cultural and social peoples' awareness through

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*Maya AlHawary*

using principles of emotional intelligence, I personally conducted an experiment that started since the beginning of my PhD thesis journey in year in August of 2017.

In this experiment administered, micro-learning and social learning seemed to be the fastest and safest way to raise awareness on EQ skills for all senior or junior professionals at a time. I decided to take on an initiative on most social media platforms such as LinkedIn, Facebook, Instagram, Snapchat and Twitter. The micro-learning video is a group of 10 sec clips totalling between 1-2 minute releases that are recorded in either at work or in my car every Monday and Thursday mornings with a different message on EQ each time. The goal is to remind the society at large with those EQ values and then give them some simple tips on how to work on an improve their human relationships. EQ topics I spoke about vary from empathy, sympathy, humility, patience, resisting anger, resisting negativity, manifestation, positivity, calamity, loving one another, forgiving, leading by example.

The micro videos echoed positively on LinkedIn that the profile viewers increased 41% in the last 90 days building 14,711 followers, drawing traffic of 22,162 profile viewers in 2 weeks. 50% of these viewers are in an executive/director/founder level, over 75% of these comments were positive with praises and appreciation for subject matter, voice pitch, body language, simplicity of message and for the practicality of applying subject matter to their everyday life. In Appendix 1, the table shows the activity that has taken place with the different topics approached. A total 32 videos were posted and for the purpose of this paper, only 10 videos were chosen to be analysed. Of course assessing the success of this experiment, micro-learning and social learning videos, can only show by the number of likes of the video, quality of comments, number of views and ultimately a clear follower growth on all platforms. LinkedIn specifically is a platform that I was able to test the impact of those videos and the table below shows a descriptive summary of the recent interactive activity between Mid December 2017 and end of January 2018. Firstly, it is a business platform where professionals come together to share ideas and learn from each other. Secondly, I didn't rely on any marketing tactics or team to infiltrate the videos; all I did was recorded, uploaded and observed impact.

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Table 1:

Analysis 12 posts from Mid- December 2017 to End of January 2018

	Number of views	Number of comments	Number of likes	Good comments	bad comments
<b>Taking Permission</b>	18,120	35	417	32	3
<b>Social Ignorance</b>	19,036	27	2967	24	3
<b>Humility</b>	27,745	166	850	160	6
<b>Equality vs Justice</b>	22,694	107	652	100	7
<b>Get rid of negativity</b>	19,227	72	605	68	4
<b>Stress Management</b>	18,743	75	554	70	5
<b>Taking decisions</b>	14,110	67	450	63	4
<b>Don't give up</b>	16,097	46	408	42	4
<b>Lean how to say no</b>	14,090	47	333	45	2
<b>Taking Permission</b>	19,098	35	422	32	3
<b>Art of communication</b>	19,099	35	346	31	4

The table above shows that, one video on *Humility* reached up to 27,745 views, 850 likes and 166 comments. Other videos such as *Equality versus Justice* 22,694 views, 652 likes and 107 comments, on techniques to *Get rid of negative energy* views went up 19,227, 605 likes and 72 comments, *Stress management* received 18,743 views, 554 likes and 75 comments, and on *Taking decisions* views went up to 14,110, 450 likes and 67 comments. The video on *Social Ignorance* received the most number of likes and least number of comments thus far. The number of bad comments were very minimal in comparison to the number of good comments. To be able to view activity on this live EQ project, click on the link to see recent activity of the posts shared. <https://www.linkedin.com/in/mayaalhawary/detail/recent-activity/shares/>

The quality of comments was more of a positive nature such as the one by S. M. D., a follower on LinkedIn, watched the video on equality and justice and commented the following: “Thank you Maya. Justice and equality are topics that transcend culture. Here in the west we enjoy complete freedom of speech. This brings the opportunity of equality, but the true ‘equalizer’ – the actual chance for equality is determined by education. An educated adult is able to properly describe any injustice he or she may have experienced without prejudice, but an uneducated or ill-educated adult invites injustice because he or she creates value judgments in his listeners. Accents, grammar, colloquialisms – these all invite value judgments. Only the educated person enjoys a completely unbiased chance for equality and justice.” Another comment by T. P. A. also from the LinkedIn network, he says: “Thanks Maya really appreciate you for saying this as a formal DPS security guard in Dubai! Have encounter some many jungle justice with some stubborn people that refuse instruction anyway thanks I’m one of you best fans”. Also, M. W., commented on another video about humility and its importance in leading healthy relationships and she said: “Hi Maya. Actually, you are right with this caption. It is very relevant



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even on LI. In this era of 5 minutes of fame we live on, people often lack intrinsic values and with the desire to shine; we often forget that we are all human and we have flaws, we become impatient, unforgiving of the same faults we are guilty of and with all the noises out there, we don't get enough introspection. Note to self: "In life what you sow is what you reap, don't expect to reap apple when you sow oranges, and if you sow nothing you will reap nothing" Have a have great day☆".

Most comments are closer to these: "Beautiful as always have wonderful day thanks for sharing this marvellous advice Maya", "again well done, we need to behave as you said", "totally agree with you Dr. Maya about Emotional Intelligence, as it is the key of success of smart leadership", "excellent Job! Thank you for sharing".

### **Conclusion**

Indeed, many of the problems facing society today are the direct result of emotional ignorance: depression, addiction, illness, religious conflict, violence and war. "Perhaps we humans have tried too hard to "civilize" ourselves, trying to deny our true animal nature – our emotional nature – along the way. We've done this because we have had the wrong idea altogether about the nature of emotion and the important function it serves in our lives" (Morrison, 2007; p.245).

Naturally, people are drawn to universal basic human traits that not necessarily related to religious beliefs such as empathy, sympathy, fear, love etc. Several studies based on the relationship between emotional intelligence with physical and mental health have been conducted. "The results show that emotional intelligence both directly and indirectly are associated with mental health" (Cherniss, 2000; p.10).

Whether or not programs are actually adopting EQ qualities, various useful skills are learned like labelling and describing emotions, appraising basic emotions in oneself and others, conflict management, taking perspective of others, decision making and problem solving techniques, effective peer relation trainings (Morrison, 2007; p.245).

People seem to be pulled by the idea of short micro-learning videos. The videos aim to minimize content congestion on common folk. Each micro-learning video deals with a single learning objective, breaking down knowledge into understandable bits. Learning is not confined any more to universities and colleges. People are able to study full courses from under their fingertips off the internet and so the micro-learning technique has made learning gullible.

People seem to enjoy focused content presented on the go through their preferred social media platform whether twitter, Facebook, Instagram, LinkedIn and Snapchat where the video is accessible on their smart devices especially mobile phones.

The clearer the spoken language and the stronger the body language, the greater the effect on its viewers. Familiar language is that which the readers easily recognize and understand because they use it on a regular basis. One of the most important functions of language is to build

“homophily” or a sense of commonality with one’s readers. By using language that is familiar to the reader, the message is likely to have more impact.

People seem to find the presenter/author appealing although she is an Arab Muslim Covered Female. Richard von Coudenhove-Kalergi in 1925 in *Practical Idealism* predicted: “The man of the future will be of a mixed race. Today’s races and classes will gradually disappear owing to the vanishing of space, time, and prejudice” (Wikipedia). And that exactly what has occurred. People are more in tune with their humanity rather than their ethnicity. The effects of globalization have surpassed our expectations in connecting people with mutual understandings.

People are threatened by the artificial intelligence hype and feel that humanity could be hindered vanish. These learning videos serve as quick reminders to encourage staying in touch with our EQ. In the Independent, Hawking points out the benefits that comes from such technology developments: “one can imagine such technology outsmarting financial markets, out-inventing human researchers, out-manipulating human leaders, and developing weapons we cannot even understand. Whereas the short-term impact of AI depends on who controls it, the long-term impact depends on whether it can be controlled at all” (Love, 2014; p.1).

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**Using Social Media Platforms in the United Arab Emirates to Create Ethical, Cultural and Social Awareness through Emotional Intelligence Principles**

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## FROM BOOKS TO MOOCS AND BACK AGAIN: AN IRISH CASE STUDY OF OPEN DIGITAL TEXTBOOKS

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### Introduction

This paper reports a work in progress to investigate the current and intended future use of open digital textbooks in Irish higher education. It begins by establishing that open digital textbooks, as a subset of the wider Open Educational Resources (OER) movement, have not featured prominently in Irish higher education policy texts. A brief synthesis of the macro-level literature reveals the strong North American influence driving innovations in open digital textbooks over the past decade, particularly in response to increasing concerns about rising costs. At the meso-level the research problem is framed by a gap in the literature and lack of information more generally about textbook use in Irish higher education, although more specifically the study aims to establish current and intended future usage of open digital textbooks. Five research questions that guide the study are then outlined along with the methodology for the first two parallel work packages: (a) an environmental scan and national baseline survey of open digital textbooks in the Irish higher education sector; and (b) a micro-level institutional case study of current practice around the use of textbooks and adoption of open digital textbooks more particularly. The final work package aspires to develop an open digital textbook initiative based on findings from earlier phases and the international literature. While the study is still at an early stage a critical perspective underpins the research as we seek to better understand the potential transformative advantages of open digital textbooks over and above the use of more conventional learning resources.

### Background

Despite textbooks still being a common feature of the higher education landscape in many countries the open digital textbook movement has not yet featured prominently in Ireland. Finding little or no explicit reference to open textbooks or open digital textbooks from a systematic search of major Irish policy texts evidences this claim. The term *textbook* for example does not occur frequently ( $n = 3$ ) in the “National Roadmap for Enhancement in a Digital World 2015-2017”, with the statement, “We will cut costs by going digital” with our textbooks’ appearing in a section under the myth of diminishing costs (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015a; p.7). More recently an Irish case study of open education policy initiatives, which is part of a wider European report

describing open initiatives in 28 EU countries (Inamorato dos Santos, et al., 2017), supports the view of a gap of policy-related activity in this area, as no reference is made to open textbooks.

On a related note, Ireland also stands out alongside of Latvia, Luxembourg and Slovenia in this European Commission report as the only countries not to identify MOOCs in the context of open education policy initiatives. The absence of the MOOC movement in Irish policy texts remains an intriguing gap, especially given the Government's current focus in the "Higher Education Systems Framework 2018-2020" on promoting flexible life-long learning (Ministry of Education and Skills, 2018). Notably, in 2017 the growth of MOOCs continued worldwide with an estimated 78 million learners registering for a free online course (Class Central, 2018). This figure is up by 20 million on the previous year and increases to approximately 130 million learners when China and other developing countries where English is not the primary language of instruction are included in the census. While globally MOOCs are still a major force in shaping thinking and the direction of the OER movement they have not yet replaced the textbook, as once predicted (Class Central, 2016), and rather it would appear the level of interest and global activity in promoting open digital textbooks is gaining momentum.

## **Synthesis of the Literature**

Most of the major open digital textbook initiatives over the past decade have taken place in North America. Of course, textbooks have traditionally been an essential part of higher education for the majority of students in the United States (US) (Fischer, Hilton, Robinson, & Wiley, 2015). While the drive for openness is anchored in deep philosophical roots the growth of open digital textbooks in the US has been partly a pragmatic response to economic crisis, underfunding of higher education and rising textbook prices. It is reported, for example, that from 1978 to 2013 textbook prices in the US increased 812% and that in 2014 a typical student spent about (US) \$2000 annually on textbooks (Baglione & Sullivan, 2016). Another US study claims that since 2006 the cost of college textbooks increased by 73%, which is over four times the rate of inflation (Senack & Donoghue, 2016). Despite rising costs Allen and Seaman (2016) found in their survey of over 3,000 US faculty that virtually all courses (98%) require a textbook, or related study materials, as part of their suite of required resources. While evidence of textbook use is clear less is known about how students use these books but there is reason to believe that copyright infringement is widespread (Scorcu & Vici, 2012).

Although there has been a proliferation of OERs in most disciplines over the past decade the reality is the level of awareness, curriculum integration and repurposing of open resources by teachers remains quite low – at least in the US (Seaman & Seaman, 2017). However, open digital textbooks – essentially a collection of OER aggregated in a manner that resembles a textbook but may also be rich with media and hyperlinks – are an exception as they have proven easier to garner support of institutional leaders, policy-makers, and major charitable donors. This claim is evidenced by the strong lead taken by organisations such as the William and Flora Hewlett Foundation and in some cases government agencies, as clearly demonstrated in the BC Campus initiative.

BC Campus began in 2012 with a project to create a collection of open textbooks aligned with the top 40 highest-enrolled subject areas in British Columbia (Burgess, 2017). A second phase began in 2014 with an additional 20 textbooks. The project continues to grow with currently over 230 open digital textbooks available and at the time of writing the BC Campus OpenEd website claims that students have saved over \$5m (Canadian) through the initiative, which now includes over 40 participating institutions. While Burgess (2017) acknowledges beyond estimated financial savings that some of the other success factors are difficult to quantify the project has contributed to the wider acceptance of OERs and has helped in terms of changing institutional culture.

## **Looking to Europe**

Around a third of the 28 European case studies reporting on open education policy initiatives previously mentioned above identify some type of current or planned open digital textbook project (Inamorato dos Santos, et al., 2017). While few rival the scale of enterprise wide projects such as BC Campus in 2017 a major open digital textbooks initiative began in the United Kingdom (UK) led by the OER Hub to test the transferability of the North American model of success to the local context. More specifically, the UK Open Textbooks project is framed by the following overarching research question:

What is the viability of introducing open textbooks in UK higher education through the testing of two proposed models: OpenStax and OpenTextbook Network approaches?

As part of the project a series of workshops has been offered throughout the UK along with the development of a teacher textbook survey. The findings of this survey, which have yet to be formally published, coupled with a growing body of research evidence on the usage, implementation and sustainability of open digital textbooks will inform our own work in the Irish higher education context.

## **Research Problem**

At this point our knowledge of whether traditional textbooks remains core to the student learning experience in Irish higher education is largely speculative. With more widespread implementation of Virtual Learning Environments (VLE) throughout the sector and the growth of OERs it might be reasonable to assume that usage of textbooks is declining; however, we simply do not have data to support or refute this assumption. In a similar vein, we have little or no data on the amount of money Irish students spend on textbooks to support their study, to what extent they decide to purchase them, and if the costs are a significant barrier to their success. Accordingly, the research seeks to address this gap in our knowledge.

At a deeper level we still need further evidence to test the underlying assumption that the use of textbooks (print and digital) and the students who utilize them will have better academic experiences and demonstrate improved academic performance (Hilton, 2016). Putting aside any projected financial savings the deeper question is whether the development of open digital textbooks leads to a transformative advantage over the use of more conventional study

resources. In other words, we should not lose sight of the risk of merely replacing an old technology (print textbooks) with a newer innovation (open digital textbooks) without fundamentally questioning the role and value of the textbook in new 21<sup>st</sup> century models of education.

## **Research Problem**

Set against this wider backdrop and the emerging literature in the area the research seeks:

- To investigate the current and intended future usage of open digital textbooks in Irish higher education and their transformative potential.

## **Research Questions**

The research is framed around five overarching research questions:

- What is the current usage level of textbooks in Irish higher education?
  - What is the current use of textbooks?
  - What is the current use of digital textbooks?
  - What is the current use of open digital textbooks?
- What awareness, experience and knowledge do Irish educators have of open digital textbooks?
  - What value do lecturers place on textbooks?
  - What is lecturers' practice in terms of textbooks?
  - What are lecturers' perceptions of the quality, suitability and potential of open digital textbooks?
- What awareness, experience and knowledge do Irish students have of open digital textbooks?
  - What value do students place on textbooks?
  - What is students' practice in terms of textbooks?
  - What are students' perceptions of the quality, suitability and potential of open digital textbooks?
- What are the perceived advantages and disadvantages of adopting open digital textbooks in Irish higher education?
  - What are the pedagogical benefits?
  - What are the actual and potential financial benefits?
  - What are the potential disadvantages?
- What are the perceived barriers and enablers likely to influence the successful enterprise-wide adoption of open digital textbooks?
  - What are the major barriers?
  - What are the major enablers?
  - What are the key lessons for Irish educators?

## **Methodology**

The research adopts a mixed methods approach involving online surveys; follow up interviews; and analysis of public databases and relevant websites potentially listing textbook requirements. There are three main work packages. The first work package involves an environmental scan and national baseline survey of the sector to establish the status of textbooks, and more specifically the level of adoption of open digital textbooks, in Irish higher education. Work package two will undertake a micro-level institutional case study of current practice around the use of textbooks and adoption and perceived value of open digital textbooks more particularly. The final work package aspires to develop an open digital textbooks initiative and wider Irish community of practice in the area based on findings from earlier phases and key lessons from international literature.

## **Preliminary Findings**

To date the findings of the first work package undertaking an environmental scan of the Irish higher education sector reveals a dearth of open digital textbook initiatives. For example, a Google search using the terms “open textbook”, “open digital textbook”, “Ireland”, and “Irish Higher Education” reveals only one result on the first three pages relevant to Ireland, which happens to be a Twitter stream dating back to 2010. Further analysis of potentially relevant links using the wider search terms “Ireland” and “Open Educational Resources” locates just two main initiatives of any note.

Firstly, search results provide information on the now closed National Digital Learning Resources (NDLR) service funded by the Higher Education Authority (HEA) of Ireland. The NDLR was an OER service providing a national open repository, online resource bank and community portal, shared between the seven universities and 14 institutes of technology (Marcus-Quinn & Diggins, 2013). The service was originally established and funded by the HEA in 2005 as a pilot project and went to full service in 2010. The NDLR’s mission was to promote and support Higher Education sector staff in the collaboration, development and sharing of learning resources and associated teaching practices (McAvina & Maguire, 2011).

According to Marcus-Quinn and Diggins (2013) by 2012 the NDLR service hosted over 27,000 digital teaching and learning resources. From 2005-2012 the HEA spent approximately €5m on the NDLR service (HEA, 2012; cited in Marcus-Quinn & Diggins, 2013). Given the level of funding and reportably mixed reviews of the service the NDLR was placed in limbo in 2012 before any formal evaluation could take place (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015b). The NDLR’s demise remains a sensitive topic in Ireland and although speculative the experience may partly explain why there has not been a more focussed policy response to the emergence of open digital textbooks as a subset of the wider OERs movement.

The second major initiative this wider search strategy identified was a report on “Learning Resources and Open Access in Higher Education Institutions” in Ireland written by a large team led by Dr. Angelica Riskey from the University of Limerick (National Forum for the



Enhancement of Teaching and Learning in Higher Education, 2015b). While the emergence of open digital textbooks is acknowledged in this report to a large extent the deliberate focus on *little OER* placed *big OER* such as MOOCs and larger scale open education initiatives outside of scope. This decision is partly understandable given the conception of OER was based on the following William and Flora Hewlett Foundation definition which incorporates a repurposing dimension:

*“Teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Unlike traditionally copyrighted material, these resources are available for ‘open’ use, which means users can edit, modify, customize, and share them” (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015b; pp.7-8).*

In many respects the report places the value of little OER in their ability to go beyond and/or provide alternatives to textbooks. This perspective is reflected in the national online survey of academic staff completed as part of the project by 219 respondents in April 2015, with one participant reporting:

*“Yes, I value having resources available. Not being constrained by what the textbook authors and editors decide to provide for us is very important. It’s part of the academic dialogue” (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015b; p.90).*

It follows that no explicit reference to the potential of the open digital textbook movement appears in the report’s final recommendations, which focus on raising greater awareness and showcasing excellent OER, embedding OER and a wider Open Educational Practices (OEP) philosophy more intentionally within national professional development initiatives, and a call for an ongoing programme of action research.

A follow up search of the National Forum for the Enhancement of Teaching and Learning in Higher Education’s website along with their dedicated T&L Scholarship Database using the terms “textbook” and “open textbook” revealed only one other relevant publication. A review of Ireland’s higher education technical infrastructure conducted in 2016 compared the findings of an online survey of senior IT managers and Chief Information Offices (CIOs) at 22 Irish institutions with the results of the annual US-based Campus Computing Survey to provide an international benchmark on key priorities (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2017). As shown in Figure 1 below using survey results reproduced from the original report (p.26), 68% of Irish respondents compared to 79% in the US perceive that open source textbooks and OER content will be an important source for instructional resources in five years. The gap between the two countries is even more notable in the findings that only 17% of Irish respondents as opposed to 38% in the US consider open source OER textbooks very important looking to the future. Therefore, from the perspective of

Irish senior IT managers and CIOs the adoption and wider use of open digital textbooks in higher education at this time does not appear to be a high priority initiative.

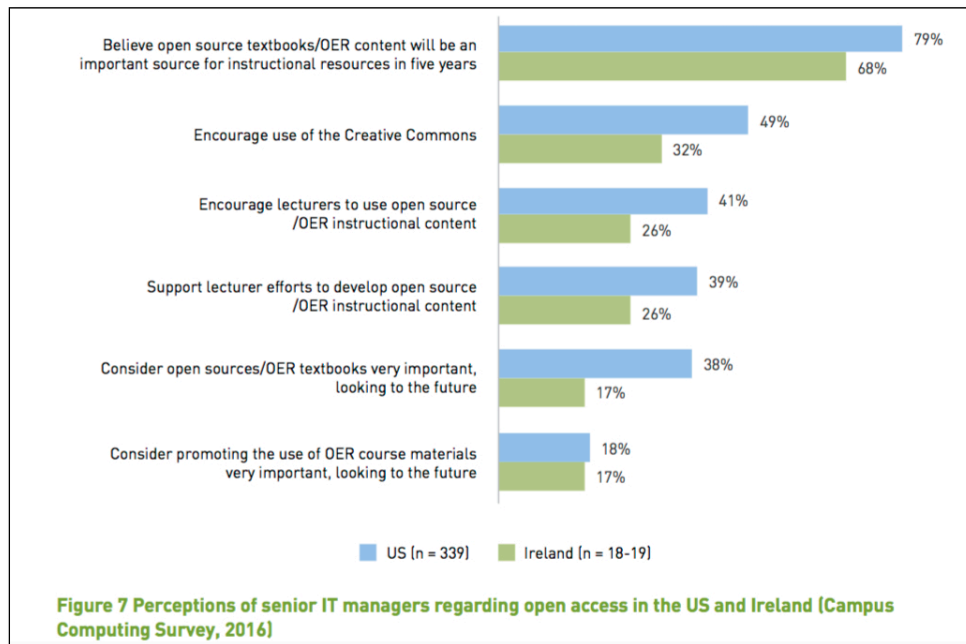


Figure 1. Perceptions of senior IT managers regarding open digital textbooks

Finally, two other desk research methods were deployed to locate relevant open digital textbook initiatives. A dearth of activity in this area was found by using the search function on the websites of all Irish universities and institutes of technology using the term *open textbooks*. In a similar vein, searches of the websites of the Computers in Education Society of Ireland (CESI) and Irish Learning Technology Association (ILTA) yielded no relevant results; and nor did a keyword search of the published proceedings of related conference papers and presentations dating back to 2010.

At the institutional level a preliminary analysis of an internal database of textbook requirements for students at Dublin City University (DCU) for Semester 1 and 2 of the 2017/18 academic year confirms widespread expectations of textbook use. This conclusion is triangulated by information contained in a publicly searchable website listing textbook requirements. For example, over 3,000 of DCU's modules mention at least one textbook. Of the textbooks list 15,922 (72%) are classified as required whilst 6,729 (28%) are listed as recommended reading. However, further analysis of the specific textbooks listed is required to identify what proportion is available in printed and digital formats. This analysis is currently underway at the same time as the development of an online survey to gather data on the practices and perceptions of both staff and students concerning their use (or non-use) of print and digital textbooks. We hope to report the results of these surveys along with the findings of a national survey exploring the use of and perceptions towards the value of open digital textbooks in the next six months.

## Conclusion

This research in progress addresses a significant gap in our understanding of the adoption, patterns of use and perceived advantages and disadvantages of open digital textbooks in Irish higher education. The study takes place at a time when there remains a dearth of government policy and related research in the use of both big and little OERs in Ireland. This interpretation is supported by our desk research of Irish policy texts and evidence from multiple sources revealing no major initiatives specifically in the area of open digital textbooks. Given the North American experience, and growing level of interest in both the UK and Europe, we hope this Irish case study will contribute to better understandings of the potential transformative advantages of open digital textbooks. Of course, like MOOCs we also understand that textbooks are not a single monolith entity and their educational affordances depend on how they are used by teachers and learners. For this reason, the research aspires to pilot and launch an Irish open digital textbooks initiative as a platform for further learning and development.

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## **DIVERGENT PERCEPTIONS FROM MOOC DESIGNERS AND LEARNERS ON INTERACTION AND LEARNING EXPERIENCE: FINDINGS FROM THE GLOBAL MOOQ SURVEY**

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### **Abstract**

As the provision of MOOCs continues to grow exponentially across the globe, much of the criticism on the quality of the learning experiences provided is based on its typically low drop-out rates. There is strong evidence that completion is not a goal for the majority of MOOC participants neither does it affect their satisfaction and perception of the quality of their learning experiences. Based on a literature review and analysis of existing quality approaches and indicators for MOOCs, the Global MOOC Quality Survey was designed and conducted in order to access quality perceptions of actors in the MOOC design and implementation process ( $n = 267$ ). In this paper, we present its first results relating to the designers' and learners' experiences with MOOCs and their offered four interaction types: learner-facilitator (LF), learner-resource (LR), learner-learner (LL) and group-group (GG). Comparing the different perspectives of learners and designers, our analysis presents significant differences in MOOC learners' and designers' intentions and experiences. The correlation differences of the MOOC learners and designers on the interaction in MOOCs are significantly very high. These results are also compared with the opinions from MOOC designers collected in a number of semi-structured interviews. Based on the analysis, we conclude this divergence is based on a misunderstanding between the two target groups on interaction. MOOC designers recognise its importance, but do not seem to understand and meet fully the expectations of MOOC learners, as their perception maybe influenced by institutional context.

### **Introduction**

Globalisation and the impact of the internet have contributed significantly to transform living and working conditions in the last two decades (Castells, 1996). The emergence of the global economy and the network society has brought new complex societal challenges which have a great impact on how education is perceived, organised and conducted. There is a strong pressure from stakeholders to innovate educational practices, making them more flexible and adjustable to context (Peter & Deimann, 2013; Stracke, 2017a). This results from the need for citizens to adapt more easily to changing social and work contexts (EC, 2011). But, public education systems are also expected to educate citizens to become agents of change themselves.

In order to meet this challenge, major changes are being introduced in education systems worldwide (OECD, 2016). From a prevailing teacher-centred perspective, education is evolving to a dominant learner-centred approach as the circumstances and modes of learning are becoming more diverse as well.

As the complexity and scale of these challenges increases, public opinion and Governments are also pressuring education systems to respond ever more rapidly and effectively, using less resources. In face of this, educational institutions and all stakeholders at the different education levels have been feeling the need for education provision to become more scalable, interoperable and flexible. In this framework, openness has become a key value in education and learning, similarly to what also happened although independently in science and innovation. Thus, inspired by the UNESCO declarations on Open Education (2002 and 2012), in particular the policy on Open Educational Resources (OER) (UNESCO, 2012), and fostered by the European Commission's communication on "Opening Up Education" (EC, 2013), educational institutions across Europe are transforming, especially in the higher education sector.

One of the drivers for this transition has been the phenomenon of Massive Open Online Courses (MOOCs). The first MOOC bearing that designation was the "Connectivism and Connective Knowledge" course (CCK08) offered by Siemens, Downes, and Cormier at the University of Manitoba, Canada, in 2008 (Daniel, 2012; Teixeira & Mota, 2014). It drew on the experiences by Alec Couros (EC&I 831: Social Media & Open Education – <http://eci831.wikispaces.com>) and David Wiley (INST 7150 Introduction to Open Education – [http://opencontent.org/wiki/index.php?title=Intro\\_Open\\_Ed\\_Syllabus](http://opencontent.org/wiki/index.php?title=Intro_Open_Ed_Syllabus)) who, in 2007, decided to open the formal, for-credit courses they were teaching at their institutions to anyone who wanted to take part in them in a not-for-credit, informal way. The term MOOC was coined by Cormier, after registrations for the course went past 2000 participants (Cormier, 2008). Although this first MOOC set itself in the larger context of Open Education and OER, it really became a huge success when Thrun and Norvig opened their "An Introduction to AI" course at Stanford, in the Fall of 2011, to anyone who wanted to take it for free, an impressive 160000 plus people registered for the course (Teixeira & Mota, 2014).

This unexpected event, coupled with the reputation of the professors and the institution involved, set in motion what would become the educational phenomenon of 2012 (Daniel, 2012). Soon after Thrun created Udacity, and Koller and Ng created a similar company, Coursera. Also in 2012, MIT announced the partnership with Harvard which established the EDx consortium. In the following years, MOOC provision grew constantly. MOOC providers and learners are now spread across all regions of the globe. According to Class Central (Shah, 2018), the number of MOOCs in 2017 is higher than ever (9,400) and the same applies to MOOC learners (81 Mio.) and providers (800+).

The unprecedented and rapid popularity of MOOCs in the last years has led to an increasing global debate about their quality, involving researchers, practitioners, institutional leaders and learners. To address the quality issues involved in the discussion, the Massive Online Open

## **Divergent Perceptions from MOOC Designers and Learners on Interaction and Learning Experience: Findings from the Global MOOQ Survey**

*António Moreira Teixeira et al.*

Education Quality (MOOQ) project was initiated as the European Alliance for the Quality of MOOCs. It is a 3-year project funded by the European Union under the ERASMUS+ call. MOOQ is directly relevant to several key aspects of the 2011 EU Modernization Agenda.

### **Designing for quality MOOCs**

The quality of the learning design and the experiences it provides for participants has been subject to much debate in recent years. Typically, the drop-out rates has been used as an indicator for measuring the quality of the learning experience. In MOOC settings, evidence indicates they are consistently very low and often below 10% (Hansen & Reich, 2015; Margaryan, Bianco, & Littlejohn, 2015). This has fuelled much of the criticism on the quality of current MOOC design. A new research agenda has been claimed in literature to reboot MOOCs (Hansen & Reich, 2015; Reich, 2015). However, this discussion of low quality MOOCs is based on an improper use of drop-out rates as a quality indicator given these courses are mostly non-formal learning experiences (Onah, Sinclair, & Boyatt, 2014). Moreover, most of the criticism in academia derives from the fact MOOCs are seen as a synonym for “teaching classes online to a high number of students”, without a sound understanding of how the notions of *open* and *massive* were the real change operators in the initial concept, or of the history and practice of distance and online education (Teixeira & Mota, 2014). In fact, most universities have adopted a traditional teacher-centred model of MOOC design. Although it allowed them to claim to be innovative, it actually didn't change much of their old culture and pedagogical practices.

As a consequence, alternative evaluation measures for MOOCs have been proposed and discussed in order to better address learners and their personal intentions and goals in learning with MOOCs (Henderikx, Kreijns, & Kalz, 2017; Stracke, 2017b; Teixeira & Mota, 2014). As MOOCs become an important part of higher education institutions' provision and are increasingly used in formal learning contexts, the debate on how they meet quality standards gains relevance. To contribute to informed decision-making by providers and designers, the MOOQ project aims at developing in an open dialogue with the experts' community a Quality Reference Framework (QRF) for MOOCs. An international alliance was established to connect and bring together key experts and organizations to collaboratively address the quality of open online learning and education and, in particular, MOOCs.

One key element to assure the success and the quality of learning processes is social interaction. This is particularly the case in online learning and especially in open learning contexts as it happens with MOOC settings (Tawfik et al., 2017). Research has provided much evidence that interactions with content, teacher/facilitators and peers lead to better results (Zimmerman, 2012), a perceived higher quality of courses (Reich, 2015), satisfaction with the learning experience (Sher, 2009) and perceived effectiveness (Nandi, Hamilton, & Harland, 2012). Early literature on MOOCs has investigated the nature of learner interactions with their course environments. However, to date we know very little about the nature of interactions between learners and facilitators or how these actors perceive the value of exchanging information with one another (Gillani & Eynon, 2014).

In fact, individual support or tutoring is impossible in a scalable or massive course environment. While there should be suggested activities and guidance from the course organizers, these can be carried out only at a more general level. Learning support in a MOOC environment has to rest mainly in the learning community, through collaboration, dialogue, peer feedback and active engagement from participants in the learning process. Participants in MOOCs are therefore expected to take an active role and be responsible for their own learning, but also seldom to actively engage in helping build a supporting learning community (Teixeira & Mota, 2014).

As Moore points out, interaction is a term which carries many meanings as to be almost useless unless specific sub-meanings can be defined and generally agreed upon (Moore, 1989). In our research we have applied the three interaction types defined by Moore for distance education: learner-instructor (LI), learner-content (LC), learner-learner (LL). But, we've also included an additional fourth kind of interaction, as MOOCs by definition imply targeting and involving a high number of learners, potentially an unlimited amount. As such, learning activities are often conducted not individually but by random teams or groups of learners who join for a specific interest. The revised typology for learning interaction is the following: learner-facilitator (LF), learner-resource (LR), learner-learner (LL) and group-group (GG). In this paper we present a comparative analysis of the learners and designers perception of their experiences and interaction in MOOCs, focusing on interaction. The results will lead to the development of a future QRF to support quality MOOC design.

## **The Global MOOC Quality Survey**

The first output of the MOOQ project was a survey on existing practices and design patterns for integrating quality approaches on emerging open online courses, including active discourse on open issues and concerns arising from the massive, large-scale implementations, showcasing paradigms of key players in the field. The goal was to reveal design patterns, both current and evolving beyond the classic theories of distance education. The analysis of the collected data will allow to derive best practises that are appropriate input for the design of the QRF.

Based on an in-depth review of literature and the analysis of existing quality approaches, evaluation instruments and quality indicators for MOOCs, we have prepared the Global MOOC Quality Survey, which was designed in two steps: First, a small pre-survey with a set of potential questions was developed and administered. We could already see from the pre-survey respondents (n = 45) that the pattern of MOOC learners' intentions when engaging in a MOOC experience was not similar to the one shown by the designers.

The following step was the development and launch of the Global MOOC Quality Survey which targeted three different groups of actors in a MOOC environment: learners, designers and facilitators. The survey was conducted in an open format over a period of four months in the first half of 2017. For its dissemination, the MOOQ team had the support of the leading international associations and institutions in the field.



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On Table 1 below an overview of the number of participants from the three target groups is presented.

Table 1: Participants of Global MOOC Survey

	MOOC learners	MOOC designers	MOOC facilitators	TOTAL
Participants	166	68	33	267

As shown on Table 1, the number of respondents was significantly high for this kind of survey. As expected, the number of learners who responded is higher than the number of designers and of facilitators. Comparatively, the number of facilitators is quite relevant as not many MOOCs provide facilitation.

According to the gender profile, the female MOOC learners who participated in the survey are younger and reporting a lower level of highest education. This feature is in line with their lower age. The distribution is also not surprising in what refers to the age range when compared with MOOC and average populations, whereas the educational level is very high in relation to the average population but very similar to the reported MOOC populations (Dillahunt, Wang, & Teasley, 2014; Glass, Shiokawa-Baklan, & Saltarelli, 2016). Both male and female groups of learners are coming from all five continents even if the majority originated from Europe.

### Results on learners' and designers' perceptions on MOOC experiences

The findings from the Global MOOC Survey on the designers' and learners' perspectives on experiences and interaction in MOOCs are described in this section (for more details see Stracke et al., 2018). On Table 2 we present the responses of the learners on their learning experience (question item LLE4).

Table 2: Answers on Learning Experience LLE4 by Learners

	n	VB	B	N	G	VG
Learning experience	166	4	4	13	75	70

VB: Very Bad, B: Bad, N: Neutral, G: Good, VG: Very Good

On Table 3 we show the responses of the designers on their design experience (question item DDE4).

Table 3: Answers on Design Experience DDE4 by Designers

	n	VB	B	N	G	VG
Design experience	68	1	2	13	33	19

VB: Very Bad, B: Bad, N: Neutral, G: Good, VG: Very Good

As shown in Tables 2 and 3, most of the 234 learners and designers who participated in the survey reported positive experiences with MOOCs. Over one third of them (38%) rate their experiences as very good (VG) and close to half (46%) declare them as good (G). This perception, however, is not similar in the two groups. Almost all of the learners (87%) report a very good (VG) or good (G) experiences with MOOCs while slightly less designers share a positive perception (77%). The result is much more significant though when we look only at the

highest rating. In fact, close to half of the learners (42%) report their experiences as very good when compared to only 28% of the designers. The high degree of satisfaction shown by the learners with their MOOC learning experiences is consistent with the results from most MOOC surveys. This is not surprising and it demonstrates how completion rates fail to capture the essence of a non-formal learning experience.

On the other hand, a possible explanation for the divergence between the perceptions on experiences by learners and designers may be linked with the great challenges faced by designers in their work. It seems designers might underestimate the complex multiple factors involved in course design for open and scalable learning environments. As such, they might feel uneasy when interpreting their design experiences.

### **Results on learners' and designers' perceptions of interaction in MOOCs**

Next, we present specific findings from the Global MOOC Quality Survey on the MOOC interactions as perceived by the designers and the MOOC interactions as reported by the learners. On Table 4 we show the learners' responses on the experienced interactions in MOOCs (LF, LL, LR and GG = question items LLR4-1 to LLR4-4).

Table 4: Answers on Interaction Items LLR4 by Learners

	n	N/A	SD	D	N	A	SA
LF by learners	146	20	5	13	48	37	23
LL by learners	146	15	3	17	34	51	26
LR by learners	146	9	2	8	25	61	41
GG by learners	146	37	4	15	50	24	16

N/A: Not available, SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

From the answers, it is clear learners perceive as more relevant the interaction with resources. Most of them (70%) strongly agree (SA) or agree (A) with this statement. A not so strong agreement (53%) is reported by learners regarding interaction with peers. Even so, this two types stand out as the perceived as more significant. Looking at the interaction with facilitators, only 41% strongly agree (SA) or agree (A). This is an interesting finding although not surprising given the special characteristics of a typical MOOC learning environment.

As presented in detail in another paper (Stracke et al., 2018), the bivariate correlations between the learners' interactions (LLR4 items as predictors) and learners' experiences (LLE4 as outcome) show very high significant relations between three types of interaction and the learning experience (LLE4), namely LF (LLR4-1: "Interaction between learners and facilitators"), LL (LLR-2: "Interaction among learners") and LR (LLR4-3: "Interaction between learners and learning resources"), whereas there is no significant relation between GG (LLR4-4: "Interaction among teams and groups") and the learning experiences (LLE4). In addition, the coefficient of determination (R<sup>2</sup>) measuring the substantive importance of an effect is very high for the three interaction types LF, LL and LR.

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On Table 5 we present the designers' responses on the designed interactions in MOOCs (LF, LL, LR and GG = question items DLR4-1 to DLR4-4).

Table 5: Answers on Interaction Items DLR4 by Designers

	n	N/A	SD	D	N	A	SA
LF by designers	52	2	1	5	11	24	9
LL by designers	52	1	1	3	11	19	17
LR by designers	52	3	1	0	4	22	22
GG by designers	52	8	2	10	14	13	5

N/A: Not available, SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

The results shown are consistent with the learner's although with a higher expression. An even larger level of agreement is reported by designers in what concerns the interaction with resources. The very large majority (85%) strongly agree or agree with the statement referring to the interaction with resources. The same phenomena occurs in relation to interaction with peers (69%). However, the difference between the previous type and the learner's interaction with facilitators is not as clear as in the case of learners. As much as 64% strongly agree or agree with the statement opposed to only 41% of the learners.

As explained in detail in the above mentioned paper (Stracke et al., 2018), the bivariate correlations between the designers' interactions (DLR4 items as predictors) and designers' experiences (DDE4 as outcome) do not present any significant relation between the four interaction types (LF, LL, LR and GG) and the design experience (DDE4). But, the results are quite different for the two interaction types LL and LR and for the two interaction types LF and GG. The coefficient of determination ( $R^2$ ) measuring the substantive importance of an effect is quite high for the two interaction types LL and LR: They are sharing around 4.5%.

### **Comparison of learners' and designers' perceptions on interaction**

Comparing the correlations from the learners' and designers' answers it seems that their perspectives on the importance of the three traditional interaction types are very contradictory (Moore, 1989). There is consensus on the fourth interaction type (GG) as the p value is the lowest for both, learners and designers, i.e. no direct relation can be demonstrated. Among the three interaction types with very high significant relations for the learners, two interaction types (LL and LR) have a much lower p value, i.e. a small relationship could exist for the designers whereas it is excluded for the other interaction type (LF) with  $p = .703$ . In general, it is surprising that designers do not value interaction as much as the learners what could lead to MOOC designs not fitting the interests and demands of the learners (as referred previously for a more detailed analysis see Stracke et al., 2018).

### **Input from semi-structured interviews with designers**

In the framework of the research, a number of additional semi-structured interviews was conducted with providers, designers and facilitators. Regarding interaction in MOOCs, it is particular significant to review the perspective shared by the designers. For this purpose, we've

selected a set of three interviews (2 males and 1 female). All the designers interviewed are much experienced.

The importance of interaction is recognised by all three designers and they agree this depends on the design options. As one designer states, a MOOC in which interaction and collaboration do not happen is very likely to be unsuccessful and therefore will have no relevance to the institution that provides it. In addition, it is also stressed by the designers the connection between interaction and the pedagogical approach and design model selected. However, it can also be concluded from the interviews that the different approaches to the design process across institutions can influence substantially the options taken by the designers. In the case of one of the institutions represented there is a reference pedagogical model for MOOCs in place, which has been subject to continuous improvement. This model promotes a learner-centred design and awards much importance to interaction. Another institution provides a set of broad design principles (interactivity, flexibility, innovation, contextualization, among others), but confers teachers the responsibility to individually choose the principles to include in the MOOC design.

Based on this input from the interviews, we can conclude that although designers acknowledge the importance of interaction, institutional context might play an important role in how this importance is perceived by designers in their actual practice.

## **Conclusion**

In this paper we present the first findings from the Global MOOC Quality Survey with a focus on the comparison between designers' and learners' different perceptions of their experiences and perspectives on interactions in MOOCs. Regarding their perceptions on the MOOC experiences, we've found the designers report a less positive perception of the quality and impact of their design work than the learners as they rate consistently higher their learning experiences. In what relates to interaction, major differences were found between learners' and designers' perception of the importance of three traditional interaction types identified by Moore. There was a very high significant relationship ( $p < .001$ ) between the learners' MOOC experience and the three interaction types LF, LR and LL and a significant relationship ( $p = .026$ ) for the fourth interaction type GG, which was added by us. On the contrary, we didn't found a significant relationship between the designers' MOOC experience and all four interaction types (for the full analysis see Stracke et al., 2018).

Comparing the different perspectives of learners and designers, our analysis presents significant differences in MOOC learners' and designers' intentions and experiences. The correlation differences of the MOOC learners and designers on the interaction in MOOCs are significantly very high. We suggest as an explanation for this divergence the different perspectives hold by designers' and learners' on interaction in MOOCs. MOOC designers do not seem to understand very well the needs and demands of MOOC learners or may be too much conditioned by their institutional environments in their design options, as the results from the additional interviews suggest. This leads us to conclude that it can be questioned whether designers and institutions/providers are currently understanding and thus fully meeting the expectations of

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MOOC learners. Given the importance and impact of this innovative type of educational provision, we believe there is the need to foster the dissemination of quality learning design models and practices specific for MOOCs which are clearly learner-centred and based on successful distance and online learning experience.

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## ASSESSING THE EFFECT OF MASSIVE ONLINE OPEN COURSES AS REMEDIAL COURSES IN HIGHER EDUCATION

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### **Motivation, research question and background**

Massive Online Open Courses (MOOCs) are one of the main important trends for the higher education worldwide. The relevance of this new tool for digital learning is related with its major features: (a) courses are “massive” (i.e. allowing scalability), (b) open to everyone interested in a topic, and (c) available online just thanks to an internet connection and a digital device. MOOCs are then an example of “disruptive innovation” that could revolutionize education as we know (Christensen & Eyring, 2011). The benefits related to MOOCs concern both efficiency and quality of education service. Universities engage with MOOCs seeking to increase their visibility, recruit new students (Hollands & Tirthali, 2014), provide flexibility of learning outcomes, improve campus teaching and respond to the evolving needs of learners worldwide. Effectively, MOOCs can have a wide range of impacts on Higher Education institutions, encompassing marketing facilitation (Riddle, 2012), stakeholder inclusiveness through democratization of education (Jorge et al. 2015), new university structure, as well as day-to-day operations improvements. Furthermore, MOOCs allow academic institutions to decrease their cost structure: lower costs can be reached through the reduction in facilities expenses (Bacow et al. 2012). Focusing on students’ benefit introduced by MOOCs, we can observe that, starting from lower levels of education, MOOCs help students to prepare for a school/university enrolment test or a school/university exam, providing a higher flexibility and a higher quality of preparation. In this respect, MOOCs can boost students’ motivation, employing several ways of supporting the learning process (Jorge et al. 2015).

The present research moves from this point focusing on the MOOC platform developed by Politecnico di Milano, the first Italian university to develop its own portal: POK (PoliMi Open Knowledge). This online platform has its own unique strategy: not as a substitute to traditional education but as a *support*, by facilitating, or actually *bridging*, the transitions at key stages of the educational path – from high school to university, from bachelor to master degree, from university to the work environment: “MOOCs to bridge the gaps” (Politecnico di Milano, 2015). In this perspective, the main aim of these MOOCs is to level the playing field between students who have very different educational background – for being able to attend the courses at PoliMi with the best auspices. The case of Politecnico di Milano represents a significant opportunity of research, thanks to its explicit strategy in developing MOOCs. Furthermore, a considerable benefit of focusing the research on POK platform is the availability of a large number of data



concerning, not only POK users, but also all Politecnico di Milano students. In the context of the MOOCs offer provided by Politecnico di Milano through its platform POK, this study wants to examine the two following research question:

- Which are the effects of using MOOC on the students' subsequent academic performances, after taking into account their individual characteristics?

We focus on the students enrolled in three different MOOCs types, one of "From Bachelor's to Master" (FinAccount101), the other of "From High School to University" (MAT101, FIS101 and FIS102) – the reason of the choice stems from the direct relationship between these MOOCs and subsequent PoliMi's courses taken by students. From strategical point of view, Politecnico di Milano developed POK (PoliMi Open Knowledge) following three main objectives: (a) meet a diversity of learners' needs; (b) introduce scientific culture to citizens; (c) support new forms of teaching and learning and their integration to enhance curricular education at Politecnico di Milano (PoliMi Open Knowledge, 2015). The idea of the proponents is to provide materials that can *align* the basic competences of prospective students to the knowledge that is assumed to be acquired before taking the courses at PoliMi (as, for instance, basic competences in physics and mathematics). From a technological perspective, the POK platform is a personalized version of Open EdX, the open source platform of EdX, which has been made available to other institutions since June 2013. On June 3<sup>rd</sup>, 2014 the first three POK courses went online. The results, after the first year, were very encouraging in terms of participation: 22,900 total of MOOC participants, 15,400 users enrolled in POK platform and 10 MOOCs online. Now, after almost two years, the MOOCs available are 15 (fifteen) and users enrolled are approximately 24,000 (PoliMi Open Knowledge, 2015).

## **Theoretical framework and hypotheses of the research**

The second research question deals with the measurement of the effects of using MOOCs on subsequent exams taken in corresponding disciplines. Our purpose is to offer an empirical analysis, not only of the impact on the MOOCs' performances (i.e. the success of the POK initiative), but also on the academic performances of students, who use POK as a support for the preparation in a specific subsequent academic course. According to the Politecnico di Milano's strategy of POK delivery, we expect to find a positive correlation between using MOOCs and the students' performances in the academic course, concerning the same topic developed in MOOC. Although Greene et al. (2015) found empirical evidence that the factor "MOOC supports academic current program" has a significant negative effect on MOOCs achievements; we think that the evidences for POK could generate the opposite results, thanks to its unique strategy of dealing with an alignment of competences at the beginning of academic courses. Specifically, POK courses have the main aim of aligning entry-level competences across students who have a different educational background. It can then be the case that the main beneficial effect can be concentrated on those students who lack the basic competences in core subjects, and can fill their gaps through MOOCs, being able to pass subsequent first-year exams even if they do not have strong experiences in secondary education on related disciplines. Hence, our hypothesis is:

- Hypothesis: Students who attend a POK course do obtain higher performances (i.e. higher grades) in discipline-related courses that they attend in their subsequent studies at Politecnico di Milano (both bachelor and master courses), when compared with their similar counterparts who did not attend the corresponding POK course.

## Data and methodology

In order to investigate the possible effect that completing a MOOC (i.e. obtaining the final certificate), has on the ability of a student to succeed in a discipline-related exam, we now take into consideration POK users who are enrolled at PoliMi. Moreover, we focus our attention on four MOOCs whose relationship with an academic exam is evident, namely:

- MAT101, which is presented on POK in the cluster “From high school to university” and is related to the exam of Mathematical Analysis and Geometry;
- FIS101 and FIS102, both contained in the cluster “From high school to university” and related to the exam of Physics;
- FINACCOUNT101, part of the cluster “From bachelor to master” and directly related to the exam of Accounting Finance and Control (AFC).

Mathematical Analysis, Geometry and Physics are part of the study plan of all bachelor degrees in Engineering at PoliMi. Accounting finance and control is part of the study plan in Management Engineering (master degree). For this reason, we consider two populations of PoliMi students in this last part of the paper:

- Students who enrolled in 2014/15 Academic Year in a bachelor degree in Engineering (N=5,928);
- Students who enrolled in 2014/15 Academic Year in a master degree in Management Engineering (N=663).

Only a subgroup of students enrolled in one of the MOOCs previously cited: they are 1,329 for Mathematics, 1,251 for Physics and 101 for AFC. As a last step, we consider the subgroup that obtained the final certificate of the MOOC, that is a score in the final test higher than 0.6 (Figure 1 summarizes the sample selection).

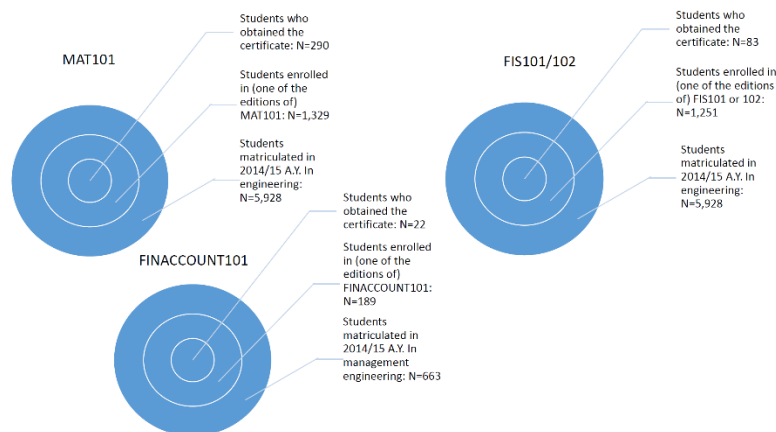


Figure 1. Sample size and selection

Starting from the original population of students, we define two possible “treatments”; the first option is obtaining the final certificate in the related MOOC, the second option include a higher number of possible treated students, defining the treatment as being *active* in the related MOOC. By *active* we mean the same stated in previous paragraphs: obtaining a final score higher than 0.1. This means that the student has at least started the final test or one of the intermediate test, having an interaction with the platform other than the pure enrolment in the MOOC. In our data, this treatment is expressed through a binary variable ( $D_i$ ) equal to 1 when the student  $i$  is treated, and 0 otherwise. The underneath assumption is that finalizing the MOOC would have a positive/negative effect on the ability of the student to obtain a higher score/pass the discipline-related exam, which is our outcome variable. To investigate this issue, we apply a propensity score matching approach, where the treatment effect  $T$  for a student  $i$  can be expressed as

$$T_i = Y_i(1) - Y_i(0) \quad (1)$$

where  $Y_i(D_i)$  is the potential outcome, given the treatment  $D_i$ . The final parameter of interest, defined as the “average treatment effect on the treated” (ATT) is then defined as

$$T_{ATT} = E[Y(1)|D = 1] - E[Y(0)|D = 1] \quad (2)$$

In this paper, we propose two possible outcomes  $Y_i$ . The first is a dummy variable equal to 1 when the student passed the exam and 0 otherwise; in this sense, the effect of the treatment can be read as the effect on the probability to pass the exam. The second outcome is the grade obtained by the student; it varies from 18 (the sufficiency) to 30 when the student passed the exam, and is missing when he/she did not. It is worth to stress that the three exams are considered separately, so that three propensity score matching models are actually run. Propensity scores are defined through a probit regression where the dependent variable is obtaining the certificate/being active in the MOOC (dummy = 1) or not (dummy = 0). To estimate this parameter, we include a vector of student’s personal characteristics ( $X_1$ ) and information about his/her university career ( $X_2$ ). Computing the propensity scores through this methodology, we aim at including as many observable individual characteristics as possible, so that the matching procedure allows the comparison of students that only differ in their exposition to treatment.

$$D_i = \alpha_0 + \alpha_1 \bar{X}_{1i} + \alpha_2 \bar{X}_{2i} + \varepsilon_i \quad (3)$$

Among individual characteristics we consider gender, citizenship, Region of residency (if the student is resident in Lombardy Region, where PoliMi is located, or not) and the socio-economic status. About the university career we take into consideration if the student obtained a scholarship, the average grade obtained in his/her career and the amount of university credits. Moreover, for master’s students we consider if the student obtained the bachelor degree at PoliMi or not and if he/she is a supplementary year student, which refers to student who took more time than generally expected to complete the bachelor’s degree. For bachelor’s students

we consider the high school grade and if he/she obtained a diploma with a major in scientific disciplines (called *liceo scientifico* in Italy); finally, we take into consideration if the student obtained an OFA, attributed to students who had to repeat the admission exam at PoliMi because they did not reach the minimum score in Physics or Mathematics.

## **Empirical results**

At first, treatment is defined as obtaining the certificate in the related MOOC. From a descriptive point of view, some characteristics are statistically different between treated and control groups. A higher percentage of female students obtained the certificate of Mathematical Analysis and Physics (33% and 31%, respectively); treated students tend to have a higher exam average and more credits by course attended in their university career, indicating a higher relative performance at university. They also register a higher grade from high school, referring to higher level of competencies at their entrance at university (for bachelor students). Though, when focusing on the level of entrance competencies in Mathematics and Physics, there appears to be a lack of matching with PoliMi requirements, given the higher number of students who obtained an OFA (i.e. a formative 'debt' assigned to students who did not pass the Mathematics of the Physics section of the admission exam). Looking at panel B, the significant characteristics in the estimation of the propensity scores are those related to the university career (average exam grade) and high school career (high school grade), both positively related to the probability to obtain the certificate in Mathematics and Physics. In other terms, the higher the average grade, the higher the probability to complete the related MOOC. Moreover, being a female student and having had an OFA are both positively related to the probability to obtain the certificate in Analysis (in the latter case, stressing the role of MOOC courses in filling a competence gap).

In order to have a closer look at the phenomenon, we also define a second possible treatment, which is defined as being active in the related MOOC (as discussed above, by active we mean a student obtaining a final score higher than 0.1). From this point of view, results show a pattern that follows the previous one. In this case, the effect is not significant, but negatively related to the student's grade. We can interpret the negative treatment effect on exam grade in the light of the *recovering (aligning)* role of MOOCs. In this interpretation, students who attend MOOCs are those who would have obtained lower grades also in absence of treatment. Though, attending a MOOC has a positive effect on their ability to pass the exam. In other terms, this is due to the effect of the MOOC that help students with a lack of initial competencies to pass the MOOC-related exam, though obtaining lower grades than the average. To test this hypothesis, we consider those students who have been defined as active in each MOOC, comparing them to all the other students matriculated in the same year. Among them, we look at those who can be defined low-achieving since their entrance at PoliMi. This definition is based on the high school grade for Mathematical Analysis and Physics, and on the bachelor grade for AFC. We define students with a lack of initial competencies those who obtained a high school grade lower than 70 up to 100 (60 is the sufficiency); for master students, this definition is reserved for those whose bachelor grade is lower than 90 up to 110. Finally, among those students who are low achieving, we compare the proportion of them who were also able to pass the MOOC-related

exam. The students who passed the exam of Mathematical Analysis and were labelled as active in the related MOOC are 30% of low achieving students, while the proportion is 26% for students that did not take part in the MOOC. Similarly, the percentage is 44% in Physics, versus 36% among similar students not active or not enrolled in the MOOC. Finally, the percentage is 100% for AFC, as it is 87% for all other students. The higher percentage of low achieving students able to pass the exam, given their participation in the discipline-related MOOC, support the hypothesis that MOOCs are actually used by students to “close the gap” in a specific discipline. This helps them to increase the possibility to pass the exam, even though with averagely lower scores. In order to check this last hypothesis, we run the propensity score matching only considering the group of students who have a lack of competencies in core subjects. Results from Table 1 show that this is actually the case, with all the test scores higher for the treated group than for the control one, though not significant. Looking at the increase in the probability of passing the exam, we can actually see a significant effect in Mathematical Analysis: among students with a lack of initial competencies, those who attended the MOOC in mathematics obtain a 15% increase in the probability to pass the exam than their comparable counterparts who did not – and, this effect is statistically significant.

Table 1: Propensity score matching, treatment: *being active in the MOOC* subgroup of students who lack of initial competencies

Panel A. Descriptive statistics

Variable	Mathematical Analysis		Physics		AFC		
	Treated N=113	Control N=901	Treated N=16	Control N=998	Treated N=9	Control N=105	
Female student (dummy=1)	Mean	0.21*	0.09*	0.06	0.11	0.33	0.29
	Std Dev	0.41	0.30	0.25	0.31	0.50	0.45
Italian citizen (dummy=1)	Mean	0.76*	0.91*	0.75*	0.90*	1.00	0.99
	Std Dev	0.43	0.27	0.45	0.30	0.00	0.10
Lombardy Region resident (dummy=1)	Mean	0.74*	0.81*	0.62*	0.80*	0.78	0.70
	Std Dev	0.44	0.39	0.50	0.40	0.44	0.46
Socio-economic status (discrete variable from 1 to 10)	Mean	5.81	6.25	6.19	6.20	5.33*	7.34*
	Std Dev	3.16	2.99	3.04	3.01	2.00	2.83
Scholarship awarded (dummy=1)	Mean	0.02	0.02	0.06	0.02	0.00	0.06
	Std Dev	0.13	0.15	0.25	0.15	0.00	0.23
Average exams grade (up to 30)	Mean	22.09	21.90	23.06*	21.90*	26.50	25.89
	Std Dev	2.31	2.29	2.66	2.28	1.54	1.29
Credits amount (in the career)	Mean	42.35	44.10	50.69	43.79	70.00	69.29
	Std Dev	28.35	29.23	27.94	29.14	16.77	17.20
Scientific high school diploma (dummy=1)	Mean	0.46*	0.72*	0.50	0.70		
	Std Dev	0.50	0.45	0.52	0.46		
High school grade (up to 100)	Mean	65.03	65.57	64.13	65.53		
	Std Dev	3.79	3.55	4.03	3.57		
OFA student (dummy=1)	Mean	0.39*	0.14*	0.19	0.17		
	Std Dev	0.49	0.35	0.40	0.38		
Supplementary year student (dummy=1)	Mean					0.00	0.02
	Std Dev					0.00	0.14
PoliMi bachelor degree (dummy=1)	Mean					1.00	1.00
	Std Dev					0.00	0.00

Note: \* p<0.1, H<sub>a</sub>: difference between treated and control groups != 0.

Panel B. Treatment effect

Subject	Output	#Untreated	#Treated	Sample	Treated	Controls	Difference	S.E	T-stat
Mathematical Analysis	Grade obtained $\in$ [18;30]	228	34	Unmatched	22.40	21.08	1.30	0.525	2.48
				ATT	22.40	21.94	0.44	0.441	0.55
Mathematical Analysis	Having passed the exam $\in$ [0;1]	651	80	Unmatched	0.43	0.35	0.07	0.057	1.32
				ATT	0.43	0.28	0.15	0.075	2.00
Physics	Grade obtained $\in$ [18;30]	356	7	Unmatched	23.29	21.45	1.83	1.199	1.53
				ATT	23.29	21.71	1.57	2.132	0.74
Physics	Having passed the exam $\in$ [0;1]	718	13	Unmatched	0.54	0.50	0.04	0.140	0.3
				ATT	0.54	0.69	-0.15	0.196	-0.78
AFC	Grade obtained $\in$ [18;30]	91	9	Unmatched	25.33	24.97	0.37	0.724	0.51
				ATT	25.33	24.67	1.07	1.067	0.62

Note: Number of treated and untreated students refer to those on common support.

A student is "active" when the final grade is higher than 0.1. Socio-economic status is measured by the fee level. Credits amount refers to the number of credits by courses attended since the students' enrolment. OFA students are those who showed a lack of core competences in the admission exam. Supplementary year students are those who took more time than theoretically expected to complete the degree.

## Concluding remarks

The current paper considers the empirical experience of an Italian technical university providing MOOCs. In line with the initial hypothesis, results show a potential effect of these courses to bridge students' gaps. A causal approach is adopted to estimate the effect of attending MOOCs on students' subsequent achievement by means of a propensity score matching approach. Results show a heterogeneity of the effect, which is not overall significant. Though, when attention is focused on students with a lack of initial competencies (in terms of grade in the lower level of education), the effect of attending MOOC is positive and significant for mathematical analysis. This result can be interpreted as a partial alignment between institutional strategy – MOOCs to bridge the gaps – and performances observed. Hence, it is particularly important for higher education institutions to formalise objectives and strategies for digital learning, in order to be able to target efforts accordingly and assess the level of accomplishment.

Further research should include a new wave of data, in order to make estimations more robust and test for the persistence of the effects over time. Moreover, empirical data should be supported by means of interviews made to students – to check their level of satisfaction with the course attended and catch their motivation and engagement – and with lecturers – to investigate the strengths and weaknesses of their course design strategy.

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## **MOOCS IN LOCAL YOUNG TERTIARY UNIVERSITIES: STRATEGY AND METRICS**

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### **Abstract**

This paper exposes a use case concerning a policy for developing Massive Open Online Courses (MOOCs). This document presents the strategy adopted by the University of Applied Sciences, Western Switzerland (quoted in this document as HES-SO), a 20-year-old tertiary university based in Switzerland. After a description of the strategy, the paper details the means implemented, namely the local hosting platform stemming from a “Moocization” of Moodle, the methodology used for production and the MOOCs developed. The metrics obtained since 2014, are consolidated, presented and analysed in the conclusion part of the paper.

### **Context**

Since 2011, distance education has been reshaped by the onset of a new type of teaching, the MOOCs. These courses are considered as a disruptive innovation to bring reform in higher education.

MOOCs enable a mostly free access to higher-level education for many self-motivated people worldwide (Jordan, 2014). Hundreds of such courses are nowadays developed by universities from all over the world, particularly by prestigious American universities, such as Stanford or Harvard, while more than 35 million people worldwide attended a MOOC in 2015 and more than 2 million among those have successfully completed a course with certification (Hollands & Tirthali, 2014).

The University of Applied Sciences Western Switzerland (HES-SO) decided in 2013 to develop a MOOC project to evaluate the potential of these courses.

21,000 students (27% of the 8 Swiss UAS students) enrol every year in the different curricula proposed by the HES-SO. This 20-year-old university offers students strong references to the real professional world, either by linking the teaching laboratories with real experiments or by developing projects with professionals in action and has become a great source of skills, ideas, innovation, creativity and knowledge. With its six faculties (Design and Fine Arts, Business, Management and Services, Engineering and Architecture, Music and Performing Arts, Health and Social Work), HES-SO plays a preeminent role in the seven cantons of Western Switzerland where its faculties stand.



The HES-SO has created an e-learning Centre, called Cyberlearn, in 2004. The Centre is in charge of developing and conducting research in blended learning, comprising the pedagogical use and implementation of new innovative and disruptive technologies.

### **A two phase strategy**

The HES-SO Board of Education designed a MOOC strategy in two phases. The first phase (2013-2015), when a pilot project was launched and assessed, has been followed by a second phase lasting from 2016 to 2020, during which MOOCs are developed to become fully-fledged in this field. After completion of the second phase, a global appraisal of the MOOCs mission will help define if this type of educational method should be officially embedded in the institution's development policy.

#### ***First phase (2013-2015)***

The objective of this phase consisted in the development of two types of MOOCs and their launching in order to measure their impact.

The first MOOC is supported by the faculty of Health, and deals with how to manage hypertension via a method of motivational consultations. The seven-week MOOC involves more than 40 contributors and provides an inter-professional eye on the topic. It is targeted for health professionals as on-going education, and for students attending courses in Health. The second MOOC proposes an oral communication method aiming at training the oral capabilities of the participants. Lasting four weeks, it involves only one professor and is targeted at the general public and students. Both MOOCs are provided in French with English subtitles. By developing these two formats, the goal was to measure the needed workload for each MOOC, the former rather wide and complex to implement, and the latter simpler and rapid to develop.

The MOOCs do not officially grant credits, but participants obtain a certificate of achievement. However, they are already designed to meet the credit requirement of the ECTS (European Credit Transfer System), so as to resume with validation in case the Board decides to officially integrate them into the educational system in Phase 2.

#### ***Hosting platform***

An institution such as the HES-SO lacks sufficient funds for the MOOCs project to appear on a worldwide reaching platform like Coursera (<http://www.coursera.org>), the main actor in this market. Neither was it realistic to deploy an edX platform (<https://www.edx.org>) in spite of a more open and non-profitable solution provided by the Massachusetts Institute of Technology and Harvard University since May 2012. This solution requires a heavy technical infrastructure, and would have duplicated the Learning Management System (LMS) Moodle in use at the HES-SO since 2005. When the decision to begin with the pilot phase was taken, other platforms such as France Université Numérique (<https://www.fun-mooc.fr>), did not yet provide hosting for external courses. Iversity (<https://iversity.org>) a European platform, claimed a waiting deadline for MOOCs publication of over one year. The HES-SO learning centre Cyberlearn, in agreement with the administrative teaching order, therefore decided to “moocize” the LMS

Moodle. The procedure consisted in simplifying Moodle and developing-strengthening some dedicated functionalities in order to ensure the management of the MOOCs, such as pre-registration, group management or management of certificates of achievement. After completion, this Moodle customisation will be shared with the Moodle community. In this way, other institutions using Moodle and wishing to embed MOOCs in their teaching strategy, can do it easily by relying on the expertise of the local team in charge of Moodle. Moreover, using a clean platform, implemented in Switzerland, solved the thorny issue of data ownership and copyright.

The e-learning Centre, therefore, concurrently developed the MOOCs platform under the name MOODEC (<https://moocs.hes-so.ch>) and designed the two courses.

### *Video infrastructure*

As on-line training involves mainly video produced specifically for a given course, the first step consisted in acquiring the right equipment for this type of resources. The HES-SO is spread over Western Switzerland in more than 28 schools, so video recording was to be produced in the schools as well as on the e-learning Centre's premises. The resources involving a professor speaking and facing a camera were filmed in the recording studio, whereas the recordings on site (patient simulation, interviews with specialists, etc.) were filmed in the concerned organizations. The Centre set up a premise dedicated to video recording, but the equipment could be easily transported to transform it into a mobile studio. After hiring a part-time producer, a premise was rented and equipped with three cameras, a prompter, microphones and a computer dedicated to video editing.

### *Specifics of the HES-SO*

Beyond attention dedicated to producing quality didactic and distance pedagogic resources, much thought was given to simulate the presence of the student in the pedagogic scenario. Therefore, a recurrent character was invented who appears in each MOOC, representing the student, and so enabling to place the participant in a meta-cognitive position while facing knowledge. The tone used in the MOOCs is relaxed and catchy to maintain an engaging communicative freshness. A health professional, amateur actress, accepted to act out the scripted scenes, and so brought added value to the courses, while becoming the living face of the MOOCs produced by the HES-SO.



Figure 1. Extract of a “Sophie” video

*Results*

Unlike professors at universities, most HES professors are not provided with their own Ra&d team and depend on the e-learning Centre to develop a MOOC. Most professors also lack the competencies required to transform a face-to-face course into an on-line course, and often are unfamiliar with the production of distance didactic scenarii. Thus, the Centre designs courses, working on both narration and production.



Figure 2. Extract of the course about oral communication

The oral communication MOOC was produced in a short time, both because it was simple and short, and because the professor involved manages the Cyberlearn Centre, and thus, had the required experience to design and produce such a course. In all, from the starting idea to the technical production, the course which is worth 1 ECTS credit, required 50 working hours. The production itself required 400 working hours.

The MOOC on hypertension required more than 600 hours for production and more than 400 hours from professors. A significant effort was required to coordinate the various departments involved in the project, the health professionals from the university hospitals, and the e-learning Centre.

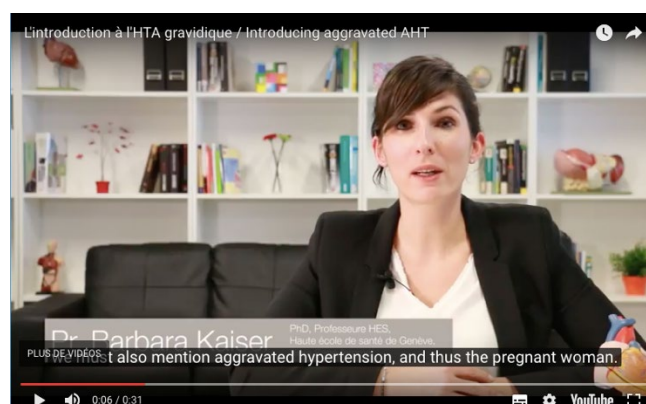


Figure 3. Extract of the course about oral communication

Its scope and complexity points out three specific issues. Firstly, concerning the academic involvement in the project, a person is needed to supervise the project and be responsible for

an efficient communication between the production team and the teaching team, in order to ensure full coordination among the contributors and the availability of the resources.

Secondly, it was noted that none of the professors involved, neither the professionals with a hospital background, had the required competencies to design a distance learning course. Often the professors focused on fears about technology, and felt awkward about thinking in a distance learning context. To schematize, rather than imagining how a future participant in the MOOC could understand, learn, be interested by an educational resource, professors tended to focus on how to design a video, a game, a simulation, regardless of how knowledge to be transmitted and student mobilization at a distance should meet.

Finally, it was noticed that more than 80% of the professors felt uneasy to improvise when facing a camera. They produced texts to be read on the prompter, more suitable for a written delivery. Texts needed rewriting, simplifying, to give them a pace closer to an oral delivery, but without distortion, all of which represented a mass of unexpected workload, as the professors facing students in a classroom are normally capable of such improvisation. A camera capturing a specific moment, the fear of delivering imperfect information paralyzed the participants. Professors needed some training first to speak in front of a camera: suitable clothes, make up, posture. Some universities choose to hire professional actors to simulate the professor, but the Centre decided against this: however incomplete the media performance, it is essential that the professor guarantees knowledge and assumes his own role.

### *Communication*

The launching of the HES-SO MOOCs was covered by a press conference, various newspapers and a TV program by the Swiss French TV channel. Concurrently, the educational department involved in the project activated its network, while the HES-SO activated its own communication service. The Centre concentrated more on social networks and targeted advertising on Facebook, LinkedIn and Twitter and published relevant information on the Moodle platform, accessed daily by more than 21,000 HES-SO users.

### *Costs*

Globally, developing an average HES-SO MOOC cost 100,000 Euros, comprising the technical infrastructure costs, the cost of the development team and the professor workload. The average worldwide MOOC production costs vary between 150,000 and 240,000 Euros (Holland & Tirthali, 2014) thus, the HES-SO costs turn out to be less expensive, in spite of the high cost of labour in Switzerland.

### *Metrics*

From 2014 to 2016, more than 3,000 people signed up on the platform, for 1,000 people actually having attended the two MOOCs. These were run several times (3 for hypertension and 6 for oral communication). It is interesting to compare these figures with the average number of participants per field in the traditional courses at the HES-SO. The oral communication MOOC has included 700 participants so far, and delivered 8 certificates of achievement. This course is

taught at the faculty of Management and Services, largest in size at the HES-SO, comprising 6,686 (rounded) students and provides 5 Bachelor and Master programs, for an average of 1,337 (rounded) students. Concerning the Hypertension MOOC, which is part of the faculty of Health Professions, ranks 3rd in size at the HES-SO, comprises 3,576 students and provides 5 Bachelor and Master programs. Traditional educational courses count 715 students per program, where the MOOC had gathered 309 participants and delivered 51 certificates of achievement. The number of participants in the MOOCs stemming directly from the HES-SO amounts to 250. The number of participants in the MOOCs corresponds to about half the total number of students per program, which is an encouraging figure.

### *Findings*

The findings of this pilot phase are globally positive. If the number of participants was not massive, strictly speaking, it was possible to demonstrate that the audience shows a true interest in this type of educational approach. It must be noted that if the figure of 50,000 learners per MOOC is often highlighted, the number of participants per MOOC, worldwide, actually amounts closer to 846 (Shah, 2016). The HES-SO MOOCs are therefore very close to this average rate. The dropout rate in this phase reaches 67%. This rate is lower than the world average reaching 96%. The difference can be explained by the proximity between the public using the HES-SO MOOCs and the HES-SO. Additionally, these courses were designed to be narratively attractive and involving a less heavy workload for compulsory workshops, which may cause some discouragement among participants enrolled in this type of course.

### *Embedding a MOOC in presential curriculum*

With regard to the financial and human effort placed into developing MOOCs, we decided to interface the MOOC on oral communication with that of the face-to-face class. Therefore, we replicated the MOOC so that only regular students could subscribe, because we wanted to ensure coherence between distance and regular courses. Physical attendance to the course was downsized from 3hrs/week to 2hrs/week. As attending the MOOC required completion outside face-to-face class, it was made compulsory in order to validate the teaching hour shifted to the MOOC. In case a student had never accessed the MOOC, he would obtain grade 1 out of 6; when the MOOC was attended and the activities completed without obtaining validation, he would be graded 3 out of 6, and if validation was successfully obtained he would be graded 6 out of 6. This grade counts for half of the mid-module assessment grading. We believe that the experiment was successful, namely because all students showed some independence in their working approach. Although facing the MOOC by themselves, they completed all activities without reminders. Students were only reminded once, one week before the end of the module, that the MOOC had to be completed. The fact that the MOOC is graded directly affects the successful completion of the communication module and obviously accounts for part of the students' involvement. We feared that having to face the same professor during classroom sessions and also in the MOOC videos would be perceived as unnecessary or boring, but no student mentioned such a thing, neither orally nor in the evaluation. It is interesting to note that the hour of the distance course was attended during face-to-face courses in other courses or on Sundays. Students revealed higher competencies than other years at the end of the

module. It is, however, impossible at this stage, to check whether this is due to the integration of the MOOC or to this year's students' inherent capabilities (Salamin, 2017).

### **Second phase (2016-2020)**

Following the positive assessment of the first phase, the HES-SO has decided to launch a yearly call for the creation of a MOOC called "Moocs.Fab". Only one project proposed by the professors is accepted at the end of the evaluation process. With this setting, a new MOOC lasting 7 weeks was produced. The faculty of Design and Fine Arts proposed this project, dealing with an initiation to Cartoon creation for beginners. Launched in 2017, 12 certificates of achievement were delivered for 574 participants. In the last week, 100 participants were still active in the course. Most participants were Swiss and French.

With the 10 sessions of the three current MOOCs of the HES-SO, a profile of the average participant can be defined. It is a woman between 25 and 36, living in Western Switzerland, with a teaching diploma in higher education, attending the MOOC on a mobile, which is consistent with the HES-SO gender distribution of the regular students, which represents 52% of women (rounded) and 48% of men (rounded).

At the end of each session, the participants of the Oral Communication and the Cartoon MOOCs were asked to fill in a questionnaire OUT to measure the satisfaction level. Concerning Oral Communication, 33 out of 34 having filled in the questionnaire felt totally and rather satisfied by the course; for the Cartoon, 39 out of 44 participants having taken part in the survey felt totally and rather satisfied. This positive rate needs to be put into perspective, as those willing to fill in this type of questionnaire are generally the most and the least satisfied participants. Nevertheless, no participant claimed deep discontentment, which leads towards a positive assessment of the provided courses and, may explain partly the relatively low dropout rate.

A new project call was launched in 2017 and a MOOC on mental health was selected. Concurrently, two other requests were made directly to the Centre and were accepted. In 2019, three new MOOCs will therefore be launched on the platform.

### **Conclusion**

At a federal level, universities and EPF develop numerous MOOCs whereas the Universities of Applied Sciences are still pondering. The HES-SO plays a leading role in this field compared to its peers. A project aiming at implementing an edX platform at the Swiss level has recently started. By mid-2018, this platform will enable institutions such as the HES-SO to set free from local constraints, and reach a wider national and international exposure. The Swiss Higher Education Schools currently developing MOOCs claim that more than 65 MOOCs will be registered on the platform "Swiss MOOCs Service", which should boost the other UAS to invest in this field.

Since the MOOC project was positively assessed, this type of course is now included in the Board's intention plan 2015-2020 (Hes-so, 2015): "The development of Massive Online Open

Courses, MOOCs and by-product models encourage pedagogical thinking towards a new step in the use of information technology and communication in teaching.” (p.23)

Digitalizing higher education has become a main concern for the European and Swiss Higher Level Education Boards, and strongly implies that professors change their teaching practices and fully seize innovative educational tools. Professors having produced a MOOC with the effort required to breakdown knowledge, question their practice, analyse how they provide educational contents, globally show better efficiency when integrating technology into their classroom. Moreover, educational methods such as flipped classes can rely on MOOCs, whether produced internally or externally, to help students integrate knowledge more nimbly, in order to adapt them flexibly to their professional future whose outlines remain unclear in a 5 to 10-year perspective.

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## **A NEW APPROACH TO DIGITAL COMPETENCE BUILDING FOR UNIVERSITY EDUCATORS IN EUROPE**

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### **New (digital media) competences for new responsibilities in a networked world**

Since the mid 1990's, the exponentially growing adoption of digital information and communication technologies (ICTs) in everyday life has resulted in new social dynamics and reconfigured opportunities for access to expertise and knowledge transfer. This has important implications for teaching and learning processes, for example through participatory cultures and open educational practices. The potential benefits of this include opportunities for informal and peer-to-peer learning, a new attitude toward intellectual property, diversification of cultural expression, a better dialogue around skills valued in the workplace, and a more proactive conception of citizenship.

However, to fully enjoy these benefits, a number of challenges need to be overcome, including unequal opportunities for participation, low media literacy and ethical issues (Jenkins et al., 2015). To address these challenges, it is essential to carefully reconsider the knowledge, skills and attitudes that must be at the core of contemporary learning experiences and, based on that, expand the key attributes that educators should possess in order to meaningfully support learners – across all age groups – in becoming competent professionals and engaged citizens in a networked world. Therefore, it is crucial for institutions and governments to understand how to better design professional development opportunities and capacity building programmes for academics at various career stages.

A number of generic frameworks redefining the idea of literacy in a digital world have emerged over the last few years out of different disciplines, schools of thought and professional sectors (Ala-Mukta, 2011). As a consequence, the range of competences, levels of proficiency, scope and terminology is extremely varied.

More specifically, some proposals have attempted to identify the attributes and qualities that are particularly relevant to academics at various levels (Redecker, 2017; UNESCO, 2011). Ultimately what is at stake is the (re)definition of what it means to be an educator in the context of contemporary educational institutions, what students need to learn and how they can best learn in contemporary networked societies.



For example, building on the work of Siemens (2008) and Bates (2016), the role of an educator in a so-called *connectivist* world could be summarized as follows:

- Amplifying knowledge, by drawing attention to content elements, ideas, thoughts and messages.
- Curating, aggregating and filtering knowledge with their comments, posts, and personal reflections.
- Guiding students' self-directed learning journey, helping them to make sense of complex information.
- Fostering collaboration, both on a small and on a large scale, and co-creation of knowledge by students.
- Modelling, especially when knowledge cannot be effectively communicated in a traditional way
- Guaranteeing a persistent online presence, meeting students anytime and anywhere.

Learning how to teach in an environment where digital ICTs are increasingly ubiquitous implies a fundamental change in routine teaching practices and learning experiences. Issues such as online identity building, trust dynamics and knowledge management come to the foreground with potential for enabling meaningful participation and increasing access of excluded learners (OpenMatt, 2016). Further, while too often presented as technology-driven responses, visions of the role and responsibilities of educators are shaped by and embody particular views on how institutions (and society at large) should operate.

### The DIGCOMPEDU Framework

Competency frameworks play an important role in trying to define which skills educators should possess. Further, in the EU context, given the diversity of Europe's cultures, languages and educational systems, competency frameworks aim to enhance both domestic and cross-border transparency of qualifications. One of the most far-ranging EU initiatives is the European Qualification Framework (EQF), which is a meta-framework aimed at increasing transparency and supporting mutual trust to enable comparability of qualification frameworks and systems (European Commission, 2008). Other Europe-wide initiatives include meta-frameworks such as the European Credit System for Vocational Education and Training (ECVET) or the Common European Digital Competency Framework (DIGCOMP), sectoral frameworks related to a specific family of professions, e.g. the European Marketing Confederation Qualification and Certification Framework (EMCQ), European Coaching/Mentoring Competence Framework (EMCC), and the European Competence Framework for Industrial Pharmacy Practice in Biotechnology (PHAR-IN). Additionally, generic frameworks and domain-specific frameworks have been designed to describe cross-domain and domain-specific competencies respectively.

An important recent development in the education domain is the DigCompEdu framework, issued in 2017 by the Joint Research Centre of the European Commission in Seville, that aims to structure and describe the digital competences that European educators should master, with the aim to inform and reinforce national initiatives in the field under a common umbrella.

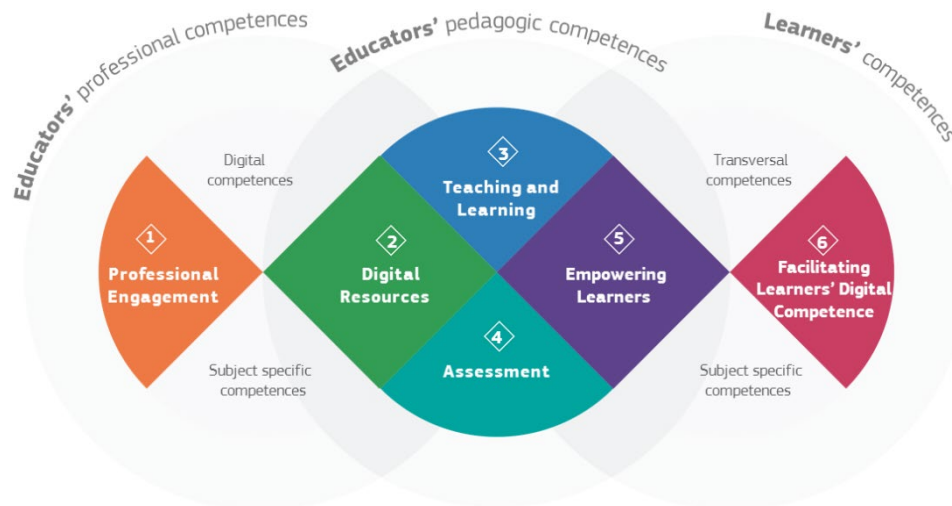


Figure 2. The DigCompEdu framework (source: JRC Seville, 2017)

The DigCompEdu framework is particularly interesting for two reasons. Firstly, it opens up the set of skills that educators should possess beyond teaching-related activities, adding a professional engagement area (on the left in the above figure) and a learners' competency areas (on the right). Secondly, it assigns a fundamental role to collaborative teaching and learning: the 23 competences within the six areas of the framework, which are all described in terms of sub-activities and proficiency descriptors, serve to inspire collaboration among educators, with students, parents and with other stakeholders. By taking this approach, the DigCompEdu framework seeks to enhance an open culture among educators and ultimately to build their capacity to work in open and networked communities. The idea is that the framework should be able to inspire national and institutional training initiatives moving away from activities centred on learning how to use ICT, towards activities aimed at understanding what kinds of collaborations can be fostered by ICT, regardless of the technology aspect. In raising awareness about such collaborative practices, both educators and students can be better informed about issues such as knowledge ownership, transparent collaboration and open digital identity management.

### **The challenge of operationalising the DigCompEdu framework**

The focus that DigCompEdu is putting on collaborative competences and on openness is surely welcome and is probably the only possible way to equip teachers with the capacity to work in our networked societies, but it is also increasing the complexity of any effort to operationalise the framework itself. This is because collaborative and open teaching (which also means collaborative designing, collaborative production of content and collaborative assessment) relies on a number of soft and dynamic competences, such as online identity management, personal data management, ability to engage in intercultural dialogues, collaborative knowledge creation and capacity to deal with ethical and privacy issues. These competences, some of which did not even exist as such just a few decades ago, dynamically evolve over time, influencing and being influenced by ICT developments themselves, and are deeply connected with each person attitudes and behaviours (Cronin, 2017).

We believe that, in order to be successful, attempts to operationalise the DigCompEdu framework – as well as any other capacity building effort that wants to build open and networked capacity of educators – should have three characteristics. It should be *open*, encouraging learners to use the open web and to both reuse and produce Open Educational Resources (OER); *collaborative*, moving away from individual capacity building towards group activities, sharing peer-feedback and interacting with others within communities of practice; and *active*, privileging practical activities (“things that can be done”), aiming to help educators rethink teaching and learning through digital practices.

In parallel, successful capacity building actions should embed three interrelated dimensions of literacy practice (Green & Beavis, 2012). First, an *operational dimension* that includes the skills and competences that enable educators to teach across a range of platforms, tools and media, including making meaning with and from diverse modes such as spoken and written language, images, sounds, videos. Second, a *sociocultural dimension* that refers to developing a repertoire of digital teaching practices in specific social and cultural contexts, such as constructing and/or maintaining effective social and educational relationships online. Third, a *critical dimension* that recognises that meaning-making resources are selective and often operate as a means of social control and social exclusion (Spitzer, 2016).

### **EduHack.eu: designing an open, collaborative and active learning experience for HE teachers**

In line with these principles, the EduHack.eu initiative is developing a capacity building course for European educators based on the DigCompEdu framework, starting from the idea that in order to be able to meaningfully teach in an open and networked world, educators need to not only “learn” how to teach with technology, but should be allowed to “experiment” with it, in an open and collaborative spirit.

In line with the DigCompEdu philosophy (Redecker, 2017), the principles of co-creation, collaborative learning and student/learner engagement are central to the course methodology. As such, the EduHack.eu course is following an active learning approach (i.e. “learning by doing”) drawing on educational paradigms and models including networked learning (Jones, 2015), participatory cultures (Jenkins, Ito, & Boyd, 2015), connected learning (Connected Learning Alliance, n.d.), hybrid pedagogy (Rorabaugh, 2012; Stommel, 2012; Rorabaugh & Stommel, 2012) and Open Education (Weller, 2014), among others.

The novelty of the EduHack.eu course is that its methodology is based on “Eduhackatons”, whereby teaching professionals in higher education (HE) will apply their competences and will produce digitally-supported learning experiences with opportunity to experiment with creative models and approaches to teaching and learning. Throughout the Hackatons, participants will in fact create digital artefacts of different kinds and will develop a rich personal teaching-learning environment on the open web while exploring the Domains of One’s Own (DoOO) philosophy (Udell, 2012) and ‘Publish (on your) Own Site, and Syndicate Elsewhere’ (POSSE) model (Indie Web Camp, 2017). Participants’ own domain (made of a personal and/or project-

based websites) will be a very tangible output that will operate as an open portfolio enabling course participants to show and to reflect on their progresses.

1. Professional engagement	2. Digital Resources	3. Teaching and Learning	4. Assessment	5. Empowering Learners	6. Facilitating Learners' Digital Competence
<p><b>1.1 Organisational communication</b> To use digital technologies to enhance organisational communication with learners, parents and third parties. To contribute to collaboratively developing and improving organisational communication strategies.</p> <p><b>1.2 Professional collaboration</b> To use digital technologies to engage in collaboration with other educators, sharing and exchanging knowledge and experiences and collaboratively innovating pedagogic practices.</p> <p><b>1.3 Reflective practice</b> To individually reflect on, critically assess and actively develop one's own digital pedagogical practice and that of one's educational community.</p> <p><b>1.4 Digital Continuous Professional Development (CPD)</b> To use digital sources and resources for continuous professional development.</p>	<p><b>2.1 Selecting digital resources</b> To identify, assess and select digital resources for teaching and learning. To consider the specific learning objective, context, pedagogical approach, and learner group, when selecting digital resources and planning their use.</p> <p><b>2.2 Creating and modifying digital resources</b> To modify and build on existing openly-licensed resources and other resources where this is permitted. To create or co-create new digital educational resources. To consider the specific learning objective, context, pedagogical approach, and learner group, when designing digital resources and planning their use.</p> <p><b>2.3 Managing, protecting and sharing digital resources</b> To organise digital content and make it available to learners, parents and other educators. To effectively protect sensitive digital content. To respect privacy and copyright rules. To understand the use and creation of open licenses and open educational resources, including their proper attribution.</p>	<p><b>3.1 Teaching</b> To plan for and implement digital devices and resources into the teaching process, so as to enhance the effectiveness of teaching interventions. To appropriately manage and orchestrate digital teaching interventions. To experiment with and develop new formats and pedagogical methods for instruction.</p> <p><b>3.2 Guidance</b> To use digital technologies and services to enhance the interaction with learners, individually and collectively, within and outside the learning session. To use digital technologies to offer timely and targeted guidance and assistance. To experiment with and develop new forms and formats for offering guidance and support.</p> <p><b>3.3 Collaborative learning</b> To use digital technologies to foster and enhance learner collaboration. To enable learners to use digital technologies as part of collaborative assignments, as means for enhancing communication and collaboration and for collaborative knowledge creation.</p> <p><b>3.4 Self-regulated learning</b> To use digital technologies to support self-regulated learning processes, i.e. to enable learners to plan, monitor and reflect on their own learning, provide evidence of progress, share insights and come up with creative solutions.</p>	<p><b>4.1 Assessment strategies</b> To use digital technologies for formative and summative assessment. To enhance the diversity and suitability of assessment formats and approaches.</p> <p><b>4.2 Analysing evidence</b> To generate, select, critically analyse and interpret digital evidence on learner activity, performance and progress, in order to inform teaching and learning.</p> <p><b>4.3 Feedback and Planning</b> To use digital technologies to provide targeted and timely feedback to learners. To adapt teaching strategies accordingly and to provide targeted support, based on the evidence generated by the digital technologies used. To enable learners and parents to understand the evidence provided by digital technologies and use it for decision-making.</p>	<p><b>5.1 Accessibility and inclusion</b> To ensure accessibility to activities, for all learners, including those with special needs. To consider and respond to learners' (digital) expectations, abilities, uses and misconceptions, as well as contextual, physical or cognitive constraints to their use of digital technologies.</p> <p><b>5.2 Differentiation and personalisation</b> To use digital technologies to address learners' diverse learning needs, by allowing learners to advance at different levels and speeds, follow individual learning pathways and goals.</p> <p><b>5.3 Actively engaging learners</b> To use digital technologies to foster learners' active and creative engagement with a subject matter. To use digital technologies within pedagogic strategies that foster learners' transversal skills, open learning to new, real-world contexts, involve learners themselves in hands-on activities, scientific investigation and complex problem solving, or in other ways that increase learners' active engagement and creative expression.</p>	<p><b>6.1 Information and media literacy</b> To incorporate learning activities, assignments and assessments which require learners to articulate information needs; to find information and resources in digital environments; to organise, process, analyse and interpret information; and to compare and critically evaluate the credibility and reliability of information and their sources.</p> <p><b>6.2 Digital communication &amp; collaboration</b> To incorporate learning activities, assignments and assessments which require learners to effectively and responsibly use digital technologies for communication, collaboration and civic participation.</p> <p><b>6.3 Digital content creation</b> To incorporate assignments and learning activities which require learners to express themselves through digital means, and to modify and create digital content in different formats. To teach learners how copyright and licenses apply to digital content, how to reference sources and attribute licenses.</p> <p><b>6.4 Responsible use</b> To take measures to ensure learners' physical, psychological and social wellbeing while using digital technologies. To empower learners to manage risks and use digital technologies safely and responsibly.</p> <p><b>6.5 Digital problem solving</b> To incorporate learning and assessment activities which require learners to identify and solve technical problems or to transfer technological knowledge creatively to new situations.</p>

Figure 4: Synthesis of the DigCompEdu competence descriptors

Figure 2. The focus of the EduHack course

The EduHack.eu experience includes an online course, followed by an EduHackaton. At the beginning of the online course, learners will be provided with a (sub)domain hosting space. Through the course they will build a personal website – and potentially other project-based sites – and populate the site with content created as a result of a series of activities that participants will need to do, both individually and in collaboration with others. Following the online course, participants will gather in EduHackatons, hands-on events that will address a selection of challenges to education in a digitally/networked era, which will be defined by the learning community (e.g. building meaningful and useful assessment, how to improve student engagement and active participation). The EduHackatons will also be promoted for access by a wider audience, beyond those participants taking the online course, including students. In order to document the process, a platform will be created in order to archive examples of the digital artefacts created by participants, as well as documentation generated at the EduHackatons. By applying detailed metadata, such content will be highly searchable.

## Conclusions and future work

The DigCompEdu framework represents an important step in the right direction for stakeholders to understand the importance of embedding openness as a key feature of collaboration within Digital Literacy practices. However, making it operational through capacity building actions that are able to maintain its open and collaborative spirit is not without its challenges.

The EduHack.eu initiative is taking up this challenge through a versatile and comprehensive model for academic professional development, focusing on digital media competences for teaching and learning, that is adaptable to the specific needs and ethos of different types of HE institutions. This model will implement active, open and collaborative learning methods, culminating in the organisation of an Eduhackaton where educators will be able to experiment

with digital technologies for learning, experiencing what it means to be an open and networked educator.

The EduHack.eu model will be piloted during 2018 in three universities in Italy, Spain and the UK, and will then be made available to any institution willing to implement it within its own context.

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## **VISUAL TURN IN THE DEVELOPMENT OF DIGITAL PEDAGOGICAL COMPETENCIES**

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### **Introduction**

The series of EDEN conferences offered a specific framework of thinking and scientific consultation to the word and interpret this problem. In fact, the starting point is an idea that is old but provides the base for didactical thinking. How should the learning material appear, and how should it be transmitted to the students? Visuality is a topic closely related to the modernization of education, and in the process of the evolution of mass education since the 17th century, by today it has become the essential didactical element of demonstration and has an impact on everyday practice as that. This lecture consists of three parts; first, it looks back upon the historical characteristics of the interrelations between visuality and pedagogy. The core of the Comenius turn is indicated by the fact that the paradigm of digital pedagogy, which has appeared during the latest decades, has placed the then very original idea (Orbis Pictus) amongst new and very practical frameworks. After the millenary, the topic of visual learning gained a new dimension: it became furnished with an environment richer than ever before by mobile communication. Finally, we point to the new experiments examining the interrelations between visuality and education explicitly in the evolution of the world of learning, wording conclusions that may urge many of us to think about this problem further and conduct constructive debates.

### **Visuality and education – new answers to old questions**

During the second half of the previous century, renowned thinkers pointed out that the role of the images and in connection with this, the role of imagination is comprehensive and originally important in education. This is why Comenius' *Didactica Magna*, and especially the prototype of schoolbooks built on modern multimodality, the *Orbis Pictus* became the reference work of modern didactics. Following the centuries of the evolution of mass education, during the latest decades, we have seen acceleration at the level of scientific thinking, as well. One example for that is Arnheim, who in the chapter "Vision in Education" of his fundamental work titled "Visual Thinking" (Arnheim, 1969) points out that photographs, images, models or even live demonstration of the objects do not necessarily guarantee a „thoughtful grasp of the subject”; merely the use of visual aids does just not provide “a sufficiently favourable condition for visual thinking”. “Thinking with pictures is an essential strand in the intellectual history of technological development.” Another author who has had a deep influence on our picture of education, Ferguson, understanding the reciprocity between visual construction and the role of technologies in the 1970s, drew the new perspectives of visual inclusion and technical planning

(Ferguson, 1977; p.827). In fact, the rapid development of mobile communication, the use of the internet and the impacts of network services transforming learning created a new situation in the education. Owing to this, we may state that after three and half centuries visuality became the most important keyword. Contemporary visual technology – film, video, interactive digital media – is promoting but is also demanding a radically new approach to learning: the new age of visual learning has begun. It is well known that higher education has always been a unique laboratory for education-related innovations, concentrating significant research and development potentials and excellent subjects for experiments aiming at modernizing education, i.e. students. In the past 25 years, several theorists pointed out that growing curricular requirements cannot be efficiently managed by formal education and the traditional tools of education should be modernized. The EDEN has, in fact, created a reference of the historical importance of this process by its annual conferences, workshops, projects, and publications. Already in 2015 and 2016, we had the opportunity to publish our research ideas on this topic.

Subsequent to the millenary, the new learning paradigm has been built on the human-machine interactivity that can be considered the differential specificity of this form of learning. It is an important recognition that collective learning may originate from the human-machine-human communication, as well. In our present, the ICT tools being existent all the time and everywhere (especially mobile broadband communication tools) offer a new possibility of “managing” space-time which means a considerable learning potential. In case there are adequate conditions, we can principally communicate – receive and send information – at any point of space so that, owing to the asynchronous nature of time, our sent and received messages can reach our addressees and us according to our intentions. The possibility of the flexible management of space-time hides the possibility of a learning strategy adoptable within the system of personal capabilities and endowments. In this extended world managing time much more flexibility, the function of demonstration has changed, as well. It is not only the moment of making the pictures that have become simpler and “more democratic” than ever before but the access to the image contents has become much more open, as well.

From an educational aspect, it is an important characteristic that in the process of demonstration, understanding the *object* requires further *knowledge*, information, structures and activity samples. Recognizing this potential knowledge, after the millenary, more and more museums, libraries and archives in the world have been digitalizing their collections, and so *learning objects* bearing important cultural content or messages are becoming learning objectives. But the very same process, although in a spontaneous manner, is forming in the case of contents, mainly images, created and shared in the virtual space by individuals. This space can really be considered a learning environment the typical function of which is the transmission of visual contents. According to our preconceptions and experiments, these spontaneous processes can, however, be applied within the educational framework and from a pedagogical aspect, making learning more interesting and conscious.



## **The birth of digital pedagogy – facing new visibility**

In our new world, which, owing to the ICT tools, differs from any of the previous ones, we also have to reconsider plenty of pedagogical questions. In the world of interactions, the channels and community-making elements of interpersonal communication have transformed (especially in the web 2.0 environment), and the more and more open access to learning contents and the never ever seen methods of online learning and community learning influence pedagogical thinking, as well. Digital pedagogy has made a considerable try to renew pedagogical thinking after the millenary. In fact, by virtue of the initiations of the previous one and a half decade, the definition of digital pedagogy, which deals with the new pedagogical problems appearing in the context of teaching-learning and research in a learning environment dominated by interactive technologies, is still being formed. This is what we also did at the Budapest University of Technology and Economics (BME) app. fifteen years ago, and by issuing two students' books – Digital Pedagogy (2006) and Digital Pedagogy 2.0 (2013) – and launching a course, we have provided the possibility to get to know digital pedagogy for hundreds of students.

In our age, knowledge has become dynamic, and the process of gaining it has become necessarily extended in space and time. On one hand, it has become diverse, it is connecting to education at a higher and higher level, and on the other hand, the years spent within education have doubled during the latest century, from 6-8 years to 12-16 years. It is widely agreed that everyone needs digital competences that make the person capable of applying electronic media self-confidentially and critically both at work and in their free time. This competence is also related to high-level information management abilities and developed visual communication capabilities. The new competences connected to info-communication technologies include, at the most basic level, search for, evaluation, storing, creation, introduction, and transmission of information of multimedia technology, communication through the internet and the capability of participating in networks.

However, in the development of education and especially the learning environment, there has been a specific *spatial transformation* going on in terms of the transmission of visual information. In image content services (see, for instance, the success of Facebook, Instagram or YouTube), an epochal development has taken place. A virtual service environment rich in visibility has been born, which has basically changed and personalized the existing functions in terms of the teaching-learning tools. This process was supported by the fact that the users have become potential content providers, increasingly in everyday practice, as well; the users of the internet have become more and more important factors by uploading their contents and images.

In this new learning environment, the students, too, have a special position: on one hand, they are open to new information, but on the other, owing to the nature of development, they also demand the possibility of orientation and active development.

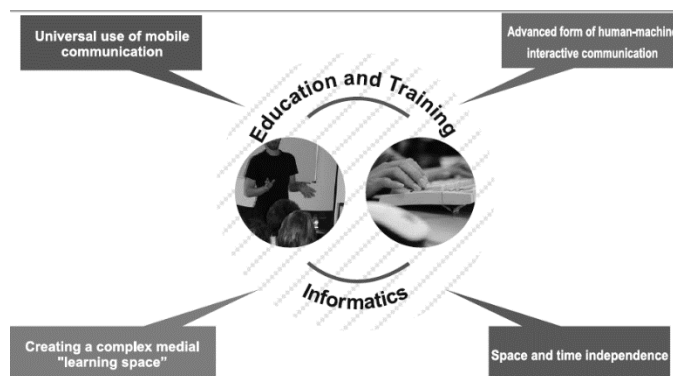


Figure 1. The new characteristics of educational informatics (source: diagram created by the author)

This is how, during our researches, it has become a new answer to old questions that e-learning should be made more than an “experimental teaching method” by extending the frameworks of online learning. Utilizing the advantages of its flexibility and the fact that it allows accessibility in space and time, comfort and personal time management in acquiring the learning material, we must open the process of content development, and make it possible for teachers and students to share new contents. This is how the development of the Open Content Development (OCD) concept in 2015-2016 that was built on the fact that interactive online learning solutions allow the recording and wide-range accessibility of digital content (text, picture, sound, and video).

### Microcontent as a visual tool

The project, that invited the teachers, who were ready to teach in an interactive and cooperative way in open content development, i.e. in an online learning environment and the students possible to be motivated, to join the development into the process of learning material construction (creation of microcontent), was initiated as a four-year unit of the methodological grant program of the Hungarian Academy of Sciences. This development paradigm sets out from the conception that the use of mobile communication has become general, which allows a high-level interactive connection between human and machines. In this process, a complex medial learning space can be established, in which the development and acquisition of the learning material can be more flexible in space and time than ever before.

The OCD model is built on the elements of the classical didactical triangle: its input is made of the teachers, the students and the learning material with the specific challenges that the teachers’ learning content development competences are of a problematic level and that the motivations to acquire learning material are rather low, especially in VET. As for learning contents, there are few modern learning materials, especially in the world of vocational training, and in this case, the dynamics of development lags far behind the actual needs.

## Visual Turn in the Development of Digital Pedagogical Competencies

András Benedek

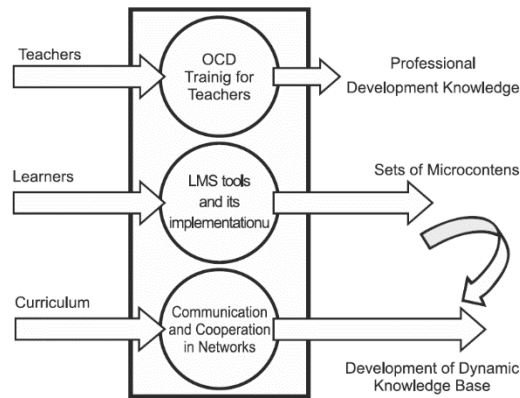


Figure 2. The new characteristics of educational informatics (source: diagram created by the author)

Our model was built on three main activities: first, it offered a special training for the teachers who joined the project. Second, it made it possible for the participants to use LMS tools and to learn methods necessary to handle these. This process started during the training by getting to know and applying the MOODLE system. Finally, in the evolving network we initiated a communication focused at development cooperation. Thus we considered the concluded personal development knowledge, the pile of the newly elaborated micro contents, the possibility that a dynamic knowledge base can be created by the participants and the open contents created by them as output factors.

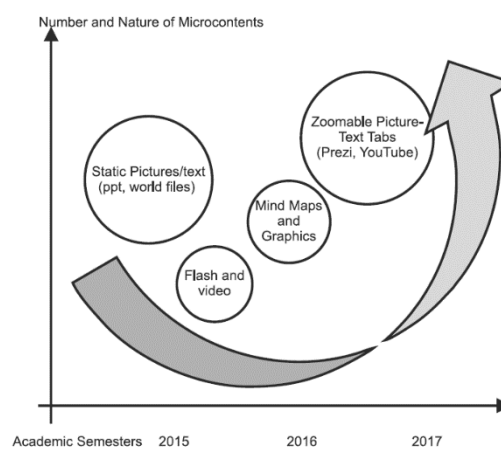


Figure 3. The new characteristics of educational informatics (source: diagram created by the author)

Figure 3 shows that the students and teachers who had become familiar with the main objectives of the model basically made static image-text type micro contents that appeared in PowerPoint slides or word files. Probably owing to the training and the new methodological knowledge, during the later semesters, dynamic image contents, too, appeared in the form of flashes and as embedded videos, mainly when YouTube educational films were used. The students, who were motivated to create microcontent by the teachers prepared within the frames of the project, joined open content development during last year. This population of students has brought about a sharp turn in genres; the number of the images and the graphs and diagrams made of them has considerably grown, which clearly indicates the advance of image structures. Finally,

it must be mentioned as the newest tendency that, mainly with engineer and economist students, learning units integrating complex image content have appeared; they bridge the dilemma of the visual presentation of micro contents, the increasing amount of information and visibility by applying presentation techniques offering zooming possibilities. Thus by increasing the sequence of the micro contents, image and text tableaux were made that took shape in a dynamic presentation of some minutes, with the help of Prezi applications. The solutions were implemented by using rich assets of images (photo, drawing or diagram) and video (mainly YouTube). Most of them were shorter than 5-10 minutes.

To sum up, we can state that a more intense use of visual elements may bring about a considerable turn in developing digital pedagogical competences; the possibility of this is clearly indicated by our experiments conducted in open content development so far, taking pedagogical-didactical aspects into account. Approaching the halftime of our project, a picture reflecting the changes of the genre of the micro contents created within the frames of the OCD model is taking shape. Between 2015 and 2017, almost 100 pieces of microcontent that could be taken as educational units were created that, regarding their visual and text elements, can be used in the methodological evaluation of education and in pointing out the main characteristics of the genre.

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## **EPICT CERTIFICATION SYLLABUS AS MEAN TO ATTEST DIGCOMPEDU COMPETENCES**

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### **Introduction**

This paper presents the EPICT Certification Syllabus (European Pedagogical ICT Licence) and its value in concretely describing the competences of the recent DigCompEdu Framework of Competences for Educators.

In November 2017 the Joint Research Center (JRC – the European Commission’s science and knowledge service committed to providing independent scientific advice and support to EU policy), delivered the final version of a framework focused on describing what it means for educators to be digitally competent. This represents an important announcement at European level because it defines the elements to consider when individual educators or training organisations start to plan professional development programs in that field.

For the past 13 years, The European Pedagogical ICT Licence (EPICT) and outside Europe (IPICT) has successfully provided a competence certification. The syllabus, having originally been developed as a result of a European eContent Project, is current and is updated annually informed by the research and professional work of the partners of the Consortium.

EPICT provides a very valuable and useful means to articulate the high level descriptions of the digital competences contained within the DigCompEdu Framework.

With this paper we intend to present the mapping of EPICT Syllabus with DigCompEdu and two case histories in order to share the results of EPICT Consortium experience in Europe.

### **The EPICT Certification**

The EPICT Certification is managed by the EPICT European Group which started as a Consortium in 2005 at the end of the European eContent project “EPICT – European Pedagogical ICT Licences”. The output of the project was the development of a Syllabus of competences for educators to describe what knowledge and skills teachers need to use digital tools to reach pedagogical goals: not an *ECDL* syllabus, but a pedagogical approach to use digital means at School.

The EPICT European project not only produced the Syllabus but it developed and rolled out both a training model and set of learning materials in English and in the languages of participant

Countries – Italy, Greece, Hungary. These learning materials were based on the original Danish version. The eContent project had the aim to “stimulate the development and use of European digital content via global networks and to promote linguistic diversity in the Information Society 2001-2005”.

The EPICT Group now consists of three partners in Europe and one outside Europe: in Italy (the Department of Informatics Bioengineering Robotics and Information Systems – DIBRIS of University of Genoa), in UK (EPICT UK), in Greece (Menon Greece), and in Sri Lanka (IPICT Lanka). We had partners in Austria, Switzerland, Malta, Albania, Australia and India where the EPICT experience has merged with national programs.

Partners who join the group receive the complete syllabus and start to participate in national and central updating of the syllabus and materials. EPICT national node is licensed from the Consortium to confer the EPICT Certification in their Countries.

The EPICT Certification is directed towards educators at all levels of education.

## **The EPICT Syllabus and Framework**

The EPICT Syllabus started from the syllabus of a training program delivered in Denmark around year 2000. At that time the *digital tools* educators might use at school were automation, office software, emails and forums and the only more interactive and dynamic type of digital tools were digital games akin to the one children might play with their *Nintendo gameboy*. At that time e-learning portals were difficult to implement at school level and were used only in some advanced training programs managed by research centres and universities.

But instead of the appearance, the EPICT project put in evidence the *pedagogical value* of that *office* and *informal tools*: the use of a word processor in class helps teachers to develop communication skills in their students; the use of spreadsheets helps teachers to develop in their students’ analytic intelligences; working together on the development of a video as well as improving communication skills, helps to develop collaboration competences; and so on.

The EPICT Syllabus defined the pedagogical goals educators may reach using ICT and thus made explicit the competences needed in order to guide students to reach them.

In the past thirteen years’ technologies in the hands of students and citizens in general, grew in number and types: 2.0 technologies, simulation technologies, coding and educational robotics, interactive whiteboards, mobile devices entered Schools and made the need for e-safety very important when using digital tools in class and outside.

## **The EPICT Framework**

In 2010 the EPICT group started work in order to organise the EPICT Syllabus into a more comprehensive framework. The work was presented at 16° International Conference on Technology Supported Learning & Training, Online Educa Berlin and was built upon the following schema: UNESCO ICT-CFT Competency Framework for Teachers, the *e-learning*

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*Competency Framework for Trainers and Teachers* developed by EifEL, the Competency Framework developed by the Institute of IT Training (IITT), now Learning & Performance Institute (LPI), the IT Trainer – Eucip (European Certification of Informatics Professionals), the Becta Self Review Framework, the Common European Framework for Teachers Professional Profile in ICT for Education, – uTeacher project, the ATC21S (Assessment and Teaching of 21<sup>st</sup> Century Skills) – Cisco Systems, Intel Corporation and Microsoft Corporation, the Digital Competence specifications draft by the Institute for Prospective Technological Studies (IPTS), – Joint Research Centre (JRC) European Commission.

The EPICT Syllabus was mapped with a description model following the guidelines provided by the Practical Guide proposed by Declan Kennedy and colleagues and the Guidelines for describing units of learning outcomes developed by Bundesministerium für Bildung und Forschung.

The result was the identification of five areas of competence and 12 competences. We broke down each competence into smaller units corresponding to the Modules of our Syllabus.

Table 1:

Macro-Area	Competence	Competence Breakdown	EPICT Modules
Pedagogical competencies	Planning for teaching & learning	Knowledge of curriculum and objectives Selection of content Selection of method Special Needs	Pedagogical Module Module 10
	Pedagogical reflection on ICT	Pedagogical reflection on ICT use in relation to subject, general pedagogical and didactic issues Continuing Professional Development	Pedagogical Module Module 9
	Teaching practice	Continuing Professional Development Classroom management Reflection and evaluation	Pedagogical Module Module 9 Module H Module 14, 16 Module A
Information competencies	Information Search and retrieval	Search and retrieval of digital resources All strategies for accessing digital information/content	Module 2, 6, 6
	Cata Capture and processing	Capture/generate data using digital tools Process data to create information	Module, A, 2, 6
	Information Processing	Analyse and organize information Evaluate and assess information Develop innovative uses of information and problem-solving strategies	Modules B – 1 - 3 – 4 – 13 - 14
Social Competencies	Information presentation	Select a suitable format for presenting information Present information on paper Present information digitally	Module C, 4
	Communication and collaboration	Communicate and collaborate in virtual environments and face-to-face using digital communication and collaboration tools	Module 15
	Safety	Protection of devices, data, health, environment as safe and responsible attitude to the use of technology	Module C, 9
Organizational competencies	School Development	Collaborate on and develop the school as a learning organization using digital tools for communication, collaboration and information exchange:	

Digital Technology Competence	Storage and Retrieval	Technical competence	The ICT tools we provide inside the EPICT e-learning platform
	Technical Problem-Solving	The ability to perform technical trouble-shooting	

Later we focused on the UNESCO ICT CFT framework and the result is a picture that put EPICT Modules along the continuum of the UNESCO framework. Teachers may express competences at different levels, depending on the type of technologies and the kind of pedagogical method they use: from Digital Literacy approach to Knowledge Creation approach passing through the Knowledge Deepening approach.

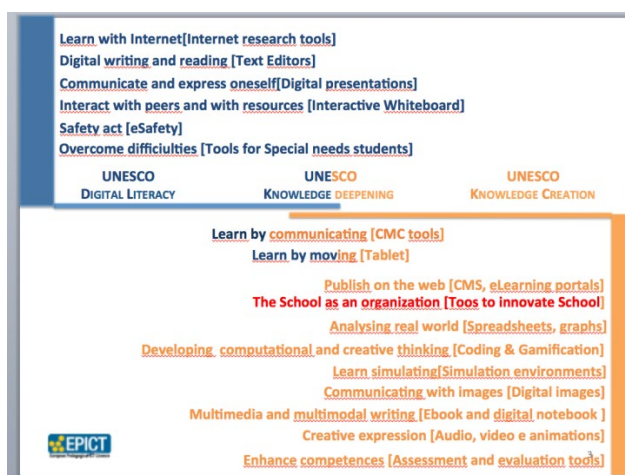


Figure 1. EPICT Modules mapped on UNESCO ICT CFT

## EPICT Certifications as a means to attest DigCompEdu Competences

The EPICT syllabus is the document that the EPICT group used to consolidate its body of knowledge. Now from December 2017 we have the final version of the official European framework of competence DigCompEdu, which describes the competences that must be held by teachers and educators. DigCompEdu is direct expression of the European Commission (which has commissioned the work at its official research centre – the JRC, Joint Research Centre), and it incorporates in a mature way the knowledge developed during years by the experiences of Digital School carried out by researchers and school practices.

DigCompEdu identifies 6 areas of competences described in 22 particular competences: it represents a high-level description of what a teacher must be able to do in order to use ICT in teaching competently.

### EPICT Modules Syllabus and DigCompEdu

EPICT Modules provide a concrete and usable tool to deeply describe the DigCompEdu high-level competences. As in previous years, we compared our Modules Syllabus with the teachers' ICT competences framework developed in the field of digital school research. We have recently subjected our syllabus to the comparison with DigCompEdu and the result confirms the validity



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of the work we have done and we continue to carry out in order to support the development of the 21<sup>st</sup> Century School.

Figure 2 presents the EPICT Modules mapped on DigCompEdu, and in our Countries, we are testing the first attempt to use EPICT Certifications as concrete tool to attest DigCompEdu competences

	PROFESSIONAL ENGAGEMENT				DIGITAL RESOURCES			TEACHING				ASSESSMENT		EMPOWERING LEARNERS			FACILITATING LEARNERS' DIGITAL COMPETENCE							
	Organizational communication	Professional collaboration	Reflective practice	Digital CDP	Selecting digital resources	Organizing, sharing and publishing DR	Creating and modifying DR	Instruction	Teacher-learner interaction	Learner collaboration	Self-directed learning	Assessment formats	Analyzing evidence	Feedback and planning	Accessibility and inclusion	Differentiation and personalization	Actively engaging learners	Information and media literacy	Digital communication and collaboration	Digital content creation	Responsible Use	Digital problem solving		
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	6.5		
[Search on the net]				X	X	X	X	X							X		X	X					X	
[Write and read digital]				X			X	X						X	X		X			X			X	
[Learning through CMC]	X	X		X		X		X	X	X	X			X	X		X		X	X			X	
[Digital assessment]			X	X				X			X	X	X	X			X						X	
[Communicate with images]				X			X	X									X			X			X	
[Analyzing the reality]				X				X									X			X			X	
[Digital Presentations]				X			X	X		X							X			X			X	
[Publish and Communicate]							X												X	X			X	
[Immersive Technologies]				X				X									X			X			X	
[Multimedia Writing]		X		X			X	X		X	X						X			X			X	
[Design school innovation]		X	X	X				X									X							
[ICT 6 Special Needs]				X				X				X			X	X	X			X			X	
[Coding & Robotics]				X				X									X			X			X	
[Audio, video and animations]				X				X									X			X			X	
[Teaching with Interactive Board]				X	X	X	X	X	X								X	X	X				X	
[eSafety: make education safe]				X	X	X	X	X	X								X	X	X			X	X	
[Teaching with mobile tools]				X	X	X	X	X	X	X							X	X	X	X			X	
[Pedagogical module]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 2. EPICT Syllabus Modules mapped on DigCompEdu

### **EPICT Certifications as means to attest DigCompEdu competences**

EPICT Certifications provide a concrete and authoritative tool to attest teachers' competences. First of all, the certification method was proven within the European EPICT Project during years 2003 – 2005 and it was approved by the audit at the end of the project activities.

EPICT Certifications are still running in Europe and in the world and the EPICT Syllabus and certification method was the starting point for new national initiatives in Countries who were partners of the EPICT Consortium.

The EPICT Consortium continues to offer sound tools to train, assess, certificate teachers' pedagogical competences in the use of ICT which have been proven and updated over 13 years.

The next section illustrates the EPICT Certification experiences in two Countries: UK and Italy.

## **Successful Case history: EPICT Certification in Italy**

In Italy from the end of the EPICT European Project, EPICT courses and EPICT Certifications are delivered from University of Genoa. Masters courses are then available to teachers who gain a Certification, which is useful to professional development. From 2013 courses based on EPICT Syllabus and with final University certification, are delivered by training institutions based in different parts of Italy.

In Italy around 2000 teachers have gained an EPICT Certification since 2005: This may seem a modest number but not if compared with the complete and long learning journey the Certification requires and the fact that professional updating was not mandatory for Italian teachers until the end of 2016.

After completing their EPICT courses, teachers may join the EPICT Teachers Association and continue informal training in the professional community.

The Italian Editorial Board that develop Italian learning materials on the basis of the EPICT Syllabus collaborates with experts who give to the pedagogical part of the modules the corresponding technical provision. This is the case with the Interactive Board didactic Module developed with the support of experts from AICA (Associazione Italiana per l'Informatica e il Calcolo automatico); the case of the Coding & Robotic Module developed with the support of Scuola di Robotica a national recognised association for educational robotics; the case of eSafety module developed and written with the collaboration of experts at Genoa local Police district.

## **Successful Case history: EPICT eSafety Certification in UK**

The EPICT Licence certification programme has been running in the UK since 2005. Over that time, many thousands of educators have completed certificates in various technology use.

The Editorial Board of the UK has worked with experts such as University Schools of Education including Manchester Metropolitan and Edge Hill along with various Associations and interest groups. A close relationship has been fostered over the years with both Central Government in London and Edinburgh and Local, Federal Government in regional areas.

The EPICT eSafety Certificate is currently the most popular course with Schools also able to build towards a School Certificate. The teachers prove their competencies by documenting actual safety work within their school thus the programme is workplace based and relevant (<http://www.epict.co.uk>)

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## THE ROLE OF PUBLIC LIBRARIES TO SUPPORT FORMAL EDUCATION USING SMART TECHNOLOGIES

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### **Abstract**

The Ministry of Education (MOE) in the United Arab Emirates (UAE) is facing a challenge to develop the 21<sup>st</sup> century skills of learners as well as knowledge in the five domain areas of Science, Technology, Engineering, Arts and Mathematics (STEAM) and high achievement of international standardised examinations such as PISA and TIMSS. The challenge could be due to time, space, monetary and probably expert limitations within schools. As such, there is a role for librarians to play to assist curriculum needs in schools and the national education agenda of the UAE. Elements of this role include immersive learning, personalised learning, community partnerships and collaborative leadership to meet educational priorities. The increasing need for the librarian to assume the role of a collaborator to support the above is becoming more apparent as noted in a few emergent studies (Greef, 2017; Hovious & van Eck, 2015). Libraries play a fundamental role in public life; they are more than just a place stacked with books that are read for recreation or by researchers who have a mission to accomplish (McMenemy, 2012). Public libraries nowadays have specialised instructional and project-focused spaces that are hubs for life-long-learning, social interactions and professional development. The shift in vision took place after the development of smart technologies that made learning through electronic devices much easier, impactful and accessible. Digital books are now available to read anytime anywhere without having to worry about the number of heavy books one should carry on the way to work or leisure. Public libraries have adopted this innovative digital wave by using smart technologies to provide electronic databases and social activities that merge fun with learning. However, the role could be extended further to work closely with schools in systemic ways that enable both entities to reach higher goals. By partnering with libraries, schools can extend the supportive educational system in terms of location and time (e.g., when schools are typically closed), which will work to empower teachers and students. There have been some spontaneous attempts in this regard by teachers themselves. However, these efforts tend to be isolated and limited in scope. A more extensive and rigorous as well as controlled system that could be shared by all stakeholders, including students, teachers and parents. Such a coordinated approach, with the ultimate goal of providing the opportunity for students to be effective knowledge-contributors, is shared in this paper with an emphasis on STREAM education (i.e. Science, Technology, Reading, Entrepreneurship, Arts and Mathematics). These are skills and competencies that are appropriate for students in the UAE. The proposed program also

emphasizes collaborative leadership skills among teachers as instructional leaders that can be capitalised upon by establishing school-library partnerships.

## **Introduction**

There is a general dissatisfaction towards the school education outcomes in the UAE that at times are considered to not meet above average international standards and UAE MOE expectations. This dissatisfaction can be addressed through innovative and collaborative projects and research. One such endeavour has been discussed among leaders of the Sharjah Public Libraries and MOE representatives in the UAE since 2017. What has emerged is a collaborative project that will capitalise of the strengths of each organization. The Sharjah Libraries have 10,000 members, which is a good record. However, the libraries face the issues of low library usage by these members, whereby only 3,000 are active members, which is defined as Members who are using library's service on regular basis. Thus, there is a gap in the mission attainment of both the schools and the libraries that could be further addressed through this collaboration. A project has been conceptualized to create innovative instructional spaces in libraries that support formal education in schools. The project is in line with the UAE's vision to focus on the 21<sup>st</sup> century skills and is flexible enough to be altered and modified for different school and community priorities, since it combines both virtual and physical spaces and will re-conceptualize libraries as supportive entities to schools. This means that there is no intent on changing the formal curriculum, school hours or other elements of formal education. The whole system is planned to be implemented as an informal after school program to further enhance the 21<sup>st</sup> century skills of learners, as well as their creative and higher thinking skills. This paper will present a conceptual framework of the project with the aim of sharing initial thoughts and plans, and to gain input on these plans. The project goals are to address the following research questions to varying degrees, with a primary focus on the first research question.

- What is a model/framework for 21<sup>st</sup> century Libraries that positions them as partners to school systems?
- What are standards/criteria for success that can be proposed for the UAE Ministry of Education to be used in collaboration with public libraries?
- What are the current levels of 21<sup>st</sup> century skills among high school students in the UAE?
- Was there a significant difference between high, mid and low ability students who used the program for the enhancement of 21<sup>st</sup> century skills when compared across the different learning environments?
- What were UAE high school students' perceptions on the use of the program in enhancing their 21<sup>st</sup> century skills?

## **Problem Statement**

Libraries can support the formal educational system in many ways. However, in the UAE there is no evidence so far of a systematic approach that can serve the mission of both types of organizations. So far, the educational system in the UAE is not achieving the stakeholders' ambitions, and the libraries are considered to be a dull place where people visit to finish certain

tasks and are unlikely to return as part a process of life-long-learning. In the Sharjah Libraries for example, there are 10,000 members registered. However, only 3,000 are active, defined as members who are using library's service on regular basis. Both schools and libraries are learning environments, and both have gaps in the attainment of their missions.

Both schools and libraries are going through transitions in terms of approach and public perception. In particular, schools are generally adopting more technological approaches with respect to instruction, and libraries are starting to be perceived increasingly as social centres in many parts of the worlds. A plan for enhancing learner opportunities could be constructed to take advantage of both of these and other positive trends. Specifically, the Sharjah Libraries propose a set of school-library interactions that can enrich students learning experiences by providing *phenomena-based* education, which is based on real-life experiences that students encounter themselves. These experiments might not be able to be implemented in schools due to many restrictions in time and/or space. Therefore, libraries can offer an after school program that is linked to the formal curriculum, yet in a fun and engaging way to ensure students' commitment.

### Literature Review

Libraries have always been the source of enlightenment in the communities they serve, as well as being much more. They can serve as parliament halls, science laboratories and social spaces for exhibitions, book clubs, wedding parties and fashion shows. However, the primary value of the library still remains in its role as a stimulating environment for knowledge reception and creation.

But how can libraries play a more effective and expanded role in knowledge sharing and creation? Combining efforts and resources with other public service organizations could be a good start. For example, "in the late 1800s and early 1900s, libraries and museums shared space, resources, and personnel" (Given & McTavish, 2010; p.7). Since that early time, the said sharing is still active, which means that both informal learning entities have successfully worked together to deliver knowledge. This informal learning could be connected further to the formal learning process (i.e. in schools) through a systematic approach, as is presented in this paper.

An advantage of establishing such a system in libraries is that as informal learning sites, they have fewer limitations than are applied in schools. A joint effort between the Association for Library Service to Children and the Public Library Association, identified five practices which are crucial to children's early literacy development. These are talking, singing, reading, writing and playing (Nespeca, 2012). Those five practices, especially playing could be imbedded in the proposed school-library collaboration through the integration of emerging technologies such as augmented reality, computer games, photogrammetry, virtual reality and others.

In conceptualizing this project, we have been employing constructivism as the base of our theoretical framework. In general terms, constructivism posits that acquiring new knowledge based on accumulating experiences and building concepts and principles based on them. Learners can also develop ideas that are more or less independent of experience by reasoning

in ways that extends beyond direct experience (i.e. abstract reasoning). Learners apply and revise their ideas on a regular basis, and it is this process that improves conceptual understanding. Constructivism has been used as a theoretical justification for active learning models, which have been demonstrated to improve learning. For example, a study of physics teachers indicated that students demonstrated improved students' performance through a 38% increase in a conceptual assessment after a shift from traditional learning to active learning model (Stone, 2012). Active learning can be implemented in a library due to the inherent flexibility of the setting, whereas at times teachers find such approaches more difficult to implement due to having to follow certain timelines and curriculum guidance. What this suggests is that, when programs are developed in coordination with schools, the library can compensate for elements of active learning that are missing in the formal-learning process. Or, it could emphasize active learning further by providing different ways of reaching the same objectives as are set as formal learning goals (i.e. those established by the MOE and UAE vision).

Libraries could be turned into learning laboratories by offering interactive, participatory, production-centred programming that incorporates the principles of what is known as connected learning (Ito et al., 2013). The features of connected learning are that it is social, equitable and participatory. This means that librarians could assist teachers in their core mission, and that students would have experiences in the library through which they would develop knowledge that serves the formal education requirement and needs. In addition, librarians can help learners in developing self-confidence and trust by listening to their feedback. Such relational attributes will upgrade the level of the learners to be advisors and designers. It is anticipated that this type of comprehensive engagement process among all parties (especially teachers, librarians and learners) will result in institutional transformation; a rethinking of the vision for libraries and new partnership opportunities for the future (Mills, Campana, & Goldsmith, 2017). Dresang, Gross, and Holt (2006) proposed a model that can also assist in the overall strategy for a library-school support partnership (as cited in Mills, Campana, & Goldsmith, 2017; p.29). This is the Outcome-Based Planning and Evaluation (OBPE) model which, among other attributes, invites librarians to “incorporate learning outcomes when designing, delivering and evaluating programs that factor in community need and relevance” (p.29). As seen in Figure 1, the OBPE process consist of 4 phases, namely gathering information; determining outcomes; developing programs and services; and conducting evaluations. It combines a number of important resources and areas of expertise. The enhancement of 21<sup>st</sup> century skills, entrepreneurship skills, and reading skills are important apart from the existing STEM skills. Thus, the proposed set of skills that can be addressed through an OBPE model will include those within what can be referred to as STREAM education (i.e. science, technology, reading, entrepreneurship, arts and mathematics) instead of the more limited STEM model.

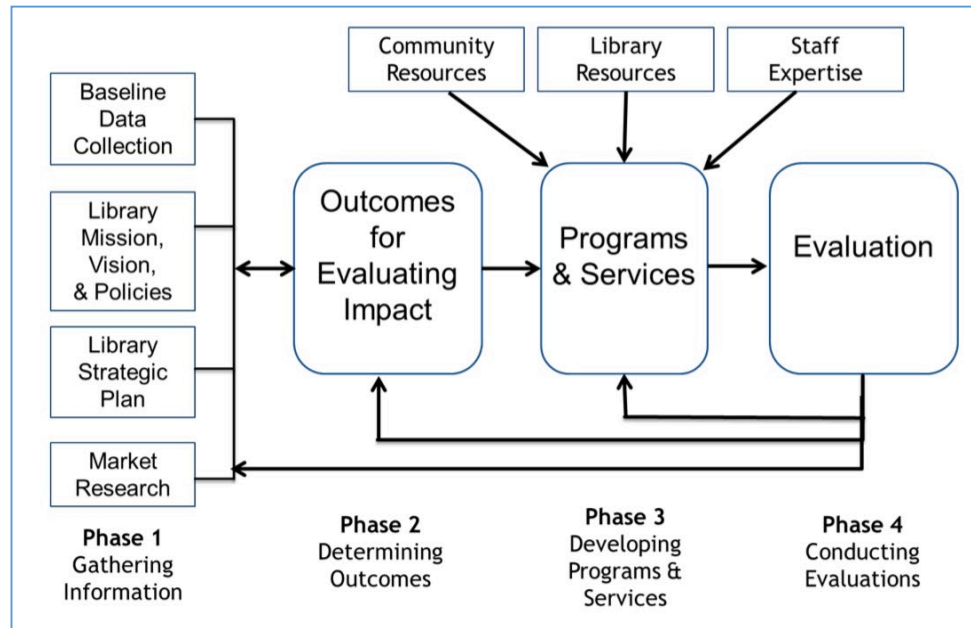


Figure 1. Outcome-Based Planning and Evaluation (OBPE) Model (Dresang, Gross, & Holt, 2006)

The radical change theory by Dresang (2008) emphasizes the creation of knowledge rather than consumption of knowledge. This is an important aspect to be considered in planning the approach for new learning systems. The aim of this theory is to understand the ever-changing behaviour of learners in the digital age. The theory was based on the digital-age principles of interactivity, connectivity and access. Radical change theory revolutionized the use of media – both print and digital – by young people through three classifications: (a) changing forms and formats, (b) changing perspectives and (c) changing boundaries. Diversity, access, collaboration and innovation are themes at the heart of this theory by referring to other research-based theories and findings into practice and pedagogy (Mills, Campana, & Goldsmith, 2017; p.29). Koh (2015) has offered a potential way that radical change theory can guide future research. Figure 2 illustrates the digital age principles, which are interactivity, connectivity and access, in a way that connects them to radical change resources and behaviours. The theory, as improved by Koh (2015), can be also be applied to explore the effectiveness of radical change resources in promoting the 21<sup>st</sup> century skills among youth who are familiar with digital technologies. Since the diagram calls for future research to explore how the interaction between changing resources and youth, it suggests that such research may have an impact on youth obtaining twenty-first century skills. The proposed system in this article will be using some of the related principles from this theory.

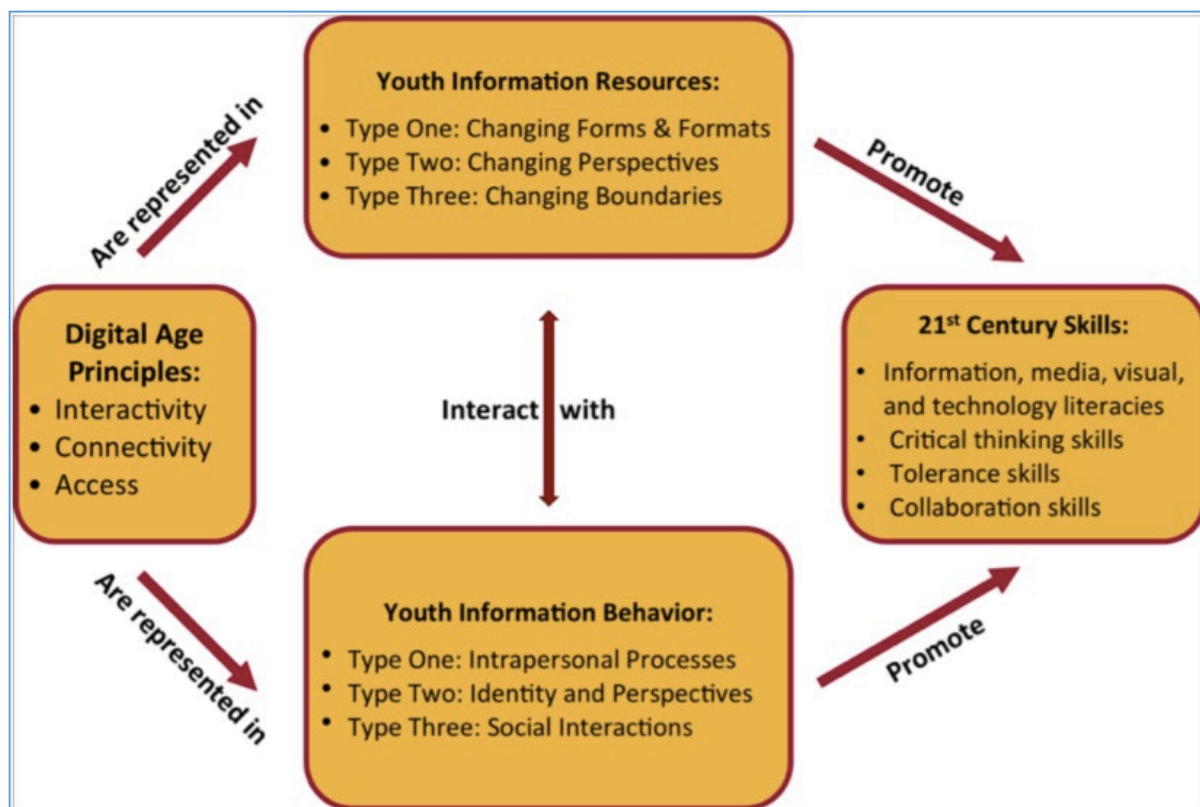


Figure 2. Radical Change Theory Improved Model (Koh, 2015)

Fullan and Stiegelbauer (1991) have proposed a theory of First and Second Order Educational Change. In this theory, the first order of change is external and incremental (systems and processes), and the second order of change is internal and transformational (beliefs). These orders of change can also be integrated with the proposed system in this paper. Brickner (1995) extends this idea to teaching innovation by proposing first-and-second-order barriers. Ertmer (1999) built upon this by elucidating barriers to technology integration practices.

While, the literature in this area indicates a need for change, it is important to consider the necessary conditions for a successful change process for both libraries and schools. For example, ideas related to change are rather pointless if there is lack of support from the educational leaders. A collaborative leadership approach from libraries and schools should be adopted to transform the way we learn and teach. Transformational leadership requires creative mentalities that can be flexible enough to adopt the change or, at least, try it. Mavrincac (2005) argues that “transformational leadership requires enthusiasm, creativity and risk-taking from individual leaders; all of which an organization must possess to achieve success in the change process” (p.394) Combining all these elements resulted in a conceptual framework represented and discussed below.

## Conceptual Framework

A conceptual framework for the project “Sa’ai Smart Library Learning Lab: Disruptive Learning” is drawn from the work done by several scholars, including Dresang (1999), Dresang, Gross, and Holt (2006), Fullan and Stiegelbauer (1991) and Ito et al. (2013). The framework is



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represented below as a what will be referred to as a *disruptive space*, which connects both the actual and virtual environments in which learners function. The disruptive space will work under conditions that include access to new digital media, participation that is driven by interest, a desire to create knowledge, collaboration between participants (e.g., librarians, teachers, and innovation leaders), partnerships between schools and libraries, willingness to engage with diverse audiences, and innovative ideas. In addition, the disruptive learning model will call for teams to willingly accept changes that evolved during their learning process. As well, the model implies that the methods for assessing learning should be in line with new assessment practices like projects, simulations, audio/video tapes, graphics and posters, presentations, etc. It is anticipated that this framework will result in the following outcomes: knowledge creation, 21<sup>st</sup> century skills, lifelong learning habits, positive beliefs and behaviours, knowledge and skills related to STREAM and a holistic personality.

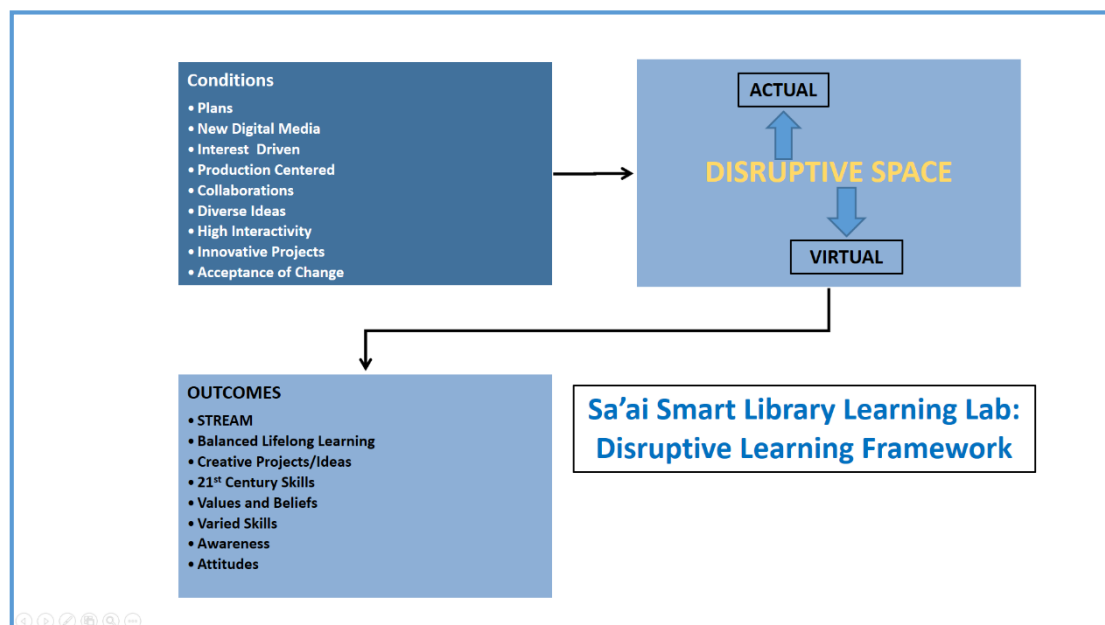


Figure 3. Sa'ai Smart Library Learning Lab: Disruptive Learning Framework

## Proposed Implementation Plan

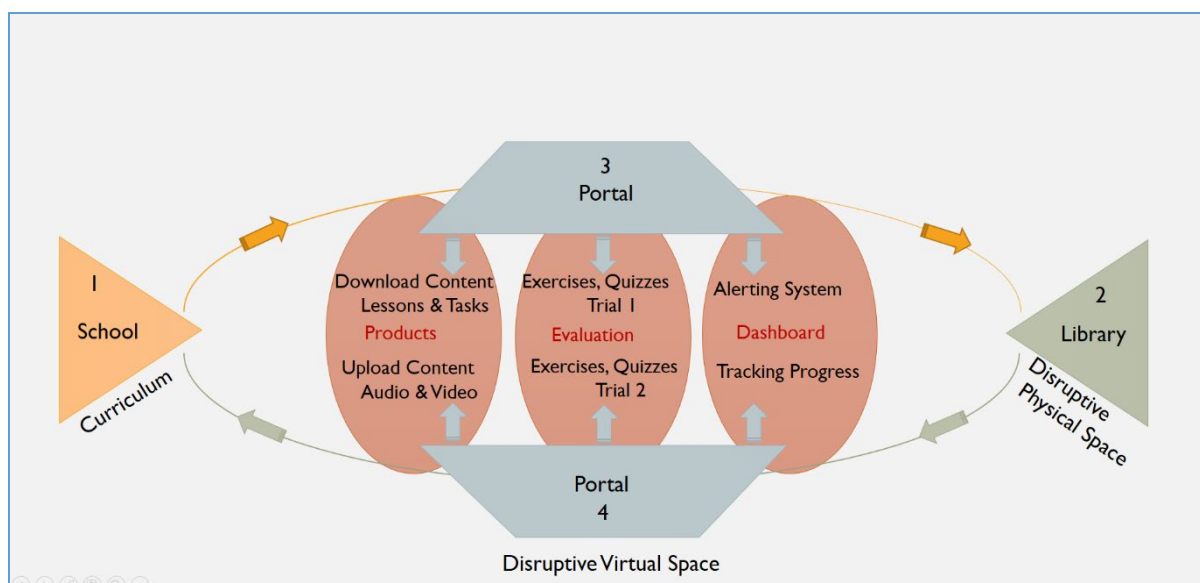


Figure 4. Sa'ai Smart Library Learning Lab: Implementation Plan

The above figure articulates how high schools and libraries could work together in a systematic way that encourages sustainable learning and bridges the gaps in both entities. Since the students get to study the curriculum at high school and there is no time nor facilities to explore learning components through more innovative spaces, libraries could fill this gap by offering two innovative spaces: virtual and physical. The virtual space is basically a digital hub and an archive of all teachers' and students' curriculum as well as other e-resources that will be useful for the transformational learning process to happen. This is the *Products section*, in which teachers can upload all the educational materials for students' references. There is also the *Evaluation section* which contains quizzes, peer feedback, scenario evaluation and so on, that are either taken before and after the library visit or suited to the needs of the evaluation/assessment process. There is also a *Dashboard*, which contains communication tools for students, parents, librarians and teachers to interact, share feedback and get notifications or alerts.

High school students (Grade 10-12) who are ready to visit the library can choose which facilities they will use to create a product. In the library environment, they can enjoy freedom regarding what to create and how to create on their own pace. They can work individually or within groups under the librarians' supervision and guidance. The innovative physical spaces in the library will include the *Creative Lab*: where students can create their audio and video works. There will also be *Interactive Workshops* that students are free to attend if they want in order to strengthen their knowledge and write a report about what they learned. There will also be a *Research Centre* that will enable students to expand on their curiosity by researching a particular area under the guidance and support of librarians. After filling certain hours and meeting projects deadlines, students will visit the virtual space again to track progress/grades and see how they can improve themselves. To self-assess their learning, they can take quizzes, by which teachers can track their before-and-after performances. Finally, and most importantly, the

students are able to be knowledge-contributors since they can upload their products and share them with their peers.

The power of this model can be summarized in the following:

- The informal involvement of teachers, parents, students and librarians is very high. This involvement will reflect on the formal education at school.
- It saves time and effort on teacher's end in terms of what else to do to make the lesson more engaging, since student will be able to practice what they have learnt with a gamification style after the school hours.
- The model is learner-centred in that it provides freedom to the learner to choose the facility and project they would like to work on based on their capabilities and pace.
- The model empowers the learner to be a knowledge-generator.
- The model is making libraries part of the learners' life-style, so when they grow up they will continue to use different facilities for life-long-learning processes.

The model is focusing on enhancing 21<sup>st</sup> century skills and improving STREAM areas through adopting smart technological tools within an innovative environment that is learner-centred.

## Conclusion

Libraries nowadays can play a bigger role than just promoting reading. They can work hand-in-hand with the schools to improve students' 21<sup>st</sup> century skills and other educational objectives. The proposed framework in this paper opens the door for a more systematic collaboration between formal and informal educational entities. The after school time could be spent at the library to finish a set of school plans under the support and supervision of librarians. It can also provide an electronic portal that offers to bridge the communication gap between students, families, teachers and librarians.

The power of the proposed model is that it prepares the students to be knowledge-generators and ambassadors of libraries that promote reading as a lifestyle. Both goals would be well-achieved if a unified vision, plan and implementation take place to create a powerful educational process that is dynamic and sustainable.

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## EFFECTIVE STRATEGIES FOR INCORPORATING OPEN EDUCATIONAL RESOURCES INTO THE CLASSROOM

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### Abstract

The purpose of this research is to identify strategies that would ensure the successful implementation of open educational resources (OERs) in the classroom. OERs are freely available content and media that can be used for teaching purposes. This reflects a transition from the classic textbook to a new educational paradigm. Often touted as a means to significantly reduce student expenses and expand the scope of knowledge beyond textbooks, anecdotal evidence indicate that the approach has had mixed results in the classroom. Based on student feedback and a faculty survey, University of Maryland University College (UMUC) graduate school students and faculty members shared their perspectives of the benefits and challenges associated with OERs. Based on these findings, a number of best practices were identified to address the major concerns related to the approach.

### Introduction

According to the William and Flora Hewlett Foundation (n.d.), OERs are:

*“... teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.”*

An OER could include textbooks, readings, simulations/games, syllabi, assessment tools such as quizzes; and anything that can be used for educational purposes.

Typically, OERs are present online via various sources. Examples of sources identified by Educause (n.d.) include:

- OER Commons;
- MIT OpenCourseWare;
- MERLOT;
- The Open Course Library;
- The Open Education Resource (OER);
- WikiEducator;
- The World Digital Library (WDL).

The Instructional Technology Council (ITC) has tracked the impact of OERs and report a 20% growth in the adoption of the concept (Lokken, 2016). Clearly, there is momentum towards the greater adoption of OERs in the classroom. Some of the primary reasons for this are as follows:

- saves cost for students;
- grants access to more quality choices;
- improves a school's reputation;
- enhances social responsibility – free education resources for all;
- ability to preview the course material before and after the course.

However, there are challenges associated with OERs. Here are a few reported by Open Washington (2017), an open educational resources network:

- Quality Assurance – lack of evidence that the amount learned from OERs are comparable to textbooks;
- Sustainability – OERs may become obsolete over time;
- Resistance to change – the transition requires a major paradigm shift and attitude change.

### ***UMUC Graduate School and Its OER Experience***

The University of Maryland University College (UMUC) specializes in educating busy professionals and offers career-relevant, affordable education that fits student life styles. It is a state university that primarily provides online classes but also onsite classes around the country and the world. A member of the University System of Maryland, UMUC is regionally accredited by the Middle States Commission on Higher Education, providing credibility and recognition to students' degrees.

The Graduate School at UMUC offers more than 55 graduate programs and specializations. These include master's degrees and specializations, doctoral degrees, and graduate certificates to help students develop professional value and open the door to career opportunities.

UMUC recognized the need to address to the increasing cost of textbooks to the students and the advantages offered by open resources by expanding the scope of knowledge beyond textbooks. As a result, an initiative was established to make the conversion from textbooks to electronic resources that are at no cost to the student. The graduate courses moved to OER by Fall 2016.

According to Hawthorne (2015), the average cost of a textbook in a UMUC study was \$93.30. For the 16,771 students in the study sample, the total cost savings was \$1.6 million. U.S. Government Accountability Office reported that in one academic year an average full time student spends about \$900 on textbooks.

There are many anecdotes from UMUC Provost Office about the cost savings that were realized:

*“Using MITOpenCourseware for one Psychology course, for example, saved every student in the course \$39.”*

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*“In one upper-level course, an e-book from Saylor.org, combined with our own tutorial on APA citation style, saved each student \$64.”*

*“Government documents in the public domain filled the need; one political science course was already using an e-book, but found a comparable (and free) government document, saving the student \$54.”*

However, the office reported some challenges including:

- Several resources needed “re-evaluation, replacement or adaptation”.
- It was difficult to find appropriate resources for certain subject areas.
- Sources sometimes changed when using it.

It is very clear that OERs offer significant economic benefits to the student, however, the cost and burden for maintaining the resources now switches from the publisher to the educational institution. Therefore, the university must somehow provide support for these new costs.

### **Context and Relevance of this Study**

The economic benefits of OERs are very clear but missing is a deep understanding of the pedagogical impact of this approach. This study examines how faculty and students see OERs towards facilitating learning. Their reflections should serve to identify issues relating to its implementation and use. Based on these issues, we can formulate potential solutions and strategies that reflect best practices to help mitigate these concerns.

### **Methods**

This study will commence with a two-pronged approach towards identifying student and faculty perceptions on the replacement of textbooks by OERs.

First, a thorough review and analysis were made of comments from past student end-of-course surveys that are related to the use of OERs.

The end-of-course surveys from the Fall 2017 semester were reviewed. (Additional reviews of the surveys from other semesters are planned and its findings will be incorporated in the conference presentation and in the final version of the paper.) The Fall 2017 sample was from 92 courses which included 176 course sections all of which were under the auspices of the Information and Technology Systems Department in UMUC’s Graduate School. The surveys covered courses on biotechnology, cloud computing, data analytics, database systems, emergency management, environmental management, homeland security management, informatics, information systems and services, information technology, software engineering, systems engineering, and telecommunications management.

Second, a survey will be conducted involving faculty members during the Spring 2018 semester to gauge their reactions on the use of OERs in lieu of textbooks. Findings will be reported during the conference presentation and in the final version of this paper.

The next step will be a review and analysis of the student and faculty perceptions gathered from the surveys. Major concerns associated with the use of OERs will be distinguished along with its benefits.

Finally, best practices and potential solutions that address the major concerns will be identified. All relevant information including the findings, best practices, potential solutions and conclusions will be documented in the final paper.

## **Preliminary Findings**

Results from the review of the Fall 2017 end-of-course surveys are as follows:

- There was a mixed reaction to the use of OERs – for some students, the readings were lauded as being instrumental towards learning while others called for a return to textbooks.
- Among those unhappy with OERs, the most common complaints were as follows (frequency in parenthesis):
  - Readings lack structure, consistency and flow. (8 comments)
  - Readings were not necessary, irrelevant, inaccurate or redundant. (8 comments)
  - Readings had broken/dead links. (6 comments)
  - Readings failed to cover the course objectives. (5 comments)
  - Readings were outdated. (4 comments)
  - Could use a supplemental recommended text. (4 comments)
  - Readings contained spelling and/or grammatical errors. (3 comments)
  - Lack of an index to reference material among the OERs. (2 comments)
  - Readings were confusing or difficult to read. (2 comments)

Preliminary recommendations derived from this study include the following:

- Provide *lecture notes* or supplemental material developed by the educational institute in order to provide a consistent thread through out a learning session, tie all of the OERs together and/or address any voids among the resources.
- Establish a continuous improvement process each semester to ensure that OER sources remain relevant, up to date, grammatically correct and all links are active.
- OER selections should closely align with meeting the course learning objectives and at the right level for the class.
- Supply a list of recommended texts in case the student is willing to pay for additional resources.
- Include an index so that students can locate pertinent topics among the OERs.

## **Preliminary Conclusions**

OERs offer strong economic benefits for the student but the educational institution now bears the responsibility for ensuring that quality resources are provided and maintained. Leadership of institutions adopting OERs needs to recognize this and provide the necessary financial support, policies and processes to ensure success in this endeavour.



Further research is needed to gauge student experience and reactions to OERs. A student survey is proposed as a future study.

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## RECOGNITION OF VALID OPEN AND ONLINE LEARNING

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### Introduction

It has been a while since recognition of prior and non-formal learning was addressed by education providers and policy makers in Europe. Quite a number of universities in Europe established instruments and procedures properly addressing strategic goals to recognize prior and non-formal learning in the form of results in formal curricula. However, this practice has been challenged by two main factors and innovations in themselves.

The first challenge, continuously changing the form and transforming traditional education is digital education and online learning. Since the advent of distance education, the question that generates the greatest concern when it comes to recognition is assessment: for example, it is difficult to be sure that the learner who completes an online assessment is the learner who enrolled, and also the possible forms of assessment are limited in online education. Validation of learner and learning results therefore continues to be questioned and researched.

The second challenge for traditional higher education, strengthened by new forms of open learning was open education itself. Questions and concerns generated were similar to online learning concerns, but often misled – instead of focusing on learning results, research questions focused on recognition of open learning itself.

### Open and Online Learning

*Open learning* is a fundamental part of the overarching topic area of open education. The word *open* is of inflationary use in today's world while *rights, access, use, transparent, and participatory* are only some of the meanings related to it. In the context of learning, particularly the meanings *use* and *access* play an essential but not the only role (Pomerantz & Peek, 2016). While there is no agreed-upon, comprehensive definition of open learning, central focus is commonly placed on the 'needs of the learner as perceived by the learner' (Coffey, 1988).

Following Fischer (2013), open learning consists of two aspects, open online courses (e.g., MOOCs, Open University, open courseware) and open educational resources (OER) (e.g., Wikipedia, TED talks, YouTube, specific OER repositories). Instead of a definition, a set of specific characteristics which are typical for open learning exists. Examples are learners accessing freely available online content, learners enrolling on free open/distance learning

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courses, learners collaborating on open knowledge-building projects, or learners sharing outcomes with one another. Thus, there is no explicit concept of open learning but the opportunity to design open learning approaches built on the principles mentioned above.

The complexity of research in open and online learning (OOL), open learning, open and online learning environments, (Hannafin et al., 1999), open and online curriculum, students' behaviour's analysis and recognition of OOL achievements and other. While there are many publications on the topics since 1986, there are still research evidences missing, especially with regards to:

Learning analytics (LA) method as metacognitive tool (Gasevic et al. 2015; Ferguson & Buckingham Shum, 2012), to understand how learners learn in today's open and networked learning environments and how learners, educators, institutions, and researchers can best support this process (Muslim, Chatti, Mughal, & Schroeder, 2017).

Assessment and recognition of OOL (Schmidt et al., 2009; Camilleri et al., 2012). Witthaus et al. (2016) analyse assessment and recognition practices in Europe and particularly MOOC-based learning pointed out the need of further research into the Member States' regulations and practices enabling the setting up of specific strategies for advancing the recognition of open education in Europe. With the mentioned possibilities open and digital badges have a potential to become an alternative credentialing system, providing visible recognition using digital symbols in public displays.

## **Validation of Open Online Learning**

### ***Measuring Learning Progress***

One of the ways to measure learning progress is through competences. Using specific digital tools which can be integrated in the learning management system (LMS) it is possible to depict competencies for learner in real-time. One of the powerful tools is Moodle LMS. From Moodle v.3.1 (2016) there is the possibility to provide a list of competencies in courses and associate them with activities. Using the Moodle competence tool the learner can monitor his/her success of competence acquisition. In the frame of a course completion, it can be measured using conditions for activities, enrolment duration, total course grade, etc. The learner can check which activities are already completed or the system can do it automatically after the set conditions are met. The learner has special information just about his/her progress in the course. Progress visualization is possible using additional extension of the Moodle LMS (for example: Completion Progress bar).

### ***Searching for learner identity solutions to facilitate recognition of learning achievements***

Taking a course on an open online learning platform has different requirements than auditorium lectures. One of the main requirements and challenges is learner identity verification. In open online learning, all teaching and learning happens online and, usually, the teacher doesn't meet learners face to face.

All institutions providing online learning courses should consider this issue and think of possible solutions for learner identification taking into account the pre-conditions established in their country. E-Citizenship program e-Government and other national solutions for digital identification of a person can be immediately applied to identify and authenticate users using mobile signature, bank account, and other tools.

There are solutions for user authentication, the most common ones use biometric parameters, such as fingerprint, face, voice recognition (Rabuzin et al., 2006). However, all these solutions require special devices to be used to verify user identity. Solutions have concerns about data security and privacy issues, as such data are very sensitive. Furthermore, this solution is valid only for the initial login process. For open online learning this solution would be too complex to achieve.

Another solution for learner identity would be continuous authentication. This solution could be used during exams or other assignments performed by the learner. Apampa et al. (2010) mentions video monitoring/recording solution via webcam. However, such solutions also require special software to make video recordings of physical work or sophisticated software that would analyse recorded video and alert the teacher if that was not the actual learner who attempted to perform the exam. Also, the learner would have to have a webcam - but recently most devices already have webcams.

A more advanced solution for learner identification is proctoring, such as remote proctoring (remoteproctor.com) which proctors the user while she is taking an exam. Such solutions are usually third-party and are commercial, meaning that the institution has to pay a sum annually or for every exam taken. In remote proctoring the learner should download a special software to be installed on his computer. The software tests the microphone, camera and computer (also, what other software is currently running), the learner must take a picture of his/her personal/student ID and should make a selfie. Then the system verifies the learner identity. Before taking an exam, the learner should move the camera around the environment in which he is performing the exam to show that there is no reading or other materials which could be used while taking exam. All exam process is being recorded and stored. The software continuously records the desktop, the additional software running and learner itself.

Freely available international solutions (open source software, etc.) are not established yet for unanimous use. Therefore, there is no single solution for each and every European country. Some learner identity methods which work in one country might not work in another. As analysis of different methods is currently in progress we have highlight the most effective methods that might be used so far:

Social networks authentication: Facebook, Google+, Twitter, LinkedIn are among the most popular social networks. Most people have at least one account in these networks. According to the rules of social networks, users should use their real names and photos. Using social networks for user authentication could be a solution to user authentication on open online learning

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platforms in case we all are meeting social network regulations continuously. But what if we do not?

Using social network authentication might work with video conferencing solutions. If the user logs in with his Facebook or other social network account, the profile picture is passed on to the learning management system (LMS). If the exam is performed in the agreed specific time via a video conferencing tool, the teacher could compare the user profile photo with the actual learner in the video conference to make sure that it is the same person.

## **Recognition of Open and Online Learning**

### ***Competence – based open and online learning***

Competence – based open and online learning – organized and may or may not be guided by a formal curriculum. This type of education may be led by a qualified teacher or by a leader with more experience. Though it doesn't result in a formal degree or diploma, non-formal education is highly enriching and builds the individual's knowledge, skills and competences. Learner's interest and motivation are driving forces behind her participation. Because of this reason, it is often considered more engaging in comparison to formal learning.

Open non-formal learning programs provide a lot more flexibility in the way content is both created and consumed. By removing the formalities educational institutions and companies are usually able to create more content quicker and deliver it to their audiences in a way that makes the most sense for professional and competence development.

### ***Recognizing intermediate achievements through digital badging***

The learning progress and achievement of the individual learner can be indicated using the (open) digital badging option of Moodle. These badges are bound to certain, well defined stages of the learning process or to the completion of the course as a whole. Digital badges can be awarded in different ways: either automatically, when the learner proved that he reached the requirements of the non-formal course, or manually, awarded by the mentor/supervisor/administrator of the course.

The automatic awarding process can be triggered either by the learner herself/himself, just by clicking to the completion box of certain building blocks of the course, or by the Moodle system once the learner has reached the pre-defined minimum score in the assignments. These options are communicated in advance in each course material.

Digital badges help to maintain the motivation of the learner to complete the course and to continue her/his learning in the relevant field of study.

### ***Matching learning offer with formal curricula***

The ReOPEN platform (<http://reopen.eu>) features respond to relevant preconditions for the recognition of non-formal open learning. Learner verification is guaranteed through the

registration process before being able to access the material, and the platform analytics allows for close learner-teacher interaction and guidance.

Another feature related to recognition of non-formal open learning is the option to receive a digital credential upon completion of the course, i.e. a digital badge. A quality framework for non-formal open curriculum is the basis for the development of the course. The material thus includes clear descriptions of the proposed learning pathway, is clearly structured into units and topics and states learning outcomes for each section.

Respectively tailored assignments allowing for robust assessment are included. The material for non-formal and open learning using the platform therefore fulfils relevant preconditions to become recognised through formal education institutions, especially when links and references to formal curricula matching the non-formal one are provided in the course description.

## **ReOPEN Solutions**

The ReOPEN – Recognition of Valid and Open Learning – project aims to create instruments to develop validated open and online learning (OOL) for recognition of non-formal learning. The project addresses recommendations stated in the EC JRC research study on “Validation of Non-formal MOOC – based Learning” (published in 2016) by establishing validated open learning practices, including learner identification and learning credentials, learning recognition forms, and establishing collaboration among institutions fostering recognition of OOL.

To recognise non-formal open learning results/achievements/outcomes, education institutions and employers need validated Open Online Learning curriculum examples and digitally smart learning environments leading to the recognition of open online learning results.

The ReOPEN project followed the OpenCred recommendations with the vision into the future: what and how smart digital learning environments / technology enhanced learning environments should be established, maintaining validated open learning practices, with a particular focus on validation of learners’ results. To enable this, the platform for learning should offer learner credentials embedded and designed in the curriculum, so that learners identification is verified, their learning path and achievements are traced and validated, and consequently approved for credentialization and certification.

During the project, the ICT platform for non-formal open learning curriculum (e.g. MOOC) development with learning validation and recognition instruments in place has been established (including learner credentials, digital badges, learning path recognition and assessment tools, see Figure 1):



Figure 1. ReOPEN ICT platform at <http://reopen.eu>

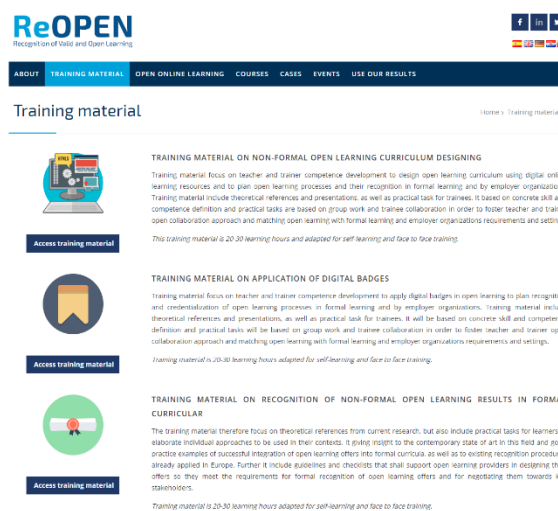


Figure 2. ReOPEN training material at <http://reopen.eu/training-material/>

Along with the three types of training material, developed to train teachers and trainers at CVET organizations, companies, HE institutions and adult learning organizations (a) to design validated non-formal open learning curriculum (e.g. MOOC or other), (b) to apply digital badges as a new form of digital credentialisation and (c) tracking one's learning path in non-formal open learning, and (d) to recognize non-formal open learning results in formal curricula, the platform became the perfect tool itself to educate education organizations, and to create new service for all society members – non-formal open learning for recognition.

The new platform allows all education providers to design non-formal open learning courses for continuous professional staff development applying learning recognition instruments for validated non-formal open learning. However, the key added value of ReOPEN solutions is the new way to establish partnership for future collaboration for non-formal open learning recognition (reviewing curriculum in partner institutions and preparing information on potential recognition of open learning).

ReOPEN is positioning itself as an example for possible solutions for the validation of open online learning results/outcomes/achievements which could be recognised in HE institutions and by companies. The REOPEN project focuses on the competency – based curriculum design, that may be the right link between HE and other training providers or employers. Non-formal open learning is also a look into the future in terms of new educational offers by HE, dividing the qualification – based curriculum into smaller units of learning, to establish formal possibilities to fulfil the societal mission of HE and to allow larger groups of learners to access HE through non-formal education. In this context, the ReOPEN project results can have a much broader impact for the development of the concept of Open Education, which is to prepare HE to provide open and non-formal education for large society groups.

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## **Recognition of Valid Open and Online Learning**

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## **OPENING-UP EDUCATION IN SOUTH-MEDITERRANEAN COUNTRIES AT THE MACRO, MESO AND MICRO LEVEL**

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### **The importance of Open Education in the Mediterranean**

Open Education has the potential to increase access and attractiveness of Higher Education (HE), fostering and democratising access to education and localising open educational services in line with the needs of local contexts (Butcher & Hoosen 2014). By using openly available teaching resources, teachers and students can collaborate on compiling course material and resources, opening up the classrooms to new forms of learning. For this to be realised, a change in attitudes towards what is meant by open education, teaching and learning is required, including new approaches towards collaboration and transparency for open education practices.

Widening participation to HE by means of adoption of Open Educational Resources (OER), is a strategic priority for the higher education sector in general and for the OER movement, and it is a matter of urgency in the South-Mediterranean. In the South-Mediterranean countries the demand of education often exceeds the capacity of the existing HE system, and therefore the use and integration of OER and Open Educational Practices (OEP) are possible ways to facilitate learners' access to the university, promoting equity, inclusion and democratisation of Higher Education. This should be done by stimulating academics to network and collaborate on course development and on ways to help students to use OER (Mossley, 2013; Hu et al., 2015).

The OpenMed project is exploring the adoption of strategies and channels that embrace the principles of openness and reusability within the context of South-Mediterranean universities. The overarching goal of OpenMed is to raise awareness and facilitate the adoption of OER in the Arab Mediterranean countries, with a particular focus on higher education in Egypt, Jordan, Morocco and Palestine. OpenMed fosters the role of universities as knowledge providers not only to their on-campus students but also beyond the walls of institutions, especially towards disadvantaged groups (e.g. low income peoples, disabled students, people living in rural areas, learners at risk of low achievement, refugees). The vision of OpenMed is that opening up education can truly change Higher Education and make it more accessible and more relevant, and that sharing information about OER initiatives can inspire others to reflect, develop their own initiatives, make connections, celebrate diversity, and work together to promote education as a public good and a basic human right.

## **Understanding the state of the art of Open Education in the Mediterranean region**

The first phase of OpenMed has involved a review of good practices in Open Education globally and in particular the South-Mediterranean region which have been brought together into a Compendium of case studies complemented by interviews with international experts in the field. A baseline survey is included in the Compendium, outlining the level of participation in Open Education within the partner institutions, to capture current practice at the time of completion (early 2016), and to identify the future goals for the participating institutions. The Compendium is openly available at <http://openmedproject.eu/results/compendium/> together with the Executive Summary in English, French, and Arabic.

International experts provided important insight into the individual case studies, and helped to shape the 22 recommendations made for the continued improvement of open education practices and resources in the South Mediterranean region. These recommendations were categorised under the following five themes: (a) Top-down and bottom-up implementation; (b) Supporting staff in using and integrating open practices and open resources; (c) Collaborative creation in communities of practice; (d) Enhancing the quality of student learning; (e) Licensing of OER content.

Starting from these recommendations, and the understanding of the long-term challenges and priorities which are necessary for opening up Higher Education in the South Mediterranean region, OpenMed has been working at three different but connected levels:

- the *macro* level, addressing policy development through multi-country dialogue with a range of stakeholders and through setting strategic actions on the basis of such dialogue, aimed at maximising the benefits of Open Education to increase the access, the quality and the equity of Higher Education in the region;
- the *meso* level, targeting university leaders through facilitating the process of development of institutional roadmaps and action plans for the implementation of open education at local and institutional levels;
- the *micro* level, working with university educators to strengthen their capacity to incorporate open educational practices into their daily teaching in order to bring learning processes and their outcomes closer to learners' needs.

### **Macro level: fostering a regional debate on Open Education**

Based on the findings and recommendations of the Compendium on Open Education in the region, OpenMed fostered a multi-stakeholder regional debate about what are the best strategies to embed openness in universities in the South Mediterranean, taking into account the specific needs and insights of the academic communities of these countries. Four OER Policy Forums have been organised in Egypt, Jordan, Morocco and Palestine, during the period November 2016 – April 2017 (OpenMed, 2016), gathering higher education managers, decision-makers, educators and other members of staff (e.g. university librarians, technical IT staff) from universities in the region as well as policy makers. The debate revolved around the

OpenMed OER Regional Agenda for the South-Mediterranean, a set of strategic actions aimed at maximising the benefits of OER and OEP to increase the access, the quality and the equity of Higher Education in the region.

The OER Regional Agenda aims to: (a) Suggest mechanisms for enhancing students access to Higher Education (HE); (b) Suggest mechanisms to promote improvement of quality of teaching and learning practices; (c) Support participant universities to widen participation in Open Education; (d) Create awareness on the benefits of OER use, reuse and remix for university course development; (e) Support the collaboration among universities on issues related to Open Education.

The overarching vision behind the OER Regional Agenda, which is shared by all OpenMed project partners, is that “Opening up education and sharing academic content may lead to improved networking, collaboration and integration of HE systems, through comprehensive development and creation of a relevant interrelated platforms of content within and outside HE Institutions. Further, the adoption of OER and OEP aims to guarantee a higher accessibility to HE and to diversify the channels and means to learn and update the knowledge of learners. In summary, Open Education can truly change HE and make it better, more accessible and relevant - all features befitting a global knowledge-sharing society.”

In order to reach this vision, a number of areas of action have been identified, and for each of these a set of recommendations for action are proposed, as follows: Open Content & Licenses, Open Pedagogy & Practice, Technology, Governance & business models, Collaborative models between institutions.

At this level, the project has contributed to the setup of a multi-stakeholder platform in Morocco, which culminated with the “Open Education for Morocco declaration” (OpenMed, 2017), a rather unique initiative to foster OER and Open Education adoption at a system level in the country, that will hopefully ensure that the learning experience of the project can be transferred in a sustainable perspective to the Moroccan Educational Authorities at governmental level, and other dignitaries such as rectors and deans. The declaration has been published as a petition, requesting international endorsement from the Open Education global community.

### **Meso level: institutional responsibilities towards setting Open Education universities’ roadmaps**

Higher Education institutions willing to start or strengthen their OER provision are indeed faced with the need to lead profound changes in organisational frameworks, models and procedures, and a framework such as the Regional Agenda is most valuable in facilitating and driving forward the process. The OER Regional Agenda served in fact as a blueprint for universities in the South-Mediterranean to build-up their own Open Education strategies: through a process where universities selected the areas of the Agenda where they intend to focus, both adaptation to the context and general coherence have been guaranteed. This is because understanding and adapting to the cultural context of educational institutions within a

country is important to consider in the successful mainstreaming of OEP (Mishra, 2017; Leidner & Kayworth, 2006).

Implementing an Open Education roadmap is a long-term exercise that will go beyond the OpenMed project, but will most probably represent the strongest legacy of the project within its partner institutions. To facilitate the implementation of the institutional roadmaps, the project has equipped physical centres, called “Innovation Centers for Open Education”, at the premises of each of the eight partner universities in Egypt, Morocco, Palestine and Jordan. These centres are intended to be open and collaborative physical spaces, where computer, video cameras and other tools and technologies are available for experimentation. The centres support learning innovation, blended teaching practices, and faculty members who are in search of better ways to design and deliver their teaching.

As the changes brought forward by the roadmaps take effect and transform the culture of the involved universities, it is anticipated that the longstanding effects will also be perceived by staff members, department services (ICT department, quality assurance services, student services, etc.), students and the wider community.

### **Micro level: building educators’ capacity on Open Education**

In order to tackle the micro level (the educators), OpenMed has designed and delivered a ‘training of trainers’ course targeted to educators from across the universities in the region, in order to support them in implementing their institutional roadmaps and in opening up their teaching practices. The course, entitled “Open Education: fundamentals and approaches: A learning journey opening up teaching in higher education”, aims to build capacity in OER and Open Education approaches across universities from the South Mediterranean. The course is running its pilot phase from September 2017 to March 2018, targeting 70 academics from HE Institutions in the South Mediterranean. The course modules have been created by the OpenMed partner institutions, and revised through an open platform launched to gather feedback from the wider open education community.

The OpenMed course takes a very practical approach towards Open Education, with the idea that, after having taken the course, learners shall be able to use OER and implement open teaching practices in their daily teaching work. Further, the course takes a strong contextualisation approach, starting from the perspective that a lot of resources and courseware of good quality exist – mostly in English – that could be tailored and adapted to the needs of the learning communities of the Mediterranean region, increasing the effectiveness of content production through economies of scale of content contextualisation. In addition, OER produced by the South Mediterranean partners, to share local scholarship more globally, and in Arabic, is also part of this practical action.

In terms of learning outcomes, on successful completion of the course, learners will be able to: (a) Understand the potential advantages of adopting OER and open education approaches in different contexts, (b) Understand how content released under different kinds of open licences can be reused and apply open licenses to their content, (c) Search for, reuse and remix OER, (d)

Understand what MOOCs are and how to produce MOOCs, (e) Adapt OER and MOOCs to their specific context and (f) Incorporate open educational practices into their daily teaching.

The course takes an active learning approach, composed of three phases, whereby online learning is complemented through a number of activities and by an intense hands-on project work.

### **Phase 1**

The course started with an intense face-to-face moment, gathering the learners participating in the course and aiming at creating a learning community and at starting up the learning activities. The face to face training took place at Politecnico di Torino (Italy) on September 25-29, 2017. The face-to-face moment represented the first phase of the OpenMed course, and gathered all the learners participating in the pilot phase of the course

### **Phase 2**

Learners go through an online learning phase, during which they are expected to take the course modules and to complete the activities proposed. This phase is run through Local Learning Circles, meaning groups of learners who meet face to face to collaboratively run the online course and activities. Each Learning Circle is coordinated by a team of Local Facilitators, who are in charge of organising meetings, supporting learners, assessing activities, and reporting back to the community. In terms of content, the training programme covers the following themes: Introducing Openness in Education, Open Licensing and Copyright, Creating and reusing OER, Localising OER and MOOCs and Open Educational Practices.

### **Phase 3**

Following the online learning experience, learners are expected to apply the skills they have acquired to develop a *project work* aiming at opening up their teaching. The project work is fully integrated with the online phase and builds upon the steps that are taken at the end of each module.

The capacity building course has been running as a pilot from September 2017 to February 2018, involving +70 university teachers from across the partner universities. Following this pilot phase, which is being formally researched, the course will be revised, based on the feedback received by learners and facilitators. Further, the data gathered through the pilot, will be made openly available, both in the present structure (where universities will have to activate the course by setting up a learning circle and enrolling a number of professors) and in a self-learning mode, to allow independent learning by interested educators.

## **Conclusions**

Open Education offers the potential to increase transparency, equity, democracy and participation. Widening participation and building capacity in Open Education in the South-Mediterranean can lead to a stronger integration of HE systems through interrelated platforms

offering OER content within or outside the institution, diversifying the channels and means to learn.

As discussed in this paper, for this to happen, change must be envisaged at three levels. First, at the macro or political level, where opening up education should be situated as an important priority and should be implemented with measures that involve as many stakeholders as possible. The Open Education Declaration in Morocco is a good example of this dynamic, as well as an important achievement of OpenMed. Second, at the *meso*, or institutional level, where incentives should be put in place, and barriers removed, for educators to be able to implement Open Educational Practices for the benefits of their actual and prospective students. And third, at the micro level of the individual educator, since they are the ones that have the power to drive the change by adapting the way they teach, and at the same time by advocating for open education initiatives to be launched or maintained. If universities really want to increase opportunities for access to education, it is essential that the three levels all interact in a virtuous circle, where policy should provide the vision, universities should adapt policy to their local context, and where educators should make it happen at the grassroots level. For this to happen, knowledge must be shared and spread, teachers should be encouraged to network and collaborate on course development, and institutions should be discouraged from fragmentation.

Favouring a bottom-up as well as top-down approach and by including the level of university governance, OpenMed has proved that it is possible to better integrate Mediterranean university systems into global academic and scientific cooperation network, which is an essential factor in the integration of Mediterranean communities and economies.

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## THE DIGITAL AND NETWORK SOCIETY NEEDS FOR OPEN ONLINE LEARNING

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### Extended abstract for presentation

Educational reformers, innovators and researchers suggest that the appearance of digital technologies will radically transform what people learn, how they learn, and where they learn, yet there are existing disagreements on the speed and scope of this change. However, looking for answers to these questions, it is important to identify factors in society which drive the need for a changed role of learning, and analyse the role of open and online learning. The common practice is to identify the learning needs related to already existing services, relating them to formal (Bates, 2015; Krumsvik, 2009), non-formal (Quesada-Pineda et al., 2011) or informal learning (Conole, 2017; Morrison, 2015). Networks and digital technologies have become the main characteristics of our society and take an important role in the society transforming it into global economies and shaping educational systems, organizations and ways that people learn (Ehlers, 2013). In a learning society (Jarvis, 2007), learning plays an important role to mitigate risks of individuals to prosper, participate and unfold in their lives, e.g. in the labour market (Beck, 1986). At the same time, access to learning opportunities seems to diversify through digital technology. The aim of this presentation is to discuss and present theoretical findings on the needs of digital and network society for open and online learning. The presentation will present the results of theoretical research and empirical (quantitative) research implemented among Lithuanian digital and networked society to clarify their needs for open and online learning.

Different studies investigated membership, participation, knowledge building (Chunngam et al., 2014), experiences of online learners, perceptions of online adult learners' interaction with the instructor, content, and the other learners (Kuo & Belland, 2016), or support for adult learners (Leping & Wenzhen, 2012). Findings of these research publications suggest that open online learning taking place outside educational institutions is important for informal learning and makes it easier for individuals to build and share knowledge, because it disregards physical distance and makes it easier to share interests.

Open online learning can promote learner agency and autonomy (Suzuki, 2013), gives them an opportunity to balance different commitments (Zhang & Cheng, 2012), can facilitate the exchange of ideas and practices among people of different cultural backgrounds

(Koutsoupidou, 2014), highlights blended learning approach and online learner-learner interaction (Cocquyt et al., 2017).

With the progress in mobile technologies, rapid increase of mobile devices and mobile applications, mobile learning has gained interest among educators and learning material developers (Hsu et al., 2014) to examine acceptance, incidence, and use of digital mobile devices (Sevillano-García & Vázquez-Cano, 2015).

Application of adult learning principles may strengthen personal and professional development when organizing online learning. Learning experiences in open online learning of adults in general seems to be positive in most cases (Byington & Tannock, 2011; Reynolds, 2016) which is a clear direction for online course designers to create visual, multimedia, and social learning environments for digitally oriented adult learners and incorporate inquiry-based and experiential learning in the curriculum (Walter, 2013) also providing slower paced learning experiences that involve time for reflection.

The discussions about the meaning of open online learning and how it should be organized responding to the main needs of adult learners continue. However, researchers indicate that people (or employees, in general) are very positive about their experiences of using online learning and are more likely to use open online learning in the future. Employees are highly interested in receiving continuous professional training in online format, and open online learning is considered to have the added value of promoting lifelong learning for different groups of society. Even older adults tend to satisfy their learning needs on health and wellness, leisure interests using informal and self-directed open online learning experiences. It is suggested that greater emphasis should be placed on understanding sub-groups who may have different skills and knowledge than their own generation because of their past experiences and attitudes towards technologies.

Members of society, particularly adults, are diverse learners in their nature, needs, and preferences. Comparison and combination of digitally orientated adult learner needs for particular learning style, time, place and pace of learning with online delivery system give clear directions for online course designers how to create and organize courses according to society needs. Visual, multimedia, social learning environments with incorporated inquiry-based and experiential learning in the curriculum are essential to fulfil the needs of learners during open online learning.

The theoretical considerations of this paper will be complemented by empirical data in the further stages of a four year long scientific research project “Open Online Learning for Digital and Networked Society” (3.3-LMT-K-712-01-0189) funded by the ESF and Lithuanian Research Council under High Level R&D grant.

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## **A DIGITAL LEARNING ECOLOGIES CONCEPTUAL FRAMEWORK IN THE MICROSYSTEM OF ONLINE HIGHER EDUCATION**

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### **Summary**

The field of online and distance learning (ODL) has expanded exponentially in the networked society becoming part of mainstream higher education practices and a catalyst for both reform and educational transformation, ushering in new pedagogical models of open and distance learning through the affordances of networked information and communication technology. The guiding research problem recognizes an urgent need to think more holistically and critically about online learning across a variety of contexts, and deliberately consider the interconnections between institutionalized learning and the informal, incidental and tacit learning that happens in contexts outside of formal environments.

This paper presents a conceptual framework that contributes to the literature base on student experiences of learning in online higher education, seeking to broaden understanding of ecological approaches and student experiences of online learning. A digital learning ecologies conceptual framework is introduced as an organizational scheme, extending from Brofenbrenner's (1979) ecosocial system model, that can be used as a guiding heuristic and analytical model for researching and conceptualizing student learning in virtual contexts across a continuum of learning formality. It presents conceptual findings useful in examining the role of emerging digital learning ecologies in online higher education, analysing the individual microsystem dimensions of students in relation to their digital learning ecologies that offer opportunities for learning.

### **Introduction & Research Context**

At the beginning of the 21<sup>st</sup> century, far-reaching technological, social and pedagogical shifts have taken place in higher education (HE), accelerated by the adoption of new media and digital technologies across all sectors of society. More fundamentally, as higher education has had to prepare for the transformation toward the digital university (Siemens et al. 2016), so to have students had to navigate increasingly digital, collaborative and globally networked learning scenarios. The objective of the current study, therefore, is to analyse the contribution and potential of the digital learning ecologies of online graduate students in order to provide recommendations and guiding heuristics for improving pedagogical practice in online HE. The context for the current study, accordingly, is the microsystem of student learning rooted in an ecological model in online higher education, influenced by the work of Brofenbrenner (1979;

1994). The purpose of the research is to examine student's experience of online learning using a Digital Learning Ecologies analytical framework, understanding how learners approach and conceive of learning across a continuum of learning formality.

In this context, several notable authors (Guitert et al, 2015; Castells, 2009) agree on the fundamental role that the university plays as an institution in the network society. Consequently, the context of innovation in online higher education responds to the changing requirements for learning in a globally networked society that sees education, training and learning as lifelong and lifewide processes (Jackson, 2016; Ito et al., 2013). In this context, new teaching and learning frameworks, as various authors (Guitert et al., 2015; Harasim, 2000) have argued, should be founded in flexibility, interactivity and networked collaborative learning.

Emerging digital pedagogies have offered the possibilities of facilitating novel and innovative teaching methodologies that foster the opportunities of digital technology including active and collaborative knowledge construction, collective intelligence, ubiquitous interactivity, and multimodal representations (Cope & Kalantzis, 2017), however there remains an unresolved debate about how ICT should be applied and used in supporting pedagogy and learning. There appears to be a tension between traditional transmission approaches to ICT and learning, with newer conceptualizations that promote a radically different vision of pedagogy based on digital age holistic approaches focused on competencies and literacies (Livingstone, 2012; Cope & Kalantzis, 2017) as well as lifelong and lifewide learning. It is clear that we will continue to see new modes of learning and advances in technology pushing the boundaries of online higher education into the future, particularly as research of communication, interaction, and collaboration continue to dominate the micro-level research agenda in online higher education.

## **Theoretical Framework**

### ***Learning in the Digital Age***

Important developments in the sciences of learning, particularly in the last 30 years, offer evidence based principles for how people learn, grounded in cognitive and constructivist theories and a learner-centred approach. For example, Bransford et al. (1999) offer compelling empirical evidence that the most effective learning environments are framed within four overlapping dimensions, arguing that successful learning is community-centred, knowledge-centred, learner-centred, and assessment-centred. Consequently, authors such as Anderson (2004) have incorporated these overlapping dimensions into robust and impactful theories of online learning, contributing to the re-conceptualization of learning from new perspectives to include emerging understandings of how, where, when, why and with who individuals learn mediated through digital technology. Many argue this process can begin through ecological or holistic approaches with a focus on life-long and lifewide learning that recognizes the interactive nature of learning across a continuum of contexts, relationships, activities and intentions (Jackson, 2016; Ito et al. 2013).

There is, however, an abundance of evidence in the literature that the conversation about learning is changing and important, new questions are emerging that aim to offer solutions to

the educational problem of how to serve the needs of both individual learners and society today (Cope & Kalantzis, 2017). Dron and Anderson (2014) argue that the university in the digital age should be built on the learning affordances of Web 2.0, social software and emerging technologies founded on social interaction, connectivity, social knowledge construction and collaboration. Similarly, Becker et al. (2017) argue that advancing innovative pedagogical approaches requires cultural transformations focused on student-centred models as well as integrating digitally-mediated formal and informal learning as the essential constituent of higher education. Consequently, the convergence of the modern university, the social Web 2.0, digital media and participatory culture is redefining higher education in the digital age toward student-centred models that focus on collaborative, active and deeper learning approaches.

### ***Lifelong and Lifewide Learning***

The concept of lifelong learning has an essential position in redefining the critical skills and abilities needed for citizens and learners today. A broad view of the core characteristics of lifelong learning include; open and universal access to learning opportunities for citizens; an acknowledgement of learning in a variety of settings beyond institutionalized formal education; learning throughout the lifespan; a diversity of approaches to teaching and learning; and a shift from teacher-centred to student-centred learning (Kehm, 2015). Lifewide learning is an allied concept to lifelong learning, although less commonly found in educational discourse and less commonly applied within educational institutions. Jackson (2016; p.4) defines lifewide learning as “all learning and personal development that emerges through activities in the multiple contexts and situations we inhabit contemporaneously at any point in our life”. The attributes of formal and informal learning are particularly important for a lifewide perspective, however many have noted (Sefton-Green, 2012; Malcolm et al., 2003) that there is a lack of agreement in the literature about what informal, non-formal and formal learning are, as well as what the boundaries between them might be. Malcolm et al. (2003) examined a range of learning contexts in a compelling literature review and concluded that attributes of formality and informality were present in all circumstances of learning and offer what they call a continuum of learning formality, which will be used in the current framework of this study.

### ***A Learning Ecologies Conceptual Framework***

In recent years, a growing yet diffuse literature on “learning ecologies” has emerged (Brown, 2000; Barron, 2006; Jackson, 2016) with an interest in the possibilities of new technologies in facilitating self-sustaining, interest-driven, boundary crossing, as well as lifelong and lifewide learning. Despite the contributions of various researchers, a learning ecologies framework is not yet a standardized or stable concept in the literature. Learning ecologies have been studied from a variety of perspectives, however most approaches seek to develop sociocultural and situated approaches to human learning and development that originated in the work of Vygotsky (1978) and in the ecology of human development from Bronfenbrenner, (1979; 1994). Bronfenbrenner’s ecosystem view on learning and development offers a conceptual system that can assist in guiding research design and data collection, laying the analytical groundwork allowing for the construction of a Digital Learning Ecologies conceptual framework. This perspective emphasizes the interacting role of culture, social interactions, practices and

resources in individual learning and development mediated through tools and technology (Barron, 2006; Sefton-Green, 2013; Ito et al., 2013). Derivative sociocultural theories such as communities of practice (Wenger, 1998) and situated learning (Lave & Wenger, 1991) as well as emerging theories such as connectivism (Siemens, 2005) have all been linked to the conceptualization of learning ecologies.

Barron (2006) defines a learning ecology “as the set of contexts found in physical or virtual spaces that provide opportunities for learning. Each context is comprised of a unique configuration of activities, material resources, relationships, and the interactions that emerge from them” (2006; p.195). Formal education, however, often overlooks new contexts and spaces of ubiquitous educational interaction (Buckingham, 2007) that is now generated through virtual environments that support expansive learning networks and communities, where knowledge is exchanged and co-constructed through digital technology in both virtual and face-to-face contexts. At the same time, formal curriculum boundaries disappear and become blurred (Cope & Kalantzis, 2010), presenting a series of both challenges and opportunities for higher education in the digital age.

## **Research Methodology**

In the first phase of a constructivist, exploratory qualitative study, a literature review has been conducted in order to construct an organizational scheme and guiding heuristic of the digital learning ecologies of online higher education students. As Brofenbrenner (1979; p.41) proposes, ecological research on learning must recognize that “the properties of the person and of the environment, the structure of environmental settings, and the processes taking place within and between them must be viewed as interdependent and analyzed in systems terms”. Correspondingly, the methodology followed for the first phase of the research involves building interrelationships between conceptual frameworks appropriate for examining student learning in online higher education, and will be used as a guiding heuristic for the design of research instruments as well as data collection and analysis.

## **Research Findings**

Using an ecological metaphor for learning involves viewing society “in terms of whole systems that contain many interacting components” (Jackson, 2016; p.33). Although Brofenbrenner’s ecological approach has been influential in human and family development studies, it has only been marginally used in higher education, and less so in online higher education. Brofenbrenner’s ecological paradigm for interpreting human learning continues to be valuable and, particularly in the digital age, can advance conceptual frameworks for researching and constructing new knowledge about learning across the physical and virtual, as well as the formal and informal environments of online higher education. Brofenbrenner’s conceptual framework provides an integrated and nested way to see learning through an ecological lens, from the configuration of activities, relationships and resources that interact to offer opportunities for learning in virtual contexts. It also offers the opportunity to fuse Brofenbrenner’s conceptual thinking with advances in the learning and pedagogical sciences, and in particular, with sociocultural orientations on learning.



### ***Ecosocial Systems in Online Higher Education***

Specifically, two levels of Bronfenbrenner's ecosocial systems model are critical for a digital learning ecologies framework (see Figure 1), namely the microsystem and mesosystem (Jackson, 2016). The microsystem is understood as the level of lifewide learning experiences and activities that include the immediate environments of home, work, school and community life, in essence the everyday situations in the world. The microsystem is the level we engage and interact with in everyday situations and experiences and in which we respond to these situations with our capability and competencies. The microsystem is the direct level of our digital learning ecology, that encompasses the configuration of activities, interpersonal and networked relationships as well as digital resources that offer opportunities for learning. The mesosystem encompasses the interrelations between two or more systems, representing lifewide experiences across a variety of contexts and settings, including the influence of mass media and the broader digital culture. The influence of the mesosystem on the microsystem is particularly important, as activities, relationships and resources at this level can support and amplify opportunities for learning and engagement, particularly through informal processes.

The Chronosystem encompasses change and consistency over time both in the ecosocial systems of the networked individual (including variables such as age, health, education or labour position, motivation, physical access to networked devices, digital competencies and digital usages), as well as in the virtual contexts in which learners interact, communicate, participate and collaborate (e.g. advances in technology, innovations and capacities of the Internet, artificial intelligence, software design, A.I., and connectivity etc.). The technosocial subsystem, where learners and technology merge to work as heterogeneous but functional wholes, is critically relevant in this framework, as the transformative technological advances in society offer valuable learning resources, unthinkable to learners just one generation ago. Examples of the technosocial subsystem are highlighted in Figure 1.

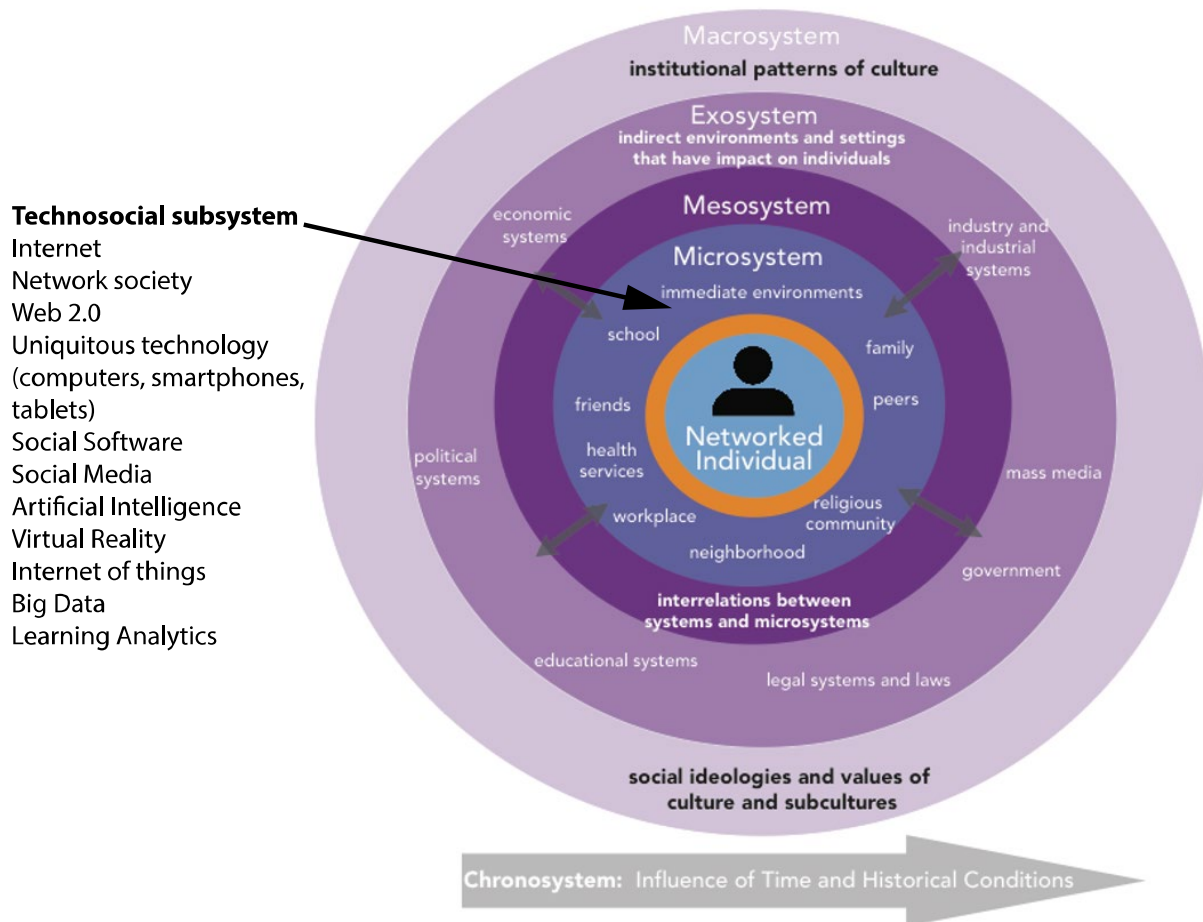


Figure 1. Ecosocial Systems Model (adapted from Bronfenbrenner (1979))

**A Digital Learning Ecologies Conceptual Framework**

Bronfenbrenner’s ecosocial systems model can be extended to the context of online higher education, interrelating with an individual’s digital learning ecology that is in constant change, adaptation and in search of an ecological balance (Ellis et al., 2013). An individual’s digital learning ecology, correspondingly, operates within the ecosocial systems (micro, meso, etc.) that an individual inhabits. In this context, all learning will be both online and situated in ever-shifting contexts. Equally important is that attributes of formality and informality will likewise be present in all circumstances of learning across a continuum of learning formality (Malcolm et al., 2003). Informal learning will occur in institutional spaces, and formal learning may take place in informal spaces such as cafes or bars. Thus, situated physical and virtual contexts are the de facto scenarios for all learning.

To advance our understanding of learning in the digital age, we need conceptual frameworks and organizing schemes that can not only advance theory but also guide data collection for empirical research in fields such as online learning. A digital learning ecology, therefore, is defined as the set of situated and ever-shifting physical and virtual contexts that provide opportunities for learning, mediated through digital technology. In a digital learning ecology, learning emerges through the interactions between an individual’s interpersonal and networked

relationships, the activities they engage in, and the digital resources they seek out or those that are introduced by a teacher, peer or knowledgeable other.

The digital age requires an organizational scheme to make sense of the myriad forms of networked social relations that are present in digital culture. A digital learning ecologies framework can use two broad categories of social relations, namely *interpersonal* and *networked* relationships across both academic and non-academic settings. This dimension includes a range of relationships encompassing individual, peer or dyadic relations, as well as group and network relations, where many of these social forms may include common learning scenarios such as communities of practice and virtual communities of interest or affinity groups.

A learner activity is often a combination of both physical and mental activity performed with mediating tools and resources in a situated environment. In online HE, the learning activity is central to student achievement and significantly impacts student learning outcomes. As Ellis and Goodyear (2013; p.120) argue, “the learner’s mental activity is the thing that changes what they know: any changes in competence or understanding are dependent on what the learner does”. Learning activities are therefore the essence of any pedagogical design in formal education. Thoughtful activity design, planning and development often determine the success or failure of any learning initiative or process. It is the interconnectedness of learner activity across formal and informal virtual contexts that is essential in building self-sustaining, interest-driven and meaningful learning.

In an ecological sense, resources “are anything that is of value to the organism and the sustainability of the ecosystem” (Jackson, 2016; p.49). In the context of higher education, resources are the material objects, expertise, knowledge or tools that are sought out by the learner or introduced by an instructor that support learning. In relation to the social nature of learning, especially underpinned by the theoretical framework of socio-constructivism, the dimension of digital resources will focus on mediating digital tools that include social software and Web 2.0 technologies as well as digital resources, that focus on digital content.

### **Conclusion**

The objective of defining a digital learning ecology conceptual framework has been to create an organizing scheme that will support future lines of research and data collection in the field of online learning using an ecological approach. This conceptual framework will be used in further case-study research to analyse the attributes of learning offered by the various components that configure the digital learning ecology of online HE students. This guiding heuristic will be used to analyse the strategies students use to connect the different components of their learning ecology across a continuum of learning formality. More fundamentally, a digital learning ecology conceptual framework will be used to support the identification and analysis of student experiences and conceptions of online learning in relation to student development as lifelong and lifewide learners. The objective of using such a framework is to analyse the contribution and potential of the digital learning ecologies of online university students in order to provide recommendations for improving pedagogical practice in online HE.

As the majority of all learning in present and future settings will be both online and situated in ever-shifting physical and virtual contexts, it is the argument of this research that an ecological perspective in online higher education, represented through a digital learning ecologies conceptual framework, will prepare students for the demands of a complex, dynamic and interconnected global society. Finally, supporting sustainable, lifelong and self-directed learning in online HE demands an ecological approach that can respond to the complex interrelations between student learning across a continuum of learning formality in self-organizing, adaptive and open digital systems, presenting implications for the holistic design and delivery of online higher education.

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## **CHANGING LIFELONG LEARNING PARADIGM AND THE DIGITAL LEARNING AGE**

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### **The structural and system-level determinants of the European institutional strategy and practice of lifelong learning (LLL) in higher education**

Knowledge production and innovation are important drives of economic growth in the 21<sup>st</sup> century. Higher education forms its role along new conceptional and operative standards in order to meet challenges. Fundamental, ongoing and embedded commitments are taking social responsibility, the improvement of quality, enhancing performance and providing “best value”.

There are growing social expectations towards higher education and scholarly work. Political and social support for universities, crucially relying on public funding and tuition fees, may be maintained on the basis of assessability of their performance through the improvement of quality. In this process, the provision of learning opportunities for age groups no longer belonging to that of university students (adults) is gaining importance.

*Social integration* and *system integration* are parts of the institutionalisation of lifelong learning. It is necessary to accumulate and reproduce the social capital of learning and achieve cooperation in both the range of service providers and the network of the programmes. This is promoted by partnerships, mutual learning, tutoring, assessment, the mediation of knowledge and information, and communication, marketing and PR, peer, team and networking activities as strengthening new forms of operation.

On the social level, it is desirable that the lifelong learning paradigm becomes integral part of human resource development and gains strategic importance in the economy, overcoming the barriers of rhetorics. Generally, universities make efforts to implement lifelong learning but support of state control is also necessary for this.

In the institutions, the primary task is the clarification of regulatory frameworks and shift from the periphery to the centre through enhancing the LLL knowledge of leaders and convincing management. This is how lifelong learning may be realistically embedded in institutional strategies.

## **Changing Lifelong Learning Paradigm and the Digital Learning Age**

*Aniko Kalman*

Due to globalisation and the rapid change of the operational environment, community culture, ways of thinking responsive network economy, as well as cooperation processes and devices have become important success factors.

The starting point is the breaking up of large structures and the implementation of a work culture based on cooperation. Digitalisation plays a significant role in these processes. This may be accompanied by an increase in the efficiency and effectiveness of the academic community, and raising awareness of the quality and pleasure of research, learning and work as a social value.

Network-based work culture, aimed at the coordination of transformation and the gaining ground of the methods of cooperative value creation for the sake of high-level, breakthrough initiatives and strategic decisions is an important factor in the process of restructuring.

Universities focusing on lifelong learning adapt their operation increasingly to the social and economic environment of lifelong learning, responding to the changes and opportunities in the learning environment, undertaking greater role in regional development and are typically more open and flexible with regard to their educational strategies.

During the implementation of LLL, institutions follow a multilevel development path, which may be described at adaptational, organisational and cultural levels. The organisation of lifelong learning mostly represents the adaptational level while structural transformations are also indispensable to attain cultural changes.

In order that universities should attain this level, they must develop a new way of thinking and acquire an institutional culture that regards all kinds of education as part of lifelong learning. To this are connected the recognition of preliminary knowledge. The contribution of universities to the implementation of lifelong learning is realised by the interpretation of classical activities of continuous further training activities towards an inclusive and responsible university conception.

### **European institutional methodology of Lifelong Learning (LLL) in higher education**

The promotion of lifelong learning develops the knowledge supply, innovation and competition capacity and system-level operation. In higher education institutions, the starting point is the implementation of a work culture based on cooperation. Learning by cooperation and its forms (project-based and problem-based learning) are increasingly becoming established forms of learning. The assessment of education shifts in the direction of evaluation of learning outcomes.

Students increasingly move towards self-directed learning experience: learning-by-doing or experiential learning which massively supports or even replaces learning-by-reading and learning-by watching.

In reality, transformative learning is not a form of learning but the essence of learning itself, and this essence is only present to a lesser extent in other forms of learning. Naturally, there is

no need for every kind of learning to be transformative but transformative learning is present in everyone's life.

This may be called the culture of lifelong learning. From the aspect of the culture of lifelong learning, informal learning is essential because there, the integration of learning and practice as well as reflective practise are also present.

It is conceptually important that the traditional teacher-centred model should be replaced by a learner-centred approach. A new requirement in the operation of institutions is the strengthening of learner support, learner-centred education and student services. Students require the development of a flexible, accessible and creative environment, the development of efficient career orientational and guidance services and the evaluation of the performance of LLL activities.

For a comprehensive restructuring, systematic methodological preparation is needed. To accelerate methodological reform is one of the priorities in the implementation of the development strategies of the institutions and the promotion of lifelong learning.

Its implementation starts with the survey of teacher competences. It is an important task to prepare, convince and inform teachers: to develop an operation which improves the flexibility of learning, wide access and the development of partner relationships in cooperation with the instructors.

There is progress in the field of the methodological trainings for instructors – a growing rate of participation: universities launch units dedicated to learning innovation and supply of courses offered for instructors. The results of well-performing departments have repercussions on both research and management, there are more and more examples to follow, thus teacher competences appear as values in the cultural and organisational transformation of the institution, as well.

A method, more and more extensively applied, which promotes the flexible and personalised learning of students is the organisation of multidisciplinary, short- or medium term projects representing intellectual challenge motivated by practical challenges.

Strengthening of students' entrepreneurial mindset in the framework of courses concerned with innovation and entrepreneurial behaviour and with the help of instructors with extensive experience and a comprehensive way of thinking is linked to this.

The rapid development of information society appears in the education sector. It is a natural requirement to strengthen an interdisciplinary approach through the application of new teaching methods and ICT.



## **The system-level model of lifelong learning**

In a modernising, globalising and digitalising higher education environment, the exploration of the correlations involved in the relation of the Knowledge Triangle and Lifelong Learning requires a systematic approach

At the beginning of the 2000s, comprehensive European Union higher education institution development projects investigated the system-level implementation of lifelong learning. Their results led to the reinterpretation of the education + research + innovation model.

In countries which are leaders in innovation – like in Finland, in particular –, a convincing example of this process is the presence of the Triple Helix model (universities – enterprises – public sector) and the Knowledge Triangle model (research- education-innovation), which formations underline the importance of reinforcing the synergy between different university functions.

As the basic assumption of the Knowledge Triangle, education is not only an input unit in the relation of R +D + I human resources, and similarly, innovation cannot be limited to being a simple output result of education and R + D activities. To focus it to two operational elements: the Triple Helix – underlining the importance of the fourth element, i.e. people-, and the Knowledge Triangle, which may promote a progressive balance between the functions and needs of universities, provide the basic components of a regional innovation ecosystem, where universities may become driving forces in social change.

The Knowledge Triangle may be the key to the renewal of university culture but universities delay in determining the priorities of key success factors like the development of new, research-based knowledge, new approach for better use of existing and new knowledge and a new entrepreneurial mindset for knowledge creation and innovation.

Investigating the impact of the Knowledge Triangle on university operations reveals that the greatest challenge is presented by university management culture. How can university autonomy in the renewal of society, be maintained while answers should be found to the often severe economic difficulties? How can the importance of continuing fundamental research be emphasized while academic life should be supported in finding answers to great social challenges? How can the university sphere be steered in the direction of academic excellence while emphasis is being shifted to the more rapid and even more productive implementation of research-based innovation?

## **The mechanisms promoting lifelong learning in the scenes of knowledge consumption and transfer**

As a result of research investigating non-formal and informal learning in relation to adaptation and development, a picture of scenarios and habits of knowledge consumption may be formed., taking into account the mechanisms playing role in the development of the systems supporting and promoting lifelong learning.

Learning is continuous and sustainable by internal motivation, a strive for understanding, problem-oriented thinking and a continuous motivation for deepening, checking and renewing knowledge. It is necessary to identify interpretations and solutions which help to understand what continuous learning means for the target population and how it can be efficiently implemented.

The possibility of the development of the ability to develop (“learning how to learn”) is among the conditions of learning to be created. Speaking about their motivation, the interviewees put the earning of a higher education degree in the first place. It is remarkable that formal education is more attractive in general, too, while non-formal trainings have a lower popularity. In the evaluation of efficiency, however, the efficiency of non-formal trainings at the workplace takes the lead: the majority of respondents considered self- education and on the job learning the best. The signs of the formation of a new culture of learning can be identified. An important asset in continuous learning is the methodology of learning and learning support, including the application of information and communication technologies.

In many cases, new technology is constrained to traditional or routinely reproduced frameworks. Under such circumstances, little is known about efficient learning and teaching, and students hardly know their own learning styles or the supply of technological tools and methods.

Through their everyday activities, teachers have substantive impact on the development of motivation for lifelong learning. In this respect, it is an important step to strengthen customer-centeredness in institutions, including the modification of the idea about or the image of the learning human as a customer.

The scenes of lifelong learning are the different institutions of the relevant region which exert an influence through a new type of tasks and operations. This may lead to improved university mission statements, new activities and contact attitudes. Such are the confirmation of the role the university plays in regional adult education, the development of the education of adult education experts, the preparation of resource maps, the development of partnership peer-learning activities and cooperation with home and foreign service providers, joining already operating networks.

### **The effect of the increasing cultural and social challenges in the world of education and labour, and their projections in LLL research processes**

The lifelong learning approach, which reinforces education and university research as social service while the latter, in turn, helps lifelong learning as an institutional mission.

Connected to this, new elements appear in education as a mindset responsive to network economy, the knowledge of the processes and devices of cooperation as success factors, the development of the quality and pleasure of learning and work, the creation of a network-centred working culture and new methods creating cooperational values and the recognition of the initiatives resulting in a high level breakthrough.

Due to the social and economic changes, student needs are shifted from information transfer to learning based on experiential and student activities, including how young experts can become innovators and entrepreneurs.

Where education is closely integrated with research and innovation, teaching and learning also contribute to added value more: students may understand multifaceted problems with a comprehensive insight. A new network culture and the enhancing of the efficiency of the university community are important for successful implementation.

The higher education institutions that may mostly be described as closed institutions must be transformed into open, service providing institutions. A part of this is sharing knowledge with participants in the region so that it can become the driving force in the knowledge region.

Innovation cooperation with the business sector comprises the widening of business contacts, PR and marketing, as well. The development of networking elements is an important component in the process together with the strengthening of already existing connections.

### **The teaching culture of lifelong learning requires new teacher roles**

As an element of strategic value creation in adult education, the professionalization of the methodological culture of learning support is gaining higher status. It is an efficient device if such a qualification system is integrated into the quality control system of the university. The improvement of instructor competences becomes a priority in institutional development. For this, financial investments are also needed but the creative application of information and communication technologies and the exploration of internal sources such as the spread of the methods of informal knowledge acquisition, the exchange of best practices and the strengthening of the internal processes promoting this are of great help.

In the transformed learning space, it becomes necessary for higher education to apply the methods, working forms and system of tools of constructive methodology. Cooperation-based learning methods, a problem-solving ability and learning through experience should be incorporated among the methodological tools.

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## BALANCED BLENDED LEARNING: SUPPORT FOR DECISION-MAKERS

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### Introduction

Saxion University of Applied Sciences is one of the largest institutions of higher education in the Netherlands, with over 27,000 students divided over three campuses in the East of the Netherlands. One of the focus points is embedding *Living Technology* in the educational programs and research – not merely as abstract pieces of technology, but rather as an integral part of living and working. The program ICT & Education has as the main goal to support the 11 schools with the implementation of technology in the educational programs. This ranges from optimizing the use of our virtual learning environments for learning, to increase the numbers of digital assessment and use of video. Despite the available support and the possibilities to use new educational technologies as a mean to increase more educational flexibility, educators do not use technology as often as our students would like to (Baas, 2013; 2014). The same studies show that the main reasons for not using new technologies are – as mentioned by our educators – a lack of knowledge, time and appreciation from their management. Research shows that leadership can have a positive influence on technology use, but it depends on the skills of the manager to co-create a vision on how to use technology in education (Albion, Forkosh-Baruch, & Tondeur, 2015). It demands specific competences and the use of one or a combination of multiple types of leadership (Figure 1; Tan, 2010).

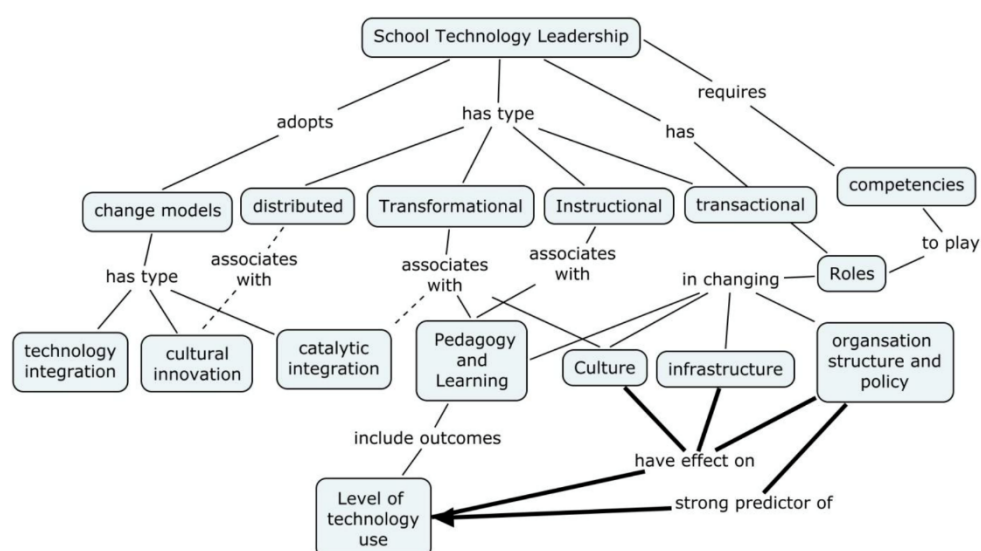


Figure 1. The influence of technology leadership (Tan, 2010)

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The last couple of years, we have been focusing on supporting the early adapters of technology in education. According to the Diffusion of Innovation Theory of Rogers (2003) adoption of new technologies or innovations do not happen simultaneously. Reaching the largest groups, the early and late majority, will enable us to successfully implement blended learning across the institution. Institutes need a vision and a strategic plan on blended learning if they want to reach this group, otherwise the adoption will be limited to the innovators and early adopters (Lee & Gaffney, 2009). Hence, it is important to enable managers to make decisions about technology in education to realise this ambition. This led to the design of a coaching trajectory.

### Balanced blended education

The basis of our coaching trajectory is Kennisnet's "Four in Balance model" (2017) which consists of the four fundamental elements that needs to be in place in order to use ICT in education effectively. In addition, integration of technology can take place at the various levels that curriculum can be developed, namely from supra level (international) to macro (national), meso (school), micro (classroom) and nano level (individual) (Akker, van den, 2003). This has been taken into account when designing the trajectory. The coaching trajectory consists of the use of an online tool in combination of face-to-face meetings as in line with blended education so that managers can experience blended education by themselves.

Our online tool has five main elements. The first element is vision which encompasses the institutions (long term) vision and related goals regarding their education and the use of technology. The second element is about content and applications which is about all digital learning materials used and which systems or software is used within the university. The third element is expertise, the competences managers, teachers, support staff and students must have to effectively use the technology. The fourth element is infrastructure regarding the availability and quality of hardware, networks and connectivity with the institution's education system. In addition to this well-established model of Kennisnet, we choose to add the element of Leadership based on the grounds mentioned before. This resulted in the balanced blended education tool (Figure 2).

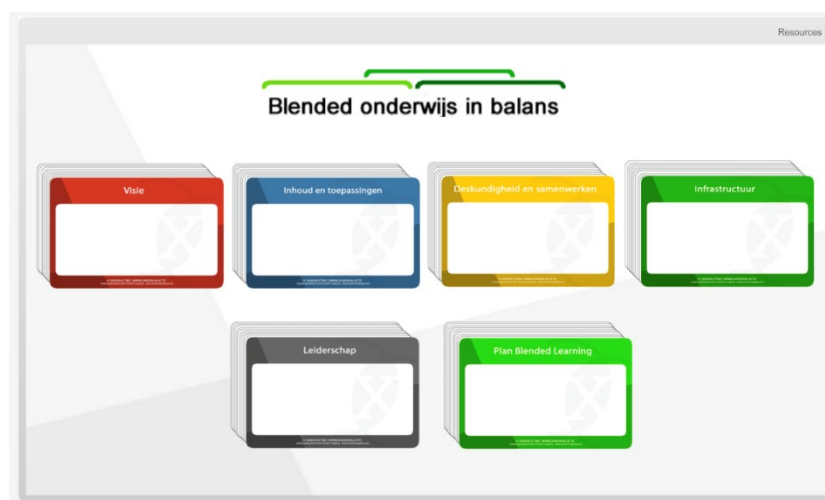


Figure 2. The elements of the online tool

In the meetings managers will use a theoretical framework to answer questions with each element in an online tool (Figure 3 and Figure 4). Answers on these questions in this module are saved and after all elements are discussed, managers finalize their answers so that an action plan on their envisioned use of technology in education can automatically generated (the light green element in Figure 2). Due to the fact that the focus of each school may be different, the meetings are also used to discuss these differences so that managers can learn from each other as well.



Figure 3. An example question within the element Vision with text fields on the right



Figure 4. Managers are given an explanation and an example for each question



## Design of the trajectory

The blended coaching trajectory has been designed in Articulate with input and feedback of educational designers and researchers. All received feedback resulted in the refinement of the blended coaching trajectory. In the month April and May, the first group of managers (n = 6) will follow this trajectory which will result in an action plan on use of technology within their school. Feedback will be collected, and an evaluation is planned. The results will be available in June and we would like to present this at EDEN. The tool itself will be available with a Creative Commons license.

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## **TOWARDS GLOBAL GOVERNANCE IN DISTANCE EDUCATION**

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### **Abstract**

Increasing transnational cooperation in open and distance education provides opportunities for non-state actors to meet around common interests, objectives, values and create a synergy. Besides transnational cooperation, these members of global civil society also motivate intergovernmental cooperation processes. International organizations and professional networks in the field, share common normative values and lead to the construction of a regime. This presentation is about the findings of a research project that aims to make a comparative analysis of the communication networks and cooperation models of international distance education organizations. The major research question asks “the extent to which decision making procedures of the regional organizations are transformed into a regime and provide tools for sustainability of cooperation”. The theoretical framework of the research is epistemic regime theory which concentrates on epistemic communities (such as academicians, professional networks, practitioners, associations, organizations, companies and interest groups) and their roles in creating implicit and explicit common principles, norms, rules and procedures towards regime building.

### **Implications of Regime-Building for Global Governance in Distance Education**

“International regimes are principles, norms, rules and decision-making procedures around which actor expectations converge in a given issue-area” (Krasner, 1983). Regimes are also defined as ideas and beliefs that actors have through mutual consent and learning (Keohane & Nye, 1987). This is why they are open agreements that regulate behaviours. The cognitive approach in the regime theory drives our attention to epistemic communities that have effects on the “consensual knowledge” paving the way to transnational cooperation. A transnational regime is composed of institutionalized regulatory structures, members of which are non-governmental actors and aim to solve problems faced by the global civil society (Young, 1999). Institutionalization of regulatory bodies does not always mean enforcing agreements but soft law as well, such as declarations by public authorities that announce the general principles in a given area. Global governance is the sum of international and transnational regimes, embracing governmental and non-governmental cooperation. What is important is the extent to which consensual knowledge embedded in oral and written resources (such as documents) lead to social practices in the specific issue-area and shape decisions and behaviors of actors. The agents may not be able to exert pressure for agenda formation at governmental levels however they

can influence the decision-making mechanisms through networking. A regime becomes operational when the generally agreed on principles are put into practice and get institutionalized. The factors that affect this process are (a) the role of locomotive actors, (b) other players/parties in the subject area, (c) collective problems that necessitate collaboration, (d) context, (e) tactics used and (f) design (Young, 1998). These concepts in the literature point to the collaboration and communication models of actors (including organizations) to determine the level and efficacy of interaction needed for regime-building. A collective problem in the area of ODL (Open and Distance Learning) is the issue of quality assurance in distance education e.g. The regimes may be classified according to different criteria such as their functions, location and members. For the effectivity and sustainability of regimes, besides the common interests and applicability of the procedures; the transparency achieved through monitoring and reporting regime outcomes become pivotal (Mitchell, 1998). The access to data and monitoring whether the members comply with the common rules or not, may be achieved more easily by individuals rather than institutions themselves. The quality assurance frameworks for transnational education and external evaluation by third parties can be given as an example for the case of ODL where actors' expectations converge around standard criteria.

### **Scope and Methodology of Project UZENET**

Project UZENET is designed as an interdisciplinary research related with disciplines of International Relations, Open and Distance Learning and Communication Sciences. The qualitative research techniques are utilized in the collection and analysis of data collected from the websites and legal documents of distance education (DE) organizations. A scale has been developed for evaluating the level of regime-building in ODL which serves as a control list for researchers in evaluating the applicability of normative components of regimes to DE organizations and determining their places on a continuum ranging from an epistemic community towards a regime. The comparative analysis of findings shall be followed by correspondence with representatives/administrators of the DE organizations in the sample group, in order to compare their self-understanding and evaluation with findings of the research team. The list of the nineteen (19) organizations has been compiled by purposive sampling from a list provided on the website of ICDE (International Council for Open and Distance Education), which is a global organization in the field. The websites of these organizations are in English, some of them have translated web pages to other languages as well.

### **Key Findings and their Relevance**

According to the regime theory, principles are “beliefs of fact and causation”. In Project UZENET, principles in the field of ODL have been defined as strategic management, internationalization, openness, lifelong learning and quality assurance by the research team. Norms are “standards of behavior defined in terms of rights and obligations”. In the project, norms are defined as cooperation, social responsibility (civic engagement) and open resources. Rules are “prescriptions or proscriptions for action” which means that they regulate behaviors through prohibition. Non-governmental transnational actors might lack enforcement mechanisms however networking may appeal to some actors more than formal credibility

issues. For the case of ODL, rules are exemplified by statutes of organizations and their other legal documents such as reports issued, in addition to agreements with members and third parties. The last component of a regime, the decision-making procedures are the accepted practices in the collective decision-making. They can be exemplified by institutional communication and collaboration models of DE organizations. It may be difficult to distinguish between these normative concepts; principles, norms and rules, for which the legal documents are the places to look for. They gradually determine and shape the actors' preferences and behaviors.

### **Principles**

The majority of the distance education organizations have clear mission statements on their websites that focus on distance education and/or lifelong learning. Five (5) organizations (out of nineteen-19) that do not have mission statements have stated their objectives in their documents. Eleven (11) organizations are regional in terms of their representation and membership, the remaining eight (8) are global organizations due to their outreach (members and partners in different geographies). Two (2) of the organizations are national foundations with international membership. On the regime scale, relations between the international organizations are evaluated on a Likert-type scale ranging from 1 to 10; 1 standing for weak relations (interaction and communication) and 10 for strong relations. Five (5) organizations have a score above 5 since they emphasize in their strategic documents, communication and cooperation with the other organizations in the field. Some of the organizations have closer national frameworks for cooperation among higher education institutions (HEIs) in their own geographies. European organizations are more assertive about cooperation with other regional and global organizations. Eight (8) of the organizations have emphasized the importance of "equal opportunity" as a common principle in lifelong-learning which may also be regarded as a common norm. Another common principle is openness in access to information; sixteen (16) of the organizations provide access to their materials and information. Flexibility in learning is another principle and six (6) of the organizations have put emphasis on flexibility as a value, on their websites and in their uploaded documents. Lifelong learning is another principle seven (7) of the organizations have stated, besides quality assurance for which eleven (11) organizations have put priority on. Three (3) of them have their own quality frameworks and evaluation criteria.

### **Norms**

In order to evaluate the effect of different norms (which are cooperation, civic engagement and openness) in shaping the relations of international actors in the field of distance education, some indicators are defined by the research team. For cooperation as a norm; the indicators are projects, agreements, conferences, networks, mobility programs, memberships and scholarships. The majority of the organizations are evaluated to be strong especially in terms of their conferences, networks and membership that provide venue for cooperation. For civic engagement the indicators are social responsibility projects/task forces, activities and open resources. The organizations are evaluated to be strong in the fields of activities and open resources. As another norm, openness is measured through the number of MOOCs, academic

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publications, bulletins, journals and workshops. The organizations have higher scores in publications and training/workshops. The findings related with the concepts operationally defined as norms indicate a mutual understanding as regards cooperation, social responsibility, open resources and are exemplified by different activities of the organizations in the sample group. The lower level of interest towards open resources is a significant finding.

### **Rules**

What are the common rules applied and observed by international distance education organizations? And to what extent they can be determinant and binding on actors' behaviors? These two questions are important to discuss the level of cooperation and regime-building in the field of ODL. Rules are given in the statutes/agreements/annual reports and membership criteria of the organizations. Eleven (11) of the organizations have their statute/constitution/manual uploaded to their websites. Some of the legal documents are not in English. Twelve (12) organizations have specific agreements with their members, ten (10) have agreements with other organizations/institutions. As regards their membership criteria, ten (10) of them have clearly defined criteria for membership available on their website; seventeen (17) have specified their membership fees and seven (7) of them provide scholarship and rewards policy (e.g. fellowship). Rules are expected to regulate behaviors through prohibition however their enforcement may be difficult in the case of non-governmental organizations such as associations and foundations where the members are volunteers for participation. However the case may change when the individuals and institutions become members through paying certain amount of fees for their participation and if they benefit certain advantages such as gaining prestige and credibility.

### **Decision-making procedures**

The communication and cooperation models of the organizations are lessons for benchmarking and evaluating where they stand on a continuum from a professional network (epistemic community) to a regime. Fifteen (15) of the organizations have clearly defined and transparently reflected their organizational structures and policies. The common denominator is the meetings serving as a decision making mechanism. Fourteen (14) of them have strong communicative network and use social media effectively. Eleven (11) of them have active Secretariat for coordination of tasks and eight (8) of the organizations have their annual reports on their websites as the output of their decision making processes. The missing reports may be available in the members' area which the research team could not access. Thirteen (13) of them have institutional social media accounts and twelve (12) have printed materials for exchange of information; fifteen (15) are strong in hosting academic activities that provide platforms for exchange of ideas and synergy. The common elements in the ways and means distance education organizations use for cooperation and communication provide opportunities for collaboration and determine the future of ODL together.

## Conclusion

In Project UZENET, the normative issues of regimes such as principles, norms, rules and decision making processes are searched for, in the websites and documents of nineteen distance education organizations active in the field of ODL with an eye to the regime theory. The findings reflect common understanding towards cooperation and increase the expectations for regime-building which shall further institutionalize international cooperation. The governmental organizations are key players in this endeavour since they can enforce common decisions on members more than their non-governmental counterparts and professional networks. This second group of stakeholders act as catalyst in regime-building through fast exchange of information in the media provided by the organizations. The global reach of the organizations increase with the number of their members however smaller and regional organizations may have stronger infrastructure for cooperation embedded in their culture such as in the case of European organizations. On the other hand national institutions may be stronger in shaping the trends in technology and standardization in quality assurance based on the experiences of their members. This is why regime-building towards global governance of distance education requires a multi-level approach and transnational cooperation. There is also need for a sociological approach in order to see the changing socio-economic needs in different regions, cultural values and changing levels of identity with common norms, shared ideas and collaborative learning.

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## **TOWARDS A EUROPEAN MATURITY MODEL FOR BLENDED EDUCATION (EMBED)**

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### **Introduction**

Higher education institutions (HEIs) are challenged to maintain quality and innovative education for large student numbers while working with lower budgets, and to accommodate the needs of a great variety of learners. As a consequence, new course and programme delivery modes emerge at universities. Since the turn of the century, convergent formats of online and onsite teaching and learning have received increased attention and it is expected that these will become the most common approaches in higher education (HE) (Daniel & Uvalić-Trumbić, 2016). Several scholars reported that such blends lead to better student experiences, higher efficiency and offer opportunities for more personalised and inclusive HE. Furthermore, they seem to be suitable for teaching large groups (a)synchronously and organize mobile or multi-campus HE (Sitzmann, Kraiger, Stewart, & Wisher, 2006; Laurillard, 2014).

Nevertheless, some important questions remain. First, little is known about the status of affairs across Europe in terms of adoption and diffusion of blended teaching and learning. Though a lively discourse is taking place among academia, practitioners and HE administrators there is a lack of consistent use of related terminology, leading to a great deal of confusion with monitoring in terms of depth and breadth. The concepts of blended learning, teaching and/or education are far from clear-cut; the literature spans various definitions and meanings. The existing methodologies nor the quality assessment frameworks comply; they are solely oriented towards e-learning and/or targeted at specific groups of learners (e.g., Excellence, eMM). Secondly, the quest for 'the best of two worlds' has flared up the recent debates. Notwithstanding there are a great number of innovative experiments and projects going on in HE it has been difficult to consolidate these in HE institutions. Further scrutiny is crucial in order to thoroughly understand the drivers of successful online and onsite teaching and learning, and in particular to know how to incorporate their best characteristics in order to enhance HE. Its sustainable embedment not only involves often a thorough course and curriculum redesign but also multiple institutional reforms in terms of staff support, workload and training, leadership, or policy development and strategies oriented at continuous improvement (Gregory & Lodge, 2015; Lim & Morris, 2009). In this regard, assessment and empowerment are key. Thirdly, some critical reports were published with regard to instructor roles and student expectations, learner dropout (Holley & Oliver, 2010; Lee, Choi & Kim, 2013) and first-rate support strategies (Bonk & Graham, 2006; Garrison & Kanuka, 2004). University policy makers and administrators, curriculum developers, as well as teams of or individual

instructors are confronted with questions related to the set-up of blended learning programmes and courses, their evaluation or appropriate capacity building to tackle difficulties and barriers for a successful adoption and diffusion of blended learning across HEI. Typically, project managers responsible for implementing blended scenarios are in search of proven practices (Martyn, 2003; McGee & Reis, 2012) and a sound, validated set of guidelines for educational design, adapted to their organisation. Institutions for HE characterised by a strong quality assurance (QA) culture, will try to identify insufficient or missing practices, plan and test (new) alternatives. Nichols and Gardner (2002) as well as Barrie, Ginns, and Prosser (2005) showed such evidence-based approach offers opportunities to significant changes in teaching and learning. In the view of the European Association of Distance Teaching Universities (EADTU) this type of R&D activities are crucial in order to achieve an excellence level (Kear, Rosewell, Williams, Ossiannilsson, Rodrigo, Sánchez-Elvira Paniagua, Santamaría Lancho, Vyt, & Mellar, 2016).

### **The EMBED project**

Given these considerations, recently, a strategic Erasmus+ partnership between seven organisations and HEIs was established: EADTU (coordinating body), Aarhus University (Denmark), Delft University (The Netherlands), KU Leuven (Belgium), University of Edinburgh (United Kingdom), DCU Ireland (Ireland) and Tampere University of Applied Sciences (Finland). During a period of three years (2017-2020) experts in the field of quality assurance, online and blended learning will work closely together to achieve different objectives related to the introduction and sustainable implementation of BE. The “European Maturity model for Blended Education” or EMBED project aims at:

- developing and validating a monitor for mapping blended learning, institutional strategies and governmental policies for blended education across Europe, including criteria to assess their degree of maturity;
- empowering European HEIs in order to achieve up-scaled quality BL programmes and courses by means of professional development activities and community building across institutional frontiers.

The project partners embrace a multilevel framework in order to tackle conceptual and implementation issues at the course level (micro), at the strategic level (meso) and with the intent to give relevant input to governmental policy (macro).

During this EDEN session we will present the main outcomes of the first phase of the EMBED project. This includes the conceptual framework which delineates the focus and scope of the multilevel maturity model, and the monitor. Both were developed on the basis of a literature review, expert reviews, a websurvey followed by in-depth interviews in each partner university. The framework is built around a consistent terminology and well-demarcated (operational) concepts. This will allow researchers, practitioners and policymakers to talk common language and assess blended education in a more systematic, comprehensive manner. The monitor is conceived as a multi-layered instrument with dimensions and indicators that were newly developed or adapted from previously validated instruments. Its goal is to grasp in detail



practices and conditions for blended learning. All instruments are piloted across different institutions, programmes and courses.

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## **TOWARDS THE CREATION OF A RANKING SYSTEM FOR ONLINE UNIVERSITIES: QUALI-QUANTITATIVE ANALYSIS OF A PARTICIPATORY WORKSHOP**

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### **Introduction**

University ranking systems are being implemented by different organizations in an attempt to evaluate and compare Higher Education Institutions (HEIs) at a global level (Brasher, Holmes, & Whitelock, 2017). Such systems are strongly criticized for their social and economic implications, as well as for their technical implementation (Amsler & Bolsmann, 2012; Lynch, 2015; Bougnol & Dula, 2015). Nevertheless, they are unlikely to disappear, at least in the near future (Tofallis, 2011). Thus, along with finding out their weaknesses, further research should be conducted in an effort to improve them and overcome their existing limitations.

At present, a widely recognised limitation of ranking systems is that they do not consider the specific characteristics of online universities (Brasher et al., 2017; King, 2012). Therefore, online universities risk that their position in most rankings misrepresents their actual quality compared to that of traditional universities. At the same time, the several benchmarking tools tailored to evaluate the quality of online programmes or courses – such as, for instance, Quality Matters (2014) – are not designed with the aim of ranking, and cannot be used to compare online HEIs. Thus, building a ranking system able to reflect the specific nature of online universities, in such a way that they are not evaluated through unsuitable indicators devised for traditional universities, is definitely a need that deserves to be addressed to protect quality in the online world (Kurre et al., 2012). However, there is a number of challenging aspects to consider in order to develop a ranking tool specifically designed for online universities. These mainly include, but are not limited to, the need to identify the most adequate criteria and indicators to reflect and measure the specificities of online universities.

Moving from these premises, the CODUR project aims to address this need. In particular, within the project we started focusing on the definition of the main criteria (and sub-criteria) to be considered when assessing and ranking online universities. As part of this work, we identified a list of criteria and observable indicators, with their relative weight. To this end, we took a participatory approach, involving several stakeholders and informants in an attempt to reach the broader HEIs community. This participatory approach was implemented through a first phase where the researchers involved in CODUR collaboratively elaborated a preliminary set of criteria for online HEIs (Table 1), and a second phase where a two-round Delphi Study

and a national participatory workshop were run to refine, enrich and evaluate the initial set of criteria (Pozzi, Manganello, Passarelli, & Persico, 2017).

In this paper, we present the approach adopted and the findings of the participatory workshop designed to collect feedback, comments and new ideas about our preliminary set of criteria, with the aim of informing their revision and, more in general, promoting debate and exchange about the evaluation of the online dimension within the university ranking systems. It is worth mentioning that, since the Delphi Study round one and the participatory workshop were based the same list of criteria, it was possible for us to compare the results of the two activities, involving different participants and adopting different methodologies (Pozzi et al., 2017). The paper has a twofold aim: on one hand, to explore how powerful participatory approaches can be in addressing problems whose best solution is not univocally defined, by gathering benefits from contributions of the main actors involved, and on the other hand, to open up the discussion concerning suitable criteria and indicators for the ranking of HEIs.

## **Method**

As already mentioned, in this paper we report on the experience and present findings from the participatory workshop run within the CODUR project to involve Italian stakeholders in the definition of the criteria and indicators for the evaluation of online HEIs. Our preliminary list of criteria, with their explanation, is presented in Table 1. In the following, we describe the workshop setting, the participants and the method adopted.

Table 1: List of criteria and their explanations, used as input for the Delphi Study (round one) and during the workshop

Criteria	Explanation
Quality of teaching	The ability of the online HEI to recruit experienced teachers trained in delivering online teaching, provide them with standards for teaching, etc.
Quality of the learning experience	The ability of the online HEI to offer effective learning experiences, in terms of sound design, delivery, adopted methods, learning materials, assessment means, etc.
Quality of student support	The ability of the online HEI to provide support to learners in different areas (learning, orientation, socializing with peers, organisational issues, use of technology, etc.)
Quality of teacher support	The ability of the online HEI to provide support to teachers and lectures in terms of training provision, organisational issues, use of technology, etc.
Reputation/Impact	Impact on job market, institutional image, communication strategies, etc.
Quality of research	The ability of the online HEI to carry out research initiatives and innovation projects
Quality of organization	Availability of service's structures, efficiency of bureaucracy, etc.
Sustainability of the Institution	Sustainability includes aspects such as the size of the institution, resources, availability of standardised procedures and strategic plans, etc.

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Quality of the technological infrastructure

The ability of the online HEI to offer a sound technological platform, in terms of usability, accessibility, flexibility, types of features offered, etc.

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### **Setting**

The workshop took place in Bolzano, Italy on August, 31 2018, in the context of the “EMEMITALIA 2017”, an Italian conference organized yearly by the Italian e-Learning Association (SIE-L). This venue attracts the most relevant stakeholders and academics working in the field of e-learning, especially as far as Higher Education (HE) is concerned. The title of the workshop was: “Towards the recognition of the e-learning dimension in the university ranking systems”. The workshop was a one-day event, including two sessions: a morning session devoted to a round-table discussion, and an afternoon session consisting of a group work discussion-based activity. Within the workshop, three main topics were considered and discussed (Table 2). The round-table discussion took place in the morning and lasted around 1h 50m, with 6 invited experts and 1 moderator, with an audience of 38 participants. The following group work discussion-based activity took place in the afternoon and participation was free, involving both the experts and part of the morning audience. Participants were split into two groups. Each group worked synchronously, with designed facilitators, for a total duration of 1h 50m.

Table 2: Key topics explored during the workshop

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Topics
1. What is your position with regard to university rankings?
2. Do you think e-learning should be considered in university ranking systems?
3. What are your reflections/considerations regarding CODUR’s suggested criteria?

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### **Participants**

Generally speaking, participants to the workshop came from a diverse range of stakeholders from the national HE community (professors, researchers, students, Ph.Ds., etc.) who had an interest and/or experience in the debate around the quality of online teaching and learning within the University context. The workshop was attended by a total of 38 individuals. Among these, 6 were experts invited as contributors to the round-table. They were all very well-known policy makers in the Italian e-learning context, as they are all members of SIE-L Steering Committee. As far as the other participants are concerned, these included 31 academics (professors, researchers, students, faculty members, ...) from 16 different Italian Universities, 4 representatives from Public Agencies operating in the sector of education at various stages, 2 from private organizations, and 1 educator.

### **Data collection and handling**

In order to launch the round-table, prior to the workshop, we sent a message to the 6 experts invited to the round-table explaining them the overall aims of the workshop. They were also provided with the list of criteria (Table 1) along with the list of the three main topics (Table 2)

and were asked to comment on them during their speech. The round-table took place during the morning session. After an introductory presentation, held by the workshop's coordinator and aimed to introduce the main topic of the workshop, along with the CODUR project and the proposed list of criteria, the floor was left to the 6 invited experts. The round-table was allocated a moderator, who led the discussion allowing two rounds of opinions for each expert. The discussion, involving the audience, turned out to be quite lively, thus demonstrating that the proposed topic is topical within the Italian University context.

The afternoon session was devoted to the collaborative activity. Participants (including the experts and part of the audience) were divided in two groups. Both groups were allocated a facilitator, and a moderator managed the plenary sessions that preceded and followed the group-based activity. At the beginning of this session, a plenary discussion among all the participants emerged very naturally, as a follow up of the morning round-table. After this, the group-based activity was launched as planned. Each group was equipped with a set of paper-forms: a number of individual forms (one for each group member) to provide an individual ranking of the proposed criteria, and one collective form for the group to provide a negotiated ranking of the proposed criteria. At the outset of the activity, each participant was asked to individually rank the proposed criteria (from 1 to 9, assigning 1 to the criterion they deemed most important and 9 to the least important). Then, the group was asked to discuss the individual rankings and achieve an agreement on a common ranking, to be reported in the collective form. During the final plenary session, a rapporteur for each group presented the results of the group ranking activity and the overall group's discussion points.

The round-table discussion was video-recorded and transcribed. In addition, during both sessions, researchers' field notes were collected.

### **Data analysis**

In order to explore the data collected during the workshop, a process of analysis was carried out. As far as the round-table discussion is concerned, transcribed data and researchers' field notes were analysed following a thematic analysis approach (Braun & Clarke, 2006). In particular, the video-recorded session of the round-table was repeatedly watched and analysed to identify pre-determined topic areas, as well as emerging themes and patterns. Pre-determined topic areas were chosen based on the other main tasks of the CODUR project, while other significant themes emerged during the analysis of the video (Table 3). With regard to the group work discussion-based activity, the two criteria rankings generated by the groups were statistically treated and then interpreted on the basis of researchers' field notes relating to perceived dynamics and interactions between participants during the different stages of the activity.

### **Results**

Drawing on data from both sessions, our complete dataset comprised 1 video-recording of the round table lasting ~1h 40m, 2 filled forms presenting the groups' lists of ranked criteria, 10

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filled forms of individual participants’ lists of ranked criteria, and 6 pages of field notes. Overall, we collected significant feedback in reference to the CODUR list of criteria and indicators during both sessions. Through the discussion among the 6 experts participating in the round-table, some interesting themes and sub-themes emerged with regard to the proposed topics. In the afternoon, participants actively contributed to the discussion providing additional opinions and comments, and the group-based decision-making activity allowed us to collect feedback in a more structured fashion. In the following, we present a detail of the main outputs emerging from the workshop.

**Round-table (morning session)**

Through the analysis of transcribed data and field notes from the morning session, we identified meaningful themes and sub-themes (Table 3).

Table 3: Themes and sub-themes emerging from the round-table data

Themes	Sub-themes	Memorable quotes
Epistemological aspects (definitions, peculiarities, field of applications)	The experts underlined the relationship between ranking systems, quality assurance measures, and accreditation systems, in most cases by identifying their different aims	“Ranking systems tend to overlap evaluation systems, but the logic of the two is actually different.”
Rankings design (approaches)	While most existing rankings tend to assume a “one size fits all approach”, what is needed is a ranking system capable of catering for the needs of different audiences	“(University rankings) have overcome the initial and prior goal that was to offer a quick consultation tool to guide students and families to choose the university.”
Levels of (quality) review	There is need to consider quality at all levels: from the micro-level (the course) to the meso-level (the Department) and the macro-level (the Institution). These are different but interdependent.	“Quality comes from the single course, and then builds on to the other.”
Data source	Relevant data can be elicited from many sources, but care should be taken in assessing data reliability and accuracy to reflect all the facets of such a complex phenomenon.	“Government and Institutional sources are not always able to capture the complexity of the university system.”
Indicators and parameters (methodology)	Rankings indicators should be statistically robust, clearly defined (transparent) and as objective as possible.	“Rankings shows a result, but it is often unclear how such result was achieved.”

**Collaborative activity (afternoon session)**

As mentioned above, individual participants were asked to rank the nine criteria (Table 1) from most important (1) to least important (9). They were asked to focus only on online universities and to consider such criteria as intended to address an online HEI as a whole, rather than at

course or program level. Since participants worked with pen and paper, choosing the place in ranking for each criterion, ties were theoretically possible. In practice, only a single participant tied two criteria, ranking both reputation and sustainability as ninth by order of importance, so that no criterion occupied the eighth place. This tie was broken randomly (sustainability took the eighth spot). As one group was not able to produce a unique ranking, we only used individual forms filled in by participants from both groups to make our calculations (N=10). The criteria rankings thus obtained were analysed using Thurstone Case V scaling (Thurstone, 1927). This kind of analysis allowed us to obtain estimates of importance on an arbitrary scale (relative importance), complete with 95% confidence intervals (Figure 1).

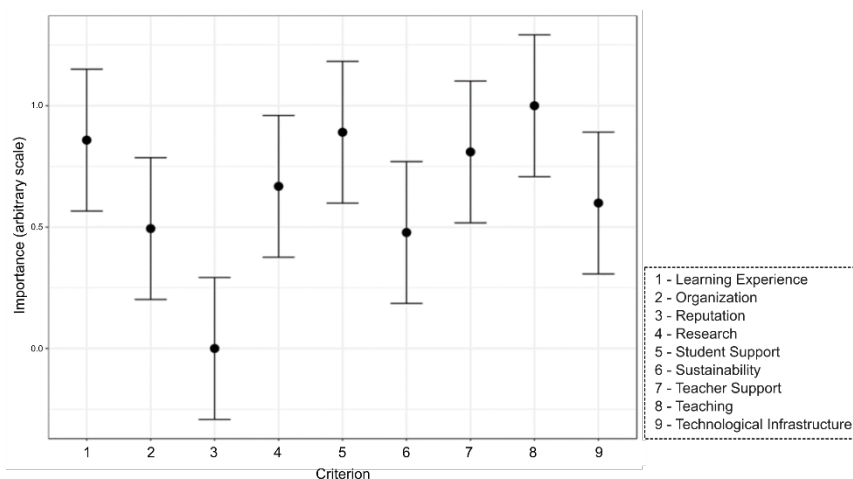


Figure 1. Relative importance of the evaluation criteria as estimated by workshop participants

From the analysis of the narratives emerged during the afternoon session, further reflections could be highlighted. As general consideration, participants agreed on the difficulty of keeping some of the proposed criteria separate – in fact, both groups suggested that some criteria could be aggregated into main categories. They also agreed that the terms used to define the proposed criteria and parameters are in most of the cases subjectively interpretable, with a very wide range, and that some criteria should be added in order to consider specific system figures. A more detailed summary of the different issues emerged is reported in the following (Table 4).

Table 4: Criteria and related issues emerging from the afternoon session

Criteria	Issues
- Student support - Learning experience - Teacher support - Technology infrastructure	Both are considered overlapping but very important.
- Learning experience - Teaching	Both should consider aspects related to teachers' training as indicator(s).
- Learning experience - Teaching	Both should be developed on students' performances measurements as well as their actual experiences.
- Sustainability of the institution - Reputation	Both are considered less important, but meaningful in terms of external image of the Institution (in this sense, they both might be somehow a result of all the other criteria). "Reputation" should be meant as the impact on the labour market. "Sustainability of the institution" could be interpreted as an appendix of "Reputation".



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- Technology infrastructure	Both are considered important and the backbone of everything, without which any online Institution could exist.
- Organization	
- Technology infrastructure	It is a fundamental prerequisite, not only in terms of classical e-learning platforms, but as anything guaranteeing the workability of the online structure from the technological point of view.
- Teaching	Both refer to pedagogical aspects and are considered related: if quality of teaching is guaranteed, then it means that behind there is a level of support for them (also in terms of training).
- Teacher support	
- Research	It is very much oriented to publications, rather than reflection, monitoring of results, attention to innovation, ability to promote innovative projects, ...
- Student support	They all are related to pedagogical aspects and could be grouped into one meaningful comprehensive category.
- Teacher support	
- Learning experience	
- Teaching	

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## Discussion

Thanks to the workshop, we got together national stakeholders with different backgrounds to discuss some relevant aspects related to the evaluation ranking systems for online universities, and identified possible strategies to refine, enrich and evaluate our preliminary list of criteria. Key findings are in terms of general considerations and recommendations informing, nurturing and enhancing our work at a methodological level. When examining the body of literature surrounding university ranking systems in general, evaluation, accreditation and ranking are considered as very critical aspects within the HE community. As it was also highlighted during the workshop, it is important not to mix these terms up, as they point to different actions, each one with different aims. Another aspect that has clearly emerged from the workshop, is that existing ranking systems are controversial (Amsler & Bolsmann, 2012; Barron, 2017; Çakır et al., 2015) and many of them are being criticized for not being solid enough, especially as far as validity of indicators, methodological correctness, transparency of sources of information and algorithms, etc. (Billaut et al., 2009). On the other hand, developing criteria able to adequately measure the quality of universities is still perceived as fundamental. In particular, the lack of specific criteria and indicators for measuring the quality of online learning is definitely felt as an urgent gap to be filled in by the HE community.

Our findings resonate with this body of work, and we have decided to focus on the ranking area by tackling a real need, i.e., to define specific criteria for the online dimension of HEIs. Defining criteria for the online dimension of HEIs is something extremely delicate and one should choose the exact focus of the work. In fact, when we use the term *online dimension* within the HE context, we can point to many different situations, ranging from “completely online institutions” (as the Open Universities), to traditional Universities running only a few courses or entire programmes through the Internet. In our work, and during the workshop in particular, we have chosen to focus on the evaluation of online HEIs, rather than on traditional universities with an online component or individual online courses or programmes. On the other hand, it

has been very useful to gather opinions from experts with a solid background in traditional universities, but at the same time highly competent on the topics of online education. In Table 5, we summarize useful feedback on the proposed list of criteria in terms of operational actions for fine-tuning it.

Table 5: Operational actions for fine-tuning our criteria and indicators

Methodology (criteria)	A statistical correlation would help merging some of the criteria. According to our results so far, "Quality of student support" and "Quality of learning experience" are probably very much related; the same can be said for "Quality of teacher support" and "Quality of teaching". "Quality of learning experience" and "Quality of teaching" (even if very much related) should be merged and considered the most important criteria.
Methodology (indicators)	Indicators should be operationalizable (straightforwardly measurable) and coherent (same level of detail). Whether developing qualitative or quantitative indicators, or a mix of them, this should be clearly chosen and stated.
Focus/context (indicators)	Indicators should be focused specifically on the online dimension. Whether the final output of our work will be integrated within one existing ranking system or it will stay as a stand-alone set of indicators, this should avoid using indicators referring to the institution as a whole (independently on the online dimension).

## Conclusions

Building a ranking tool specifically designed for online universities is crucial to enable stakeholders' reflection on HEIs' peculiar nature. It is essential that online universities are not ranked according to the same criteria and indicators used for traditional universities, in order to represent their actual quality, and allow fair comparison between the two types of institutions. We have begun to develop, test and refine representative performance online quality education indicators based on common criteria. Overall, the actions put in place so far have turned out to be quite effective in terms of feedback collected. In particular, by comparing the results of the workshop with the ones of the Delphi Study round one, we observed remarkable agreement. Additionally, the face-to-face participatory approach adopted in the workshop provided us with valuable insights and qualitative data, despite the relatively low number of participants. Among the main conclusions of this work, the importance of teaching, student support and student experience turned out to be higher than any other criteria, organization, teacher support, research, sustainability and technological infrastructure are middle ground criteria, while reputation was deemed the least important criteria.

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More details about the project are available online at the URL:

[http://in3.uoc.edu/opencms\\_in3/opencms/webs/projectes/codur/en/index.html](http://in3.uoc.edu/opencms_in3/opencms/webs/projectes/codur/en/index.html)

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## **EVERYTHING FOR EVERYBODY? THE NEED FOR DISTANCE EDUCATION TO BE RELEVANT TO ALL ITS STUDENTS**

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### **The crisis, the crucible**

Distance Education provides education for students spread over the whole of earth, in all time zones, on every continent, in every country. That is at once an exceptional strength of Distance Education, as it is one of its biggest challenges. The strengths are that it brings knowledge and education within reach of all peoples. The challenge is that it needs to consider the aspect of culturally meaningful learning.

According to the sciences of learning (Dunlosky et al., 2013), meaningful learning is a prerequisite for effective learning. It is not enough to teach content of a subject. It needs to be shown how this content can be applied to real life situations.

The question is therefore, is it possible to develop a course that is everything for everybody? How is it practically possible to teach content in a way that it addresses real needs of real people in diverse situations? Is what is being taught decided by the lecturer, with his or her context in mind, therefore possibly ignoring the needs of a diverse body of students?

The recent debate about the “Decolonisation of the Curriculum” at many universities attest to this need for relevant teaching and learning. Students feel that subject content is Western-oriented, thereby ignoring indigenous knowledge and bypassing local needs. Many students feel the Western content should be totally scrapped from the curriculum, and supplanted by local knowledge.

Is it possible to become relevant while still building on accepted knowledge and standards? What is needed, is a road map to help people through and out of this multifaceted and almost chaotic situation towards solutions on many fronts. This article focuses on one aspect only, namely effective learning by students who want to continue and complete their studies under the current circumstances, and the kind of teaching which could support it.

It is a conceptual paper, using a literature review to identify effective learning strategies, and on the basis of findings suggest scientifically sound workable solutions.

The article is therefore not about the reasons, rationale, validity or stupidities of the various strands and movements of the #fallist phenomena. It is also not evaluating the legitimacy or not

of the decolonisation debate, apart from one aspect only, namely the quest for meaningfulness of study as a factor playing a role in effective learning.

Point of departure is that the current situation is a crucible which will give birth to a new situation. It is important to plan in order to influence the outcome towards workable and suitable results.

### **The #fallist situation, with a decolonised agenda**

The #fallist movement gained visibility in society and the media with the #rhodesmustfall movement, when students complained about the statue of Cecil John Rhodes on the University of Cape Town campus. According to some students, Rhodes was a racist exploiter of the local population, and even though he supported learning through a foundation providing bursaries (originally only white students but currently all qualifying students), his legacy is so tainted that everything about him should be erased from current campuses.

This then spilled over in a #feesmustfall movement, where students complained about the high cost of university tuition fees, leading to the exclusion of many students who cannot afford it.

The decolonisation debate became part of the situation, where students felt that the Western academic tradition is dominant to such an extent that it excludes the contributions from Africa and other non-Western origins, leading to feelings of alienation, non-belonging and meaningfulness. At some universities where Afrikaans is or was a language of instruction, the call #afrikaansmustfall also became part of the demands, because in South Africa Afrikaans is seen as the language of the oppressor, even though the colonial language English is being accepted as the language of choice for tuition.

The outcomes of this situation and movements are still to be seen, because it is still unfolding. In practical terms it leads to large scale violence and destruction of property such as the burning of libraries, laboratories and other facilities, as well as the disruption and eventual suspension of academic programs, with some students being unable to attend classes, write exams and complete their academic years.

### **Scenarios**

Reactions to this situation varies, ranging from people who believe the closure of universities and the cessation of the academic program is but a price to pay in service of some bigger goal to be pursued, to people who want the movement to be crushed, with many shades of all kinds of beliefs in between.

Long term, to my mind there are at least four consequences flowing forth from these events, with related options for students who want to complete their tertiary education.

A first consequence is that these events are the “womb of the private universities” in South Africa. Private universities such as Curro, Akademia, Monash and many others will capitalise on the uncertainties and disruptions at public universities. It can already be seen that Curro

## **Everything for Everybody? The Need for Distance Education to be Relevant to all its Students**

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announced that they acquired campuses in Pretoria and Johannesburg, and that one in Stellenbosch is in the offing. *Akademika* had a full-page advertisement in a newspaper *Beeld* on a page following pages with reports on the disruption of classes and exams on public university campuses. More and more students who can afford it will definitely choose to study at private universities who are not as prone to disruptions of their academic program.

A second consequence is that dedicated Distance Education Universities such as the University of South Africa (Unisa) will get more students. Unisa had some disruptions about outsourcing of staff – something that has been engineered by a previous minister of Education, Kader Asmal – but as of late has not as exposed to disruptions as the other universities. It is therefore still a public university which provides affordable internationally accredited qualifications, and therefore some students will enrol there.

A third consequence is that students who can afford it, will move to face-to-face universities overseas. In many countries tertiary education is free for qualifying students. Qualifying means students with proven academic performance, and it is therefore definitely not a free-for-all situation. Challenges for these students will still be a matter of cost, because their cost of living in these countries are not free and with an unfavourable exchange rate it will still be affordable for only a very small part of the population. Added to this is the language of instruction, which will be the mother tongue of the country they go to. Tuition on English speaking countries such as the UK and the USA is everything but free, being out of reach even for their own citizens, making study abroad in English not much of an option.

The fourth consequence is that public face-to-face universities in South Africa will introduce a blended mode of delivery, introducing an online component. The online component will probably be complementing face-to-face contact classes throughout the academic year by making learning material electronically available on their learning management systems as has in any case been done for some time now, but might become the dominant mode of tuition delivery in times of violence and disruptions. They may even introduce online examinations as has already been done at some institutions.

### ***Decolonisation***

An important aspect of this drive relates to experiences of alienation. Students feel that what they have to learn does not speak to their lived reality, the people teaching it do not seem to understand their lived reality, and the sources referred to does not come from their lived reality. They struggle to make sense of and master to work prescribed in the curriculum, and therefore believe if the curriculum changes they will find their studies more meaningful and they will be more successful in their studies.

A contributing factor is the issue of language of instruction. Many students are not conversant in English, but they still choose English as the language of choice. English might be the language of colonisation and Rhodes, but at least it is a language that should give them access to broader understanding and entrance into the employment market. Afrikaans (in South Africa), however, carries the burden of 1976 and apartheid. Therefore, they believe Afrikaans should fall

too, because if they have to study in a language other than their own, Afrikaans students should not enjoy the headstart of studying in their home language.

Once again it all boils down to the basic question, namely how to study effectively, under trying circumstances where even the language is a barrier.

All of this points to the fact that students want relevant tuition that takes into account local context. Is Distance Education aware of this, and more importantly, up to the task of providing relevant education to a diverse student population?

### **The need for effective learning strategies: students need to become self-directed life-long learners**

Whatever route a student chooses to continue their studies and circumvent the current disruptions, the need for being able to study effectively will become even more necessary as it is currently.

It is a well-researched and documented reality that students are not well prepared for tertiary studies. At schools they are often coached to pass instead of being taught how to learn. Many schools, especially in South Africa with a large part of schools being dysfunctional or under-performing, do not prepare students adequately for tertiary studies where students have to master vast amounts of work with much less support than they might have been used to at school. The high drop-out figures and non-completion rates attest to this fact. This boils down to one conclusion - students need to learn how to learn effectively. This is even the case for students who are passing and are performing adequately or even well, but who still uses ineffective and outdated study strategies. The high attrition number in distance education institutions, is even more alarming, and flies in the face of claims that distance education provides education to all. If people do not pass or drop out, education is not provided.

Add to this the fact that lecturers often also do not know how to engender effective learning. Lecturers are appointed based upon their disciplinary prowess and subject knowledge, and rarely appraised on their tuitionary knowledge and skills. This is an issue in face-to-face classes, but at least there is the possibility that students might ask questions and clarify uncertainties in the moment, even though this does not always happen. When these classes are pushed online, the chances of misunderstanding become all the more a possibility.

Bottom line is, students need to learn how to learn effectively, and lecturers need to learn how to teach their students how to learn effectively. The reality is that it does not happen, with dire consequences for student success, and when being pushed online, the consequences will become even more pronounced.

To address this, at least three issues need to be addressed. The first is that Distance Educators should understand what is effective learning, and especially how to support application oriented learning. The second is that there should be an appropriate theoretical understanding and practical implementation of culturally relevant teaching and learning. The third aspect is that



there should be theoretically based and workable strategies for implementing culturally relevant teaching and learning.

## **Effective Learning: needs and strategies for lecturers and students**

Mind, Brain, and Education Science is putting forward solid research about what effective learning is. Articles and books such as Dunlosky et al. (2013), Brown et al. (2014), and Doyle, and Zakrajsek (2013) showing the way, based on reputable neuro- and cognitive science research.

Effective learning strategies, according to them, is the following:

- Practice testing;
- Varied Repetition;
- Application Oriented;
- Integration (self-explanation);
- Mnemonic strategies (e.g. Memory Palace);
- Sharing and Teaching;
- Mindfulness;
- Focus without multitasking;
- Interleaved, Spaced.

Strategies with moderate utility includes:

- Write concepts out;
- Old papers and memoranda;
- Mnemonics.

Ineffective strategies are often the most widely used:

- Read and re-read;
- Highlighting and Underlining;
- Summaries;
- Cramming.

Many lecturers and students still use ineffective learning strategies. However, it is imperative that they should become knowledgeable about effective strategies, and start using them. In the context of this paper, it is the Application Oriented strategy that needs to be used, in order to support meaningful learning. If any activity is experienced as meaningful, people will spend time on it, and if guided well, will want to excel in it.

Knowledge can be described as consisting of a basic stem like that of a tree, which represents the accepted and time-tested body of knowledge. Branches spread out in various directions, touching local realities, as it were. The leaves are the new developments taking place every day.

In order to master a field of knowledge, all three aspects need to be touched upon. The experience of alienation is when only one aspect of knowledge, usually the accepted and time-

tested aspect of a discipline as developed in Western context, is taught. Inclusion of the other two aspects of knowledge needs to be embraced and included.

### **Culturally appropriate education**

Much has been written on respect for the viewpoints and worldviews of others. Zhou and Fischer (2013) attempted this from a Mind, Brain, and Education Science point of view. According to them, “Culturally appropriate education focuses on educational competence needed in a global world and respect for different world views of learners and teachers from different cultural contexts. The relationship between gene, brain, and culture is complex and dynamical. Cultural experience and learning sculpts the anatomy and function of the human brain and shapes human behavior. This neuroplasticity is the basis of educability in human beings. Education reform should reflect cultural diversity and embed teaching practices into the cultural history of a nation and should promote positive inclusion of minority and indigenous history so as to maximize successful adoption by teachers and parents. This tenet is at the core of the concept of ‘culturally appropriate education’. Successful educational reform and pedagogy require that teachers become culturally and neuroscientifically literate.”

With this, they provide a theoretically sound and practice tested way of understanding differences, and celebrating it in educational circumstances. It provides a point of departure with a specific inclusive end goal in mind. We live in a multicultural world, and therefore cultural intelligence is needed “the capacity of individuals to function effectively in multicultural situations” (Early & Ang, 2003).

### **Workable strategies to provide culturally appropriate education**

Tracy Tokuhama-Espinosa (2010) is an eminent protagonist of the Mind, Brain, and Education Science movement. In a pre-recorded plenary presentation at the CALL and the BRAIN 2016 meeting titled “Neuroconstructivism and the Modern Classroom” (Tokuhama-Espinosa, 2017), she suggests “Topical readings and videos at different “entry levels” of complexity. In this way lecturers can teach basic information and knowledge, but allow for individualised application in particular contexts.

This allow for a combination of Surface, Deep and Transfer Learning (Chin & Brown, 2000; Hattie & Donoghue, 2016), in the sense that basic knowledge is shared, but in allowing it to be applied in real life situations, deep learning and eventually transfer learning also take place.

### **Conclusion**

Distance education institutions and lecturers need to become aware of the need for culturally appropriate education in order to skill their students for working in real life contexts. The Mind, Brain, and Education Science discipline provides well researched and useable results to make this a reality. Knowledge and use of effective learning strategies are necessary. Celebration of diversity is crucial, as well as providing tuition in such a way that students are guided to apply what they learn in their contexts. This is true, useable and sustainable “decolonisation of the curriculum”.

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## **STUCK IN THE MIDDLE? MAKING SENSE OF THE IMPACT OF MICRO, MESO AND MACRO INSTITUTIONAL, STRUCTURAL AND ORGANISATIONAL FACTORS ON IMPLEMENTING LEARNING ANALYTICS**

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### **Introduction**

Despite evidence that learning analytics has become institutionalised within higher education since its emergence in 2011 (Ferguson, 2012; Gašević, Dawson, & Siemens, 2015), there remain questions regarding its impact on informing curricula, pedagogy and ultimately, on student success (Ferguson et al, 2016; Ferguson & Clow, 2017; Kitto, Shum, & Gibson, 2018). A variety of factors may impact on the implementation of learning analytics (e.g., Leitner, Khalil, & Ebner, 2017; Lonn, McKay, & Teasley, 2017; Scheffel, Drachsler, & Specht, 2015). Despite its huge potential to inform and support learning, learning analytics may become stuck in the middle of, inter alia, the need to balance operational needs and resource allocation, and different perceptions of learning, agency and loci of control in learning, teaching and macro-societal factors. In this *conceptual* paper, we propose an institutional cartography of learning analytics and explore the impact of a number of micro, meso and macro institutional factors that may impact and shape the institutionalisation of learning analytics. As a conceptual basis for developing this cartography, we utilise the Subotzky and Prinsloo (2011) socio-critical model for understanding student success.

### **Academic and learning analytics: Spot the difference**

As the availability of datasets has grown, higher education institutions have increasingly analysed educational data with a view to better understanding how effective learning takes place. Data mining first appeared as a means of analysing databases in order to uncover patterns within data. Educational data mining is particularly concerned with developing data mining and machine learning techniques with a view to better understanding students, and the settings in which they learn (Ferguson, 2012; Papamitsiou & Economides, 2014).

Analytics within higher education tends to be classified as either learning analytics or academic analytics (Siemens & Long, 2011). Although there may be datasets in common, the two terminologies largely reflect the different purposes to which student data might be put. Academic analytics generally refers to uses of (mostly aggregated) student data in courses, programs or qualifications, at an institutional or (inter)national level – at a meso or macro level.

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The purposes of academic analytics include regulatory reporting (for example, for funding purposes), and marketing (to potential students and alumni), as well as high level information on learner profiles (for example, to develop a national picture of student demographics), and staff records.

Fundamentally, learning analytics is designed to support greater insight into how students learn (Gašević, Dawson, & Siemens, 2015). This might include work at the individual (micro) student level: for example, tracking student progression with a view to improving completion or predicting student likelihood of completion in order to provide proactive support. Learning analytics also encompasses module or qualification wide (meso) analyses in support of curriculum design; for example, to facilitate implementation of assessment or tuition strategies which support student success. Often, when students at risk or with special needs are identified in learning analytics, institutional responses and where necessary, resource allocation, are approved at the meso level.

The issues and policies which impact on the collection, analysis and use of student data exist at micro, meso and macro levels. Developing a greater understanding of how these issues exist and operate across all three levels may help to reduce some of the complexities involved in successfully institutionalising learning analytics.

### **A social-critical understanding of successful learning**

Central to learning analytics is learning and the effectiveness of learning (Gašević, Dawson, & Siemens, 2015). In the context of higher education, research into the effectiveness of learning is well-documented, as per the early theoretical models developed by Spady (1970), and Tinto (1975; 1988; 2006). Though these models form the basis of much of the research on student success, they also attract criticism. Some feel that such models over-emphasise student agency and the responsibility of students to “fit” into organisational cultures (e.g., Braxton, 2000), while others argue that they reflect North-Atlantic geopolitical, epistemological and social realities, and assume a universal validity (e.g., Subotzky & Prinsloo, 2011). Much of the published research focuses on selected individual variables, forgetting that student success is a complex and dynamic phenomenon found in the intersection of student’s habitus, capital, prior educational experiences and life-worlds (micro), the character, values, processes, resources and efficiencies of institutions (meso), and “supra-institutional (macro-political and socio-economic factors)” (Subotzky & Prinsloo, 2011; p.179) (macro). Figure 1 provides an overview of the main tenets of Subotzky and Prinsloo’s socio-critical model of student success (2011). The central “student walk” provides a linear view of student progression from the moment of registration up to successful graduation. The main agents in this “student walk” are students and the institution. Unique to this model is the third element of the broader societal context, impacting on both students and the institution.

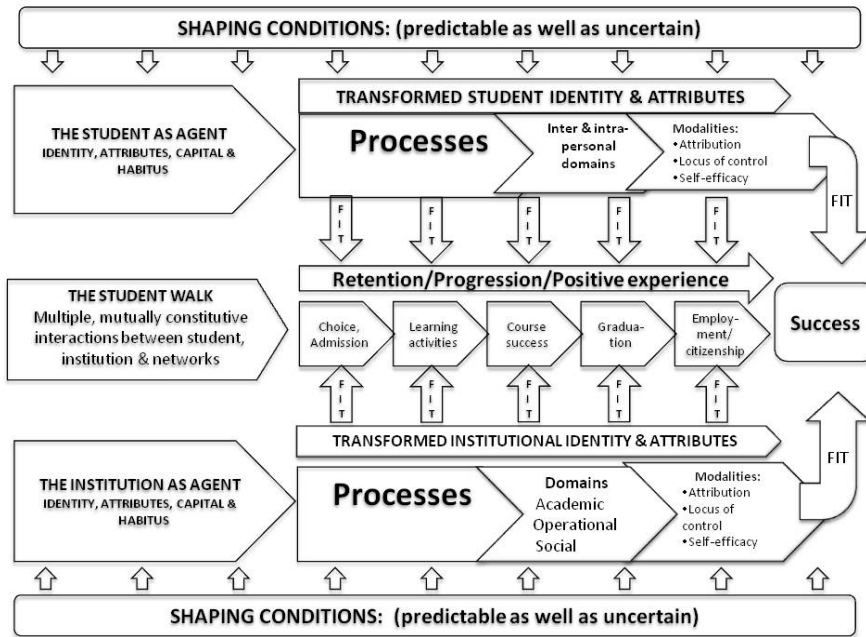


Figure 1. A socio-critical model of student success (Subotzky & Prinsloo, 2011)

Subotzky and Prinsloo’s socio-critical model (2011) proposes a number of key constructs to understand the complexities and effectiveness of teaching and learning. These are:

- *Situated agents: student and institution.* This construct emphasises that students are not helpless recipients of services but that they have some agency. However, we should also accept that the agency of both students and institutions is constrained. The situatedness of both means that “attributes and behaviours are strongly shaped by the structural conditions of their historical, geographical, socio-economic, and cultural backgrounds and circumstances. Nonetheless, as agents, they enjoy relative freedom within these constraints to develop, grow, and transform their attributes in pursuit of success” (Subotzky & Prinsloo, 2011; p.184). We note here that this model deviates from earlier models for understanding student success in the explicit recognition of student agency and responsibility.
- *The student walk.* Subotzky and Prinsloo (2011) refer to “the numerous ongoing interactions between student and institution throughout each step of the student’s journey” as the “student walk” (p.185). What happens ‘in the middle’ between students and the institution is often mutually constitutive and interdependent. The ‘student walk’ and both parties’ ability and responsiveness to the learning journey are shaped by connections on both sides to players and circumstances outside of that journey.
- *Capital.* This refers to the role of different kinds of capital, including financial capital but also “cultural, intellectual, organizational, and attitudinal forms of capital” (p.186) in the decisions and (in)actions of both students and the institution. Student capital is dwarfed by the symbolic and cultural capital of the institution.
- *Habitus.* Subotzky and Prinsloo (2011) refer to Bourdieu (1971) and Braxton (2000) and describe the notion of habitus as “the complex combination of perceptions, experiences,

values, practices, discourses, and assumptions that underlies the construction of our worldviews” (p.186). The habitus of both students and the institution affect how they see risk, success, and the factors that shape the chances of dropout or success. Early models of student success and failure (Spady, 1970; Tinto, 1975) normalised students’ chances of success as their (in)ability to be assimilated into accepted norms, worldviews, and assumptions undergirding student learning. When students enter higher education, they do not leave their habitus at the door. Often their habitus (ontologies and epistemologies) will collide with that of the hosting institution. Then, depending on their capital and loci of control, they will negotiate a way through the “student walk”.

- *The domains and modalities of transformation.* In reference to students, Subotzky and Prinsloo (2011) refer to intra- and interpersonal domains and how these shape students’ approaches to, and strategies in, their learning journey. In respect of the providing institution, the three domains of academic, administrative, and non-academic social domains of institutional life interact with students’ intra- and interpersonal domains in complex and often interdependent ways.
- *Student success.* The sixth construct suggests that “student success” may not be fully understood. Measuring student success is commonly assumed to refer to course success or successful graduation (measured as time-to-completion). With an emphasis on student satisfaction in higher education, there is also the possibility that success can be defined as a satisfactory experience. Finally, student success may also refer to the “successful fit between students’ graduate attributes and the requirements of the workplace, civil society, and democratic, participative citizenship” (Subotzky & Prinsloo, 2011; p.188).

## **Mapping macro, meso and micro institutional structural and organisational factors**

Much of the literature around learning analytics assumes that outcomes are determined either by the actions or characteristics of the individual – the student – or by the behaviours of cohorts of students at a module or subject level. Subotzky and Prinsloo’s socio-critical model (2011) provides a useful framework to examine a range of factors at micro, meso and macro levels which have the potential to impact and shape the institutionalisation of learning analytics.

### ***Macro factors***

At first glance, it may appear that few issues have any real impact on the implementation of learning analytics at a macro level. In this section, we make the case that the concept of habitus – the habits, skills, and dispositions shaped by life experiences – has relevance at each level – micro, meso and macro. At an institutional level, habitus will be influenced by the national context as well as by the views and perceptions of senior management. These will shape how data are defined, what data are collected and the underlying beliefs around what that data represents. In the context of learning analytics, analysis and action are often driven by available data rather than actual need. This can be exacerbated by a lack of political will to engage students in the meaning of their data, on what is collected, when it is collected and what other data may

provide both the institution and learners with a more comprehensive view of students' habitus and capital in the *student walk* (Prinsloo, 2017).

Similarly, the notion of capital – the assets that a party can bring to bear – has application across each level. The acquisition of capital is likely to be impacted by socio-economic and cultural contexts. It has been argued elsewhere that institutions have a fiduciary and moral duty to use their capital to ensure effective, ethical and caring and appropriate learning experiences (Slade & Prinsloo, 2013; Prinsloo & Slade, 2016). Not only must institutions provide ethical oversight on the collection and analysis of students' data to establish the scope and value of their *capital* (Willis, Slade, & Prinsloo, 2016), but they should also accept a contractual and moral responsibility to ensure the ethical allocation of resources in response to the analysis of student data (Prinsloo & Slade, 2017).

Learning analytics is often used to examine students' behavioural data which, in many respects, are the outcome of the interplay of their different kinds of capital in response to pedagogical strategies, curriculum coherence, stimuli and events in their life-worlds outside of their studies. It is pertinent to note that there is little evidence of equivalent reflection of the institutions' capital and how that capital is used to support and ensure effective, appropriate and high-quality learning journeys via the systematic collection, analysis and use of institutional data, across and between strategic and operational silos.

Institutions are often faced with regulatory issues, such as changes in the funding regime, which seriously impact and hamper both their offer and their response to operational challenges, increasing competition and supporting students. As Prinsloo and Slade (2017) indicate, institutions' ability to respond to students' identified risks and support needs, is, in many respects, "an elephant in the learning analytics room" (p.1).

### ***Meso factors***

Although students have a clear responsibility to contribute to their own student walk, there is less attention directed to other partners in that walk, namely faculty and support staff, and the institutions themselves. The current drive to collect as much student data as possible (without always knowing its potential purpose) is starkly juxtaposed by the lack of an institutional commitment and resource allocation to keep track of, surveil and build institutional profiles of actions taken by course teams and the ways in which support and study resource are allocated within courses and faculties. It is likely also that the existence of departmental silos leads to a loss of shared insight as well as subsequent inefficiencies and a lack of real understanding of both the raw data and the subsequent analysis.

Learning analytics can get "stuck in the middle" as a result of a focus on role of the student without equal consideration of the (in)actions of others in the learning journey. Similarly, the social domain of the institution – its culture, power relations, and dominant ideology – has a significant impact on academic and administrative strategy. Recognizing and addressing this is an essential feature of the socio-critical model (Subotzky & Prinsloo, 2011).



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The construct of *situatedness* has important implications for the potential of learning analytics to effectively address students' needs and risks. Learning, as proposed by Subotzky and Prinsloo (2011), is caught between the constrained agency of two players, namely students and the institution. However, given the asymmetries in the power relationship between students and the institution, and the ways in which institutional processes, rules and regulations impact on student learning, it would not be reasonable to take an approach to learning analytics which focuses only on what students do or don't do. Though students have agency, such that some of their decisions about learning fall within their loci of control, in practice their agency and loci of control are constrained. What students do or don't do is often in response to instructional and institutional intentions and (in)actions.

Another issue in the context of student (constrained) agency is that of student consent. Generally, it is assumed that students' acceptance of the Terms and Conditions at the moment of enrolment provides the institution with blanket permission to have their data collected, analysed and used. While the use of student aggregated data (as proposed in Academic Analytics) is provided for in the contractual, fiduciary duty of the institution, the ethics around the collection, analysis and use of individualised and identifiable student data to shape their learning is unclear (Willis, Slade, & Prinsloo, 2016). With changes in international data regulations (e.g., the European General Data Protection Regulation, GDPR), there is increasing pressure on higher education to develop a nuanced regulatory framework to ensure the legally compliant, but also morally justifiable option to allow students to opt-out of the collection, analysis and use of their data (Sclater, 2017).

### ***Micro factors***

We have access to increasing volumes of student data, and also to a greater variety, velocity and granularity of student data. Institutions harvest and analyse behavioural data, and combine this with demographic and historical learning data, and data from sources such as the library, student counselling, and, increasingly, from social media. As such we have increasingly detailed views of individual student identities, behaviours and networks. We use this data to understand and describe student learning, to diagnose their needs, risks and potential, to predict chances of success, failure and their need of institutional resources, and increasingly to prescribe personalised / individualised curricula, assessment, learning pathways and future enrolments. Such determinations are weakened when data is not complete or where proxies are used to substitute for missing datasets. Where data proxies are used in predictive analytics, there is also a danger of creating false positives, identification of individual students deemed to be at risk as a result of unrepresentative datasets.

In a learning analytics context, less attention is paid to the intra-personal domain of the student – the range of individual psychological attributes required for successful study, such as positive attitude and beliefs, self-discipline, motivation, and confidence since these are not routinely captured nor easily measured. There is a growing focus on the inter-personal domain – the

social interactions which can support learning and understanding (Ferguson & Shum, 2012; Perrotta & Williamson, 2016).

Subotzky and Prinsloo (2011) discuss how notions of causality and attribution, control and efficacy play out in the student walk. In the field of learning analytics research, there are concerns that data are used, incorrectly, to prove causality rather than simple correlation (Ferguson et al., 2016). For both students and institution, there are factors within the control (or perceived control) of students and/or the institution, but also many that fall outside the loci of control of both students and institution. It is often assumed that the mere act of identifying a factor in a student's strategies or learning behaviours, will allow that student to make a change. Although we should not label students as helpless, we should also not underestimate the impact of intergenerational, context-specific and structural elements which may constrain their self-efficacy and loci of control.

Subotzky and Prinsloo's five constructs (2011) culminate in the concept of student success. One of the many attractions of learning analytics is its promise of identifying students at risk of not being successful. Models of student success are often comparative – measuring current students against the characteristics, demographics and behavioural data of students who have previously successfully completed a course or programme. This can result in such feedback as “our research indicates that students like you...”. There is a danger in equating a predicted outcome based on historical student behaviours and characteristics with an actual outcome, effectively pre-labelling students as successful or not. In addition, Woodley (2004) warns that we should not pathologise student dropout in distance education contexts because the motivations and individual measures of what makes for successful study may vary. In this case, it becomes difficult to use the statement 'students like you' in any meaningful way.

## **(In)conclusions**

Learning analytics as a practice, discipline and research focus has matured. There are however concerns regarding a lack of evidence of its ability to impact positively on students learning (Ferguson & Clow, 2017), and suggestions that learning analytics is, in many respects, *imperfect* (Kitto, Sum, & Gibson, 2018). Though there is research that maps and explores the many factors that impact on the institutionalisation of learning analytics (Ferguson, 2012; Scheffel, Drachsler, & Specht, 2015), this paper provides a perspective on three levels – micro, meso and macro – of factors that shape and impact the effectiveness of learning analytics. Much of the learning analytics literature is focused on the individual student, at a micro level, and on how student characteristics and behaviours determine outcomes. This paper suggests that such a focus may be misguided. In viewing the factors which impact on student learning from a *socio-critical* perspective, we find that many (as identified through learning analytics and communicated to students, faculty and support staff through dashboards and early warning systems) may fall outside students' loci of control.

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## **CONNECT OR DISCONNECT: ACADEMIC IDENTITY IN A DIGITAL AGE**

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The 21<sup>st</sup> century has seen a rapid expansion of digital ways of working. Within higher education, there is an urgent need to ensure students acquire essential digital graduate attributes during their time at university while institutions themselves are moving towards more blended forms of design and delivery. This flexibility is particularly suited for increasingly diverse student cohorts, many of whom are combining part-time and full-time study with work and other commitments. Virtual learning environments which offer 24/7 access to digital resources, at a time, place and device of choice, have the potential to meet the complex demands of 21<sup>st</sup> century higher education. However, while the field of education technology research includes literature around how students learn as e-learners, there is less knowledge about how academic staff teach as e-teachers. Little is known about how they conceptualise their practice, in particular how they negotiate the processes through which academic identity on the internet is built.

A three-year investigation into the digital experiences of staff who teach and support learning in UK higher education explored what it means to be an academic in a digital society (Watling; 2014, 2015). Research participants were enrolled on a teacher education programme called Teaching and Learning in a Digital Age (TELEDA). The programme was developed and facilitated by the researcher, with data being collected from forums, reflective journals and end of course interviews. Learning activities included an introduction to using social media to build an academic profile. This not only highlighted lower than expected levels of digital literacies and confidence, it also revealed a reluctance to transfer professional identity into what was perceived as personal social spaces. While some academic staff appear digitally fluent, this appears to obscure a majority who have yet to make the necessary digital shifts in attitudes and practice. There is a growing disconnect between the requirements of 21<sup>st</sup> century higher education and the reality of digital shyness and resistance among staff who teach and support learning. This is resulting in a silencing of their academic voice. As the platforms for educational debate and discussion move online, those who have yet to connect and establish digital identities are being essentially excluded from participation.

To teach and support learning in 2018 means to become involved in a range of altered practices. Educators are required to navigate complex landscapes where traditional approaches and new perspectives collide. The open education movement has challenged historical conceptions around the acquisition, sharing and distribution of knowledge (Daniel, 2012). Digital literacies involve working with multiple media formats, including audio and video while bitcoin, blockchain and badges are all examples of new currencies with the potential to transform

traditional ways of working. Threaded throughout these changes are the pedagogic shifts from didactic transmission models of teaching to more student centred interactive approaches to learning design (Laurillard, 2002).

Of all the challenges currently facing higher education, the need to tackle the digitally divided practices of early and late adopters of technology enhanced learning, requires more attention and focus than it is currently receiving. The shifts from paper-text to digital-based knowledge production and dissemination, via teaching, learning and research, requires complex sets of literacies. These encompass the creation, curation, selecting, sharing and synthesis of knowledge from online as well as face-to-face perspectives. Overall, they can be seen to represent a broader set of social literacies which constitute the core elements of what it means to be an academic in a digital age. However, across the sector, universities continue to apply competency-based ICT training approaches to the development of digital skills. These deficit models of competence risk obscuring the realities of digital adoption and use which in themselves constitute complex and multifaceted landscapes.

Analysis of the data from the TELEDA research suggests a broader understanding of digital literacies as socially situated practices could be beneficial. Such an approach would constitute more meaningful engagement with literacies of the digital kind in order to usefully inform future development. This would be of particular value where institutions are seeking to support academics to make digital shifts from disconnected to connected academic identity and practice.

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## **MODEL-BASED APPROACH FOR PENETRATING EDUCATION SYSTEMS BY DIGITAL TRANSFORMATION KNOWLEDGE**

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### **Model-Based Approach**

Digitization penetrates all areas of social life and is one of the defining phenomena for the future development in science, business and politics. Digital transformations are characterized by high dynamics and high complexity. One of the biggest challenges for knowledge transfer in society is the near-term transfer of the latest knowledge on complex system developments from research, development and application in elementary, primary, secondary and tertiary education. Despite the variety of well-known research methods, the challenge of mastering complexity is growing (Epple, 2016).

Based on the theory of competence cells for the transfer of knowledge in industrial and economic networks (Müller & Riedel, 2003), including the related knowledge and competence networks, a theory of knowledge networks with the knowledge carriers as nodes and the knowledge flows as edges was developed, whereby new insights and applications were generated by exploration of the processes within the nodes and edges (Schumann & Tittmann, 2009). Similar considerations in educational research led to the design of the theory of connectivism (Siemens, 2004) as a counterpart to the prevailing constructivism. Common to all theories of this cluster is that networks can be scaled arbitrarily. Thus approaches can be used in particular for very complex problems.

Due to the pace and variety of the changes, it is difficult to examine individual areas empirically, normatively or formally in order to come to empirical or rational knowledge about the entire system. Therefore, the different methods of research are also networked. Therefore, quite different research methods are combined in a holistic approach. In addition, there is the danger to follow the real developments with the theoretically founded research results only with a time delay. That is why; the combination with the theory of action is

### **Holistic challenge of the exploration area**

Of course, the transfer of new knowledge and competence potentials from the field of digital transformation into the education systems is also characterized by individual sciences and special topics, but due to the complexity of the real world, it has to be traced back to a holistic approach of interdisciplinary nature, whereby the interconnection of humanities and social

sciences, medical and health sciences, natural sciences, engineering and technology as well as agricultural sciences (OECD, 2006) are explored in complex, interrelated fields of action. The whole is more than the sum of the parts, which is why, starting from the wholeness, individual parts of the system have to be identified, analysed, described and interpreted. The design should be done in the sense of an overall optimum.

The holistic approach also requires complex consideration from the macro level as a contextual level at the overall system level through the meso level as transactional level at the group and community level to the micro level as individual-organizational level at the intra- and interpersonal level (STEEP edition, 2015; Eco-Social Work, 2015).

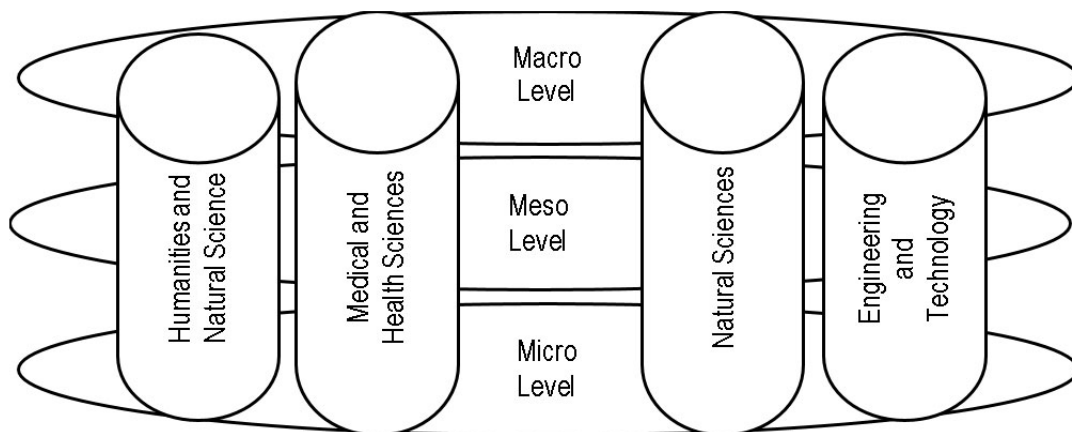


Figure 1. Holistic view of social levels and sciences

If knowledge and experience from transformations in general and digital transformations in particular are to be transferred into education, then the field of investigation has to be considered holistically, otherwise inadmissible simplifications and errors in the interpretation of the models may occur.

### **Variety and diversity of views and concepts**

The present state of analysis, description and interpretation of such complex processes as the digitization of social processes and functions as well as digital transformations of different systems require different disciplinary perspectives which in turn lead to a high variety and diversity of different concepts. If a two-dimensional clustering with the characteristics System, Model, Technology and Application in the first dimension and with the characteristics Business / Management, ICT, Production / Logistics, Safety and Engineering in the second dimension would be chosen, then even the matrix would have the complexity of  $4 \times 5$ , which would still lead to a comparatively clear semantic representation.



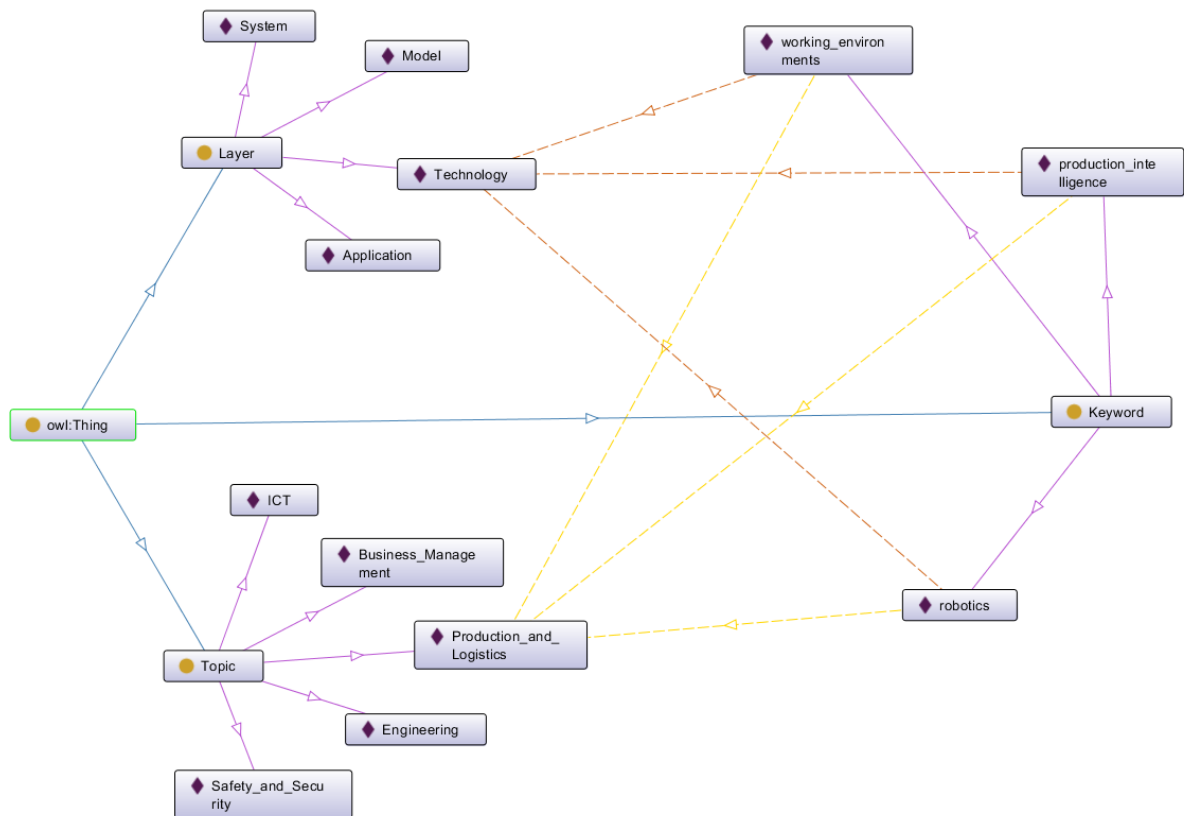


Figure 2. Semantic presentation of the holistic clustering for digital transformation (Gallenkämper et al., 2018)

Depending on which singular or multivalent perspective digital transformations are observed, described and interpreted, very different model variations arise for one and the same research subject.

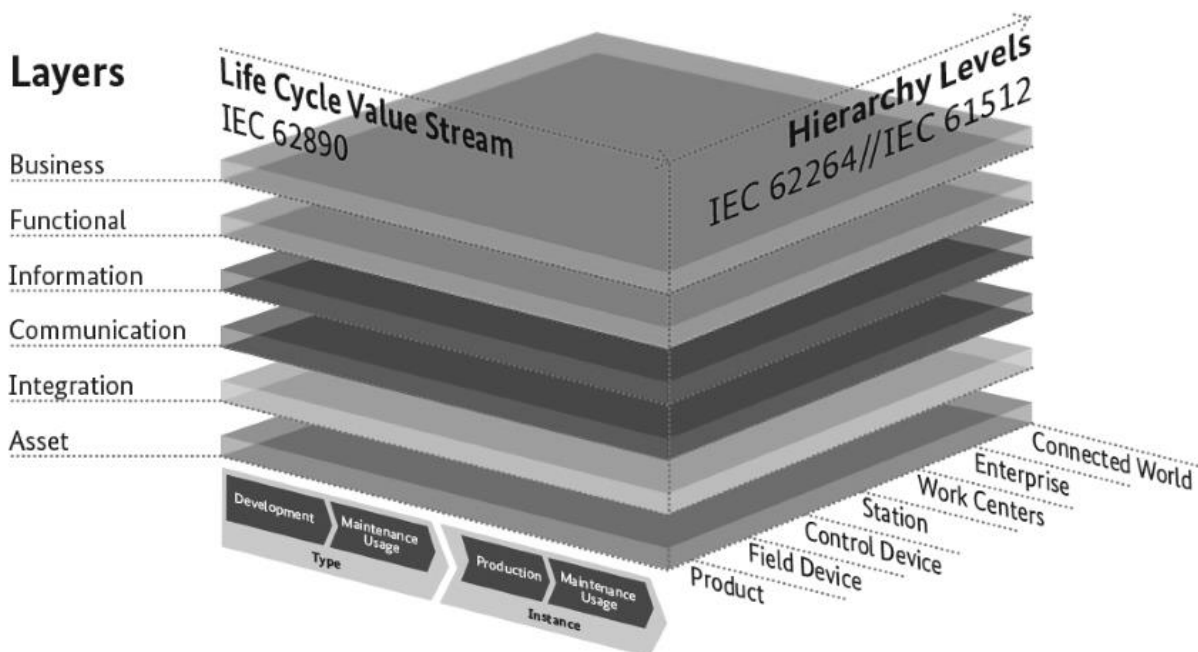


Figure 3. Reference Architectural Model Industry 4.0 (RAMI 4.0) (Adolphs & Epple, 2015)

If the same area of investigation is viewed from the viewpoint “World of Work” rather than from the viewpoint of industrial systems, different model approaches occur.

Table 1: Multi-layer model Working World 4.0

Incentives	Payment Flexibilisation Appreciativeness
Organisation	Project orientation Network organisation Lean organisation
Leadership	Collectiveness Self management Implicit leadership
Technology	Digital transformation Big data Smart system
Cooperation	Agile methods Inter- and transdisciplinarity Interculturality
Environment	Creative labs Smart working spaces Virtuality

### Impact of system engineering models

Systems are sets of objects between which relations exist. Systems theory is used for interdisciplinary explanations. System engineering offers models and tools for the research and design of complex tasks and applications. The goal is the successful planning, design, development, implementation and operation of systems. Systems engineering is closely related to software engineering. Engineering systematic was transferred to software development. New methods of software development are shared interdisciplinary, in particular through project management. One of the most recent examples is the dissemination of agile methods and procedures that were first applied to software development (Schumann et al., 2014). System and software development have verifiably influenced the design of new learning systems in the categories development philosophy, development process and lifecycle management.

Table 2: Impact of system theory and engineering modelling on educational design

	Selected Models of Software Engineering	Use cases of (digitalised) Learning Systems
Development philosophy	Prototyping Agility / Scrum	Design of frame degree programs Developing of new curricula in education networks
Development process	Rational Unified Process Waterfall model Spiral model V-Modell	Automated generating of tutorials Creating of multimedia sequences Developing of Content Management Systems Knowledge transfer based on structured knowledge bases

Lifecycle management	Product Lifecycle Management	Development, application and reengineering of certification tracking
	Capability Maturity Model	Defining of degree of digitalisation of education programmes
	Control Objectives for Information and Technology	Controlling of the use of e-learning in educational organisations

The V-Modell (2006) was explicitly selected for further consideration, because it includes not only the analysis and decomposition of the task, but also the subsequent synthesis and composition of the educational application including the corresponding quality assurance. In addition, the design of knowledge transfer in teaching and learning systems was successfully established in this way and is used in particular for tasks of the public sector on development standards.

### Approach by using V-model in curricula development

The multi-phased approach from requirements analysis to module design in a top-down process is described on the left side of the model. Equivalently, there is one phase each on the right-hand side for reviewing previously developed concepts and solutions. This results in different views at different levels of detail, which ensures the direct involvement of all stakeholders in the development process, depending on their role.

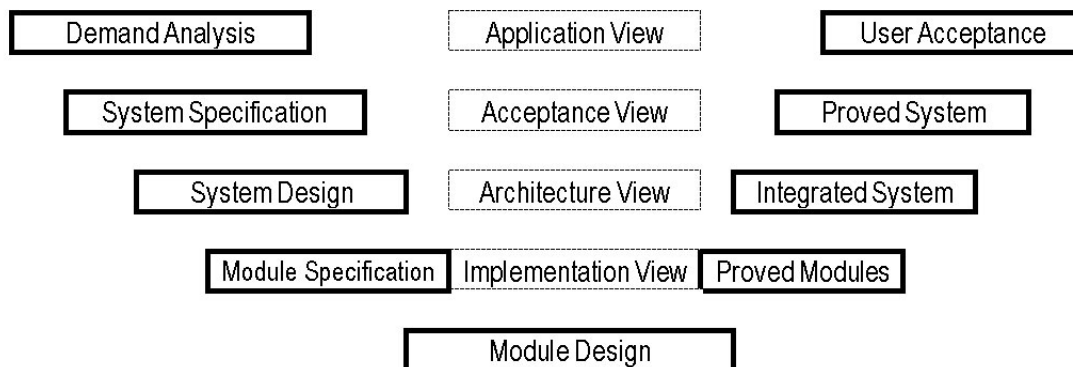


Figure 4. Architecture of the general V-Model

If this general development perspective is applied to the course design, especially of the curriculum, a specification of the contents is done, while preserving the basic idea of development and the better mastering of the complexity.

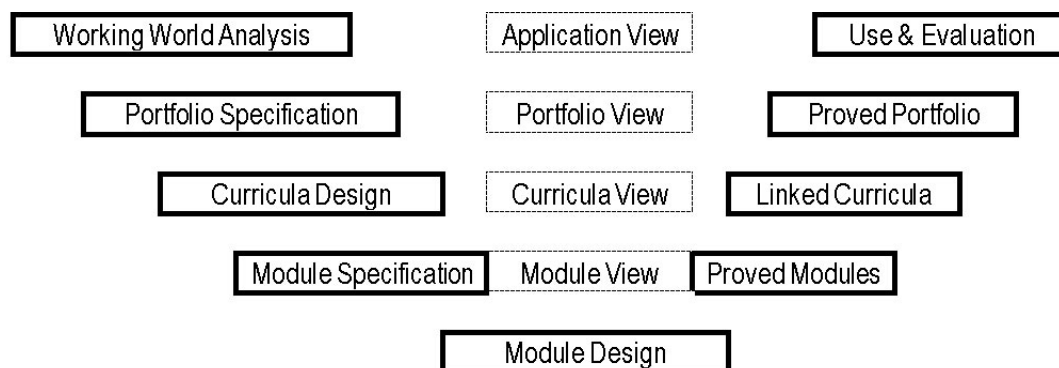


Figure 5. Architecture of the V-Model in course design

Thus, even in more complex educational networks, new study programs can be professionally designed in a short time and in high quality, while respecting the individual needs and stakeholder demands.

### Case study and results

The process model was successfully used in the development of new double degree programs in national and international educational cooperations, for example in China and Mexico, in combination with other methods of system and project development. The interdisciplinary program for Business Administration and Engineering (BizEng) was designed in a basic version, subsequently built up by four different profiles, and then additionally expanded to include “Digital Transformation / Industry 4.0 (DT I40)” profile.

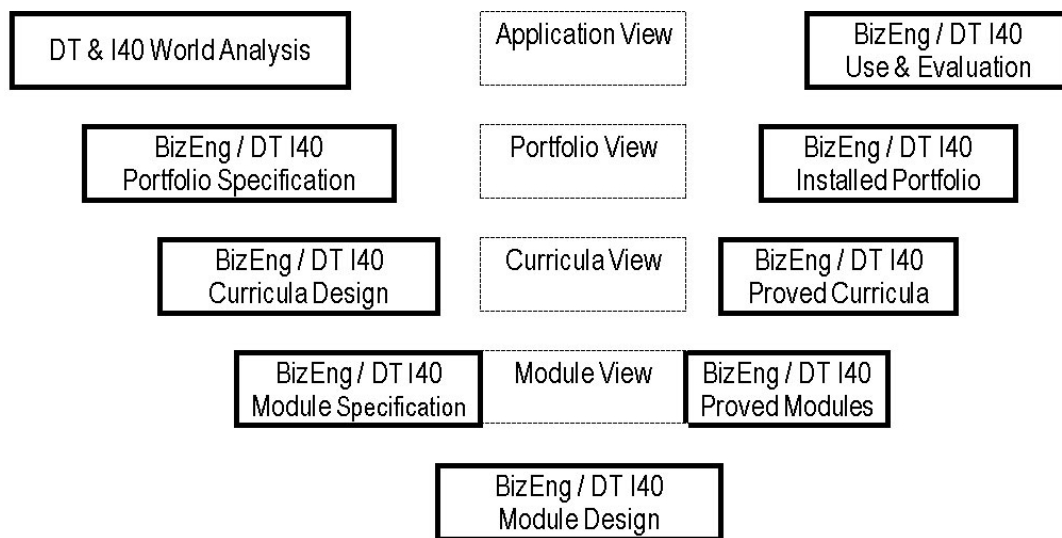


Figure 6. Architecture of the V-Model in course design for Digital Transformation & Industry 4.0

Once the standardized procedure has been introduced procedurally, contextually and organisationally, it can be ensured even for complex applications that derivatives can be derived in a target group-specific and output-oriented manner in a short time and in high quality. Hitherto, several variants of distance learning with different partners have been developed for the entire program as part of PPP models. Thus, a significant contribution is made to transfer the latest research results in the field of digital transformation into teaching as quickly as possible.

### Perspectives

Content and form, purposes and objects, methodology and didactics of knowledge transfer concerning digital transformations are subjected to a constant change, which simply results from the dynamics of the development of the real world. From a strategic point of view, this means for 2018 and the following time (Evans, 2017):

- Digital insight – from platitudes to actionable perspectives.
- Digital frameworks – from DIY to off-the-shelf platforms and accelerators.

- Digital intrinsic agility – from destination focus to continuous journey focus.
- Digital balance – from gregarious disruption to ethical disruption.

The changes are extremely fast. The major trends in 2018 will be: The IoT will push as to the edge, blockchain finds its way; AI goes from newbie to mainstream, VR goes from hero to zero, failure as a service, culture remains hurdle, and digital transformation becomes a must (Newman, 2017).

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## **A PRACTICE ORIENTATED FRAMEWORK TO SUPPORT SUCCESSFUL HIGHER EDUCATION ONLINE LEARNING**

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### **Abstract**

Since the year 2000 learning online has grown considerably and various models have evolved to support strategic planners and practitioners' decision making. The Joint Information Systems Committee (JISC) pedagogy strand helped to classify a wide range of models under six headings. These classifications have been further analysed and expanded to create a practice orientated framework for modelling online learning.

The purpose of this study is to present practical examples of pedagogic and educational practices that support successful Higher Education online learning, using the classifications of the aforementioned practice orientated framework. It is hoped that the study will provide strategic planners and practitioners with a framework and examples of successful strategies with which to investigate their own organisational practices and shape their own successful online learning strategy.

### **Introduction**

In 2011, the year in which our online learning department began, the social landscape was changing significantly. On the one hand Web 2.0 was routine, the smart phone was ubiquitous and Facebook permeated all walks of society, on the other hand these changes in the social landscape had little impact on our educational landscape. Granted, academics became more aware of the Virtual Learning Environment's (VLE) social tools but the experimental usage of these tools to offer Higher Education to a wider audience was limited to a few enthusiasts. The reality for the online learner was often sporadic support, resulting in emails waiting to be read or queries waiting to be answered. This disjointed approach did not result in an excellent student experience.

Recognising the opportunities that online education could offer, the University of Derby could either continue to grow their online audience slowly or they could take the radical step to remove online development and delivery from faculties and create a specialist department dedicated to this mode of delivery; the University chose the latter and University of Derby Online Learning (UDOL) was born. The department has been successful in terms of growth; in 2009 the University's HE student population reached 20,053 with 649 being online across 7 programmes, this was approximately 3% of total. In 2017 this has risen to 3,500 students in 40 major awarding programmes, approximately 15% of the University's HE student population (University of Derby Online Learning, 2017). Whilst this growth indicates success, other

indicators may more usefully elucidate how successful UDOL has been pedagogically and in the eyes of its learners. This paper charts UDOLs journey from 2011 to the present day, using a practice orientated framework to evaluate the impact of interventions on the online student experience.

## **Background**

In order to understand why the University of Derby decided to create a specialist online learning department and how it has evolved from 2011 to the present day, it is first necessary to place it in the context of earlier developments. The year 2000 was a significant starting point for the evolution of eLearning, this coincided with the introduction of the social web 2.0. Throughout the decade, learning online became more available through low level compliance testing (eLearning), more distributed via a combination of books, eBooks and email type support (distance learning) and more social through Virtual Learning Environment (VLE) integrated platforms of learning with embedded social communication (online learning). During this decade eLearning enthusiastic academics created a plethora of models to conceptualise eLearning, this was not surprising in this era of innovation but it was difficult for educators to be discerning about which models to adopt and in particular, which models would be appropriate to Higher Education. JISC, the Joint Information Systems Committee, founded in 1993 was well placed to take up the challenge of reviewing and translating good practice for post 16 educators; one such output in 2004 was an overarching common framework to describe and model eLearning (Beetham, 2004). The aim of the first part of this project was to collate models of eLearning and organise them under six classification headings (Mayes & de Freitas, 2004). Using these classifications, we reviewed the eLearning landscape, adapting and enhancing our understanding to create a framework that was applicable to our own context. The resultant “Practice Based Framework for Modelling Online Learning” applied in UDOL, guided our overarching online learning strategy.

### ***A Practice Orientated Framework for Modelling Online Learning***

In 2004 the Joint Information Systems Committee (JISC) pedagogy strand reviewed a wide range of models and created a common framework so that post 16 educators could systematically determine their eLearning priorities. The framework provided examples of good practice under six classifications. Further analysis of these classifications revealed that they too could be organised into two main categories; those that were pedagogy focused and those that were education planning focused. We proceeded to organise the six classifications as follows:

- Pedagogic Classifications – Theoretical accounts, taxonomies and ontologies and practice models;
- Education Planning Classifications – Standards and specifications, organisational models and practical accounts.

Although our intentions had changed from eLearning to online learning by 2011, we believed that the classifications remained sound and provided a prototype that we could use to shape our online learning strategy. With the addition of horizon scanning we used this framework in



## A Practice Orientated Framework to Support Successful Higher Education Online Learning

Paula Shaw

conjunction with evidence and anecdotal accounts of good design from within the University as a starting point. Annually this common framework is reviewed and adapted to the changing landscape; adding and removing key drivers in each of the classifications. The model below illustrates our evolved framework for 2017, with horizon scanning sitting centrally, crossing the boundary between pedagogic and education planning.

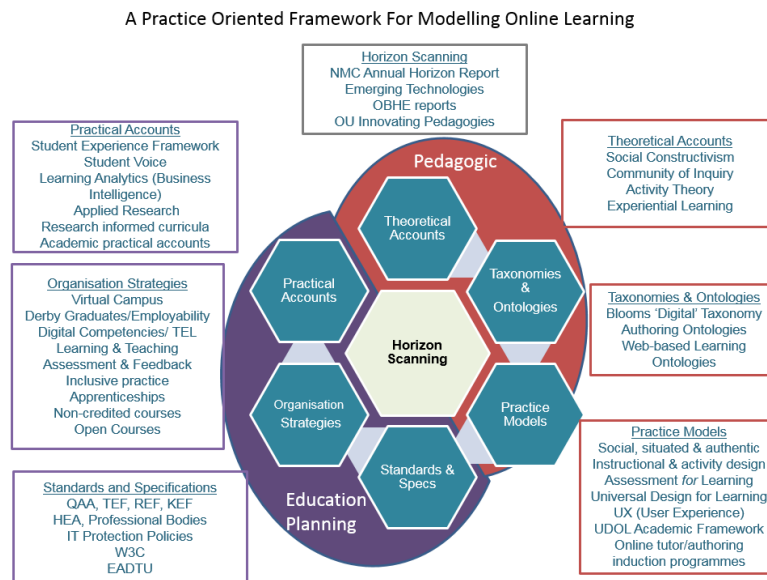


Figure 3. 2017 Practice Orientated Framework for Modelling Online Learning in UDOL (Shaw, 2017)

Recognising that it is not possible to discuss each model in the framework; this paper focuses on specific online learning models to reveal an alternative story of pedagogic success and student satisfaction.

## Horizon Scanning

### NMC Horizon Report

The New Media Consortium (NMC) Higher Education Horizon report, issued annually, is incredibly important to shaping our online environment. This ongoing research project is a collaborative effort between the NMC and the EDUCAUSE Learning Initiative (ELI) and seeks to identify emerging technologies; key trends, significant challenges and important developments likely to have an impact in the short, medium and long term. The application of “big picture themes” drive pedagogic and educational planning changes, thus this is central to both. The 2017 number one key theme resonates with our practice framework:

*“Advancing progressive learning approaches requires cultural transformation. Institutions must be structured in ways that promote the exchange of fresh ideas, identify successful models within and outside of the campus, and reward teaching innovation — with student success at the center.” (Beker et al, 2017; p.2)*

Other key short term trends in Higher Education technology adoption permeate our framework these being; collaborative learning, a growing focus on measuring learning, redesigning

learning spaces, improving digital literacy and rethinking the roles of educators. However, it is prudent to monitor the mid to long term future technology developments as well, in particular; next generation LMS, artificial intelligence and natural user interfaces. (Ibid, 2017)

## **Pedagogic Classifications**

### ***Theoretical Accounts***

#### *Community of Inquiry*

The Community of Inquiry model (CoI) is “a process of creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements – social, cognitive and teaching presence” (Garrison et al, 1999). Moreover, the model does not attest to be a “catch all” for eLearning and Distance Learning modes of delivery as some critics suggest (Annand,2011), Garrison’s (2011) reply to such suggestions is that “In such contexts there is little reason or incentive to engage in collaborative inquiry”. Hence, this model specifically helps us to elevate the social element of online learning, whose importance could be undermined in other models, to the same standing as the teaching and cognitive elements. However, it is salient to note that the model is portrayed as a Venn diagram and it is the overlapping elements of social with teaching, social with cognitive and teaching with cognitive that provides the most informative insights into the online educational experience. A critical feature we introduced in our module design was the *Community space*, it is in this space that social learning takes place activated by good content design and engaging eTivities, influenced by Salmon (2002).

#### *Activity Theory*

Activity Theory (Engeström,1999), essentially an ergonomic framework for analysing human-computer interactions, provided a way of analysing the needs of learner when interacting with mediating artefacts, rules, the community and divisions of labour. This framework is useful at the strategic level to visualise usability. Designing an effective, efficient and satisfying online experience at the point of human-computer interaction, is not easy to visualise without traversing it as a student. Analysis of the end to end online University experience revealed that students had to access many separate IT tools; the University website, online application form, VLE, integrated teaching tools, finance, grade centre, library services etc., each having its own access point, look and feel. This journey was disjointed, creating an unnecessary and distracting cognitive load for students studying online. The upshot of this analysis was the creation of an online student access portal and later a virtual campus, both of these are discussed later.

### ***Taxonomies and Ontologies***

#### *Bloom’s Digital Taxonomy*

2011 signified a step change from distance learning (eLearning with customer support) to fully integrated online learning, with the ambition of creating a virtual campus. Staff, customer service and academics, that chose to work in the department would need to understand that they were entering a different environment; one which champions online social/teaching presence and social/cognitive presence. This brought with it new vocabulary, learning design

## **A Practice Orientated Framework to Support Successful Higher Education Online Learning**

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ontologies and remastered taxonomies. The well-known Bloom's Taxonomy; revised by Anderson and Krathwohl (2001), was reified by Churches (2008), providing practical, digital examples for each of the psychological domains. This enabled us to talk about online learning using a well-understood taxonomy along with practical examples of digital practice.

### ***Practice Models***

#### *UDOL Academic Framework*

In 2011 it was clear that if we were to fully embrace the new vocabulary and practice approaches, we needed a framework that content authors and module teachers could easily comprehend. The UDOL Academic Framework clarified operating standards, stating in particular the immediacy of response (ideally within 24 to 48 hours) and the frequency of facilitated tutor engagement (5 times per week). It also embedded the Community of Inquiry principles, providing guidance for academics on the use of the social tools; discussion forums, blogs and wikis, and how they are best integrated into module design and assessment. This framework was approved by the University's Academic Board in 2013. Moreover, the UDOL Academic Framework recognises the additional user experience (UX) "ramp" to participating online; aging computers, poor internet quality, disabilities and poor technology skills all affect the individuals' ability to participate fully. This is compounded when learners encounter poor navigation and instructions, or perceive detachment from the tutor. In 2014 the negative effects of this were moderated by the introduction of a tutored online induction programme for all online teaching academics. This induction programme encourages good practice in online teaching and provides participants with an experience of being an online learner themselves.

#### *Instructional, Activity Design and User Experience*

Content authoring is closer to eLearning than online learning and is a whole paradigm away from classroom teaching, so it is unsurprising that traditional academics generally find it difficult to conceptualise. Perseverance, continuous dialog, practice examples and the recruitment of learning designers have all helped to create better online learning experiences. Activity Theory (Engeström, 1999), provided the framework for supportive dialogue to address usability in 2011, when the first module template was introduced. Every module from this point onwards would use the same menu nomenclature and house content in the same place, to create a consistent look and feel to all modules. Using elements of Behaviourism (consistent and repetitive tasks) this module template enables students to learn how to navigate within modules without having to learn a new process each time they move on.

#### *Universal Design for Learning*

The initial 2011 framework included Andragogy as a practice model, to reinforce the fact that we support adult learners. However, this model has continued to be challenged and as our learner demographic has changed, it has become less appropriate. Sandlin (2005) listed the critiques as: it is not value neutral, apolitical, inclusive of gender and class; it silences voices, ignores other ways of knowing and the relationship between self and society and it reproduces inequalities. These critiques could not be ignored and a more palatable way of visualising

inclusivity was embedded. Universal Design for Learning (UDL) is described as ‘including representation, expression, and engagement whilst reducing barriers with appropriate supports and challenges built into instruction’ (U.S. Department of Education, 2010). This accessible and socio-politically neutral approach is more applicable to the online environment. Reinforcing this whilst designing content and activities we avoided applying a UK-centric view. Nevertheless, it remains difficult to be inclusive of all contexts e.g. learners within specific countries. We address this by asking learners to reflect on their own contexts and discuss these with their peers, thus the students themselves help to expand all module participants’ world view.

## **Education Planning**

### ***Standards and Specifications***

#### *World Wide Web Consortium W3C*

The issue of educational online accessibility was little understood and underrepresented. Whilst the commercial world recognises and adheres to web-based accessibility standards, the application of these standards in educational settings was ignored even though, in our case the use of the Blackboard VLE is widespread across the University. Recognising that our statistics consistently show higher than average numbers of disabled students choose to study online, we presented an argument for making accessibility a high priority in our web-based materials design; showing that there are economic benefits to implementing accessibility in the early stages of learning design that benefit all students. A course that is planned to be inclusive of all people (including educators who may have a disability) is much more effective than courses that undergo a belated accessibility retrofit (Ellis, 2011). By 2012 the quality of content authoring and production was enhanced and transferred to the first Content Management System (CMS). Since then we have ensured that our technologies, websites, and content, are fully optimised for students with disabilities by applying a W3C WCAG 2.0 standards checklist (World Wide Web Consortium, 2008) as part of the content sign off process.

### ***Organisational Strategies***

#### *Virtual Campus*

In 2012 UDOL recruited its first Online Learner Advisors to specifically cater for the pastoral care of its students at a distance. This, a predominantly phone and email support service, helped to reduce the navigational cognitive load learners encountered in our environment. Later in 2012 a student portal was designed; a single entry point to access all the University’s services, news and information in one place, presented as user friendly tabs and icons. In 2013, we invited a student panel to help us to refresh the landing page, improving the user experience, look and feel of the environment. To complement the student portal, we had ambitions to make the online student experience equal to that of a campus student; ensuring that online students have access to all the same student services opportunities but accessed in a different way, a *virtual campus*. In 2014, our virtual campus began to take shape, the Student Wellbeing team initiated a Service Level Agreement which led to changes for the benefit of online learners. Student Wellbeing Service appointed two counsellors that have experience of counselling via the

## **A Practice Orientated Framework to Support Successful Higher Education Online Learning**

*Paula Shaw*

internet. Encouraged by the Student Wellbeing approach, other Student Services followed suit to reimagine their offer and to ensure that our virtual campus wasn't a deficit model. Skype appointments and a timetable of live interactive webinar sessions were introduced that included workshops with colleagues from the library, study skills, careers and student wellbeing. In 2015 with support from the careers department and based on graduate skills identified through research (Jackson et al, 2013), a free resource "Personal Development Planning for the Digital Age" was developed and integrated into every online module. This resource continues to support the development of graduate attributes and digital capabilities.

### *Open Courses*

In 2014, to increase the pace of innovation the University created a digital Innovation Hub. They were tasked with bringing University of Derby MOOCs to the masses. By 2015 thousands of learners engaged with the "Bridging the Dementia Divide" MOOC and MP Pauline Latham OBE hosted the University of Derby at an event at Westminster to raise awareness of digital solutions to combating Dementia. Learning from the MOOC's "testing in the wild" experience saw the introduction of digital badges for achieving micro-learning, Leach et al. (2016) demonstrated that digital badges enabled MOOC learners to stay motivated and on track, with higher than average course completions. These learnings have been integrated into our main programmes.

### **Practical Accounts**

#### *Student Voice*

The student voice provides a measure of our success in the eyes of our learners, analysis of student feedback surveys between 2014 and 2017 reveal that student satisfaction in teaching, course organisation, challenge and overall satisfaction has constantly achieved 75% or above (University of Derby, 2017). Yet, despite our extensive pedagogic and strategic approach there is still room for improvement, feedback surveys also indicate that some students sense a lack of community, some feel that they don't have the right opportunities to work with other learners and others don't feel comfortable participating or being "forced" to participate with others (ibid. 2017). Nevertheless, we have a robust online framework underpinning our activity and we have demonstrated that we can evolve, enhance, refine and reflect on our approaches, in 2017 the University took part in the Teaching Excellence Framework (TEF) rating pilot, of which online learning contributed to our TEF Gold award.

### **Conclusions and Recommendations**

In conclusion, what has been the impact on academic staff and their development? Anecdotal practical accounts have implied that there is a greater team spirit, openness of ideas, support of each other in the use of technology, innovation from cross disciplinary working, efficient work practices to manage the challenges, clarity, purpose and confidence in working in this relatively new paradigm. As the University starts to explore new more innovative platforms, these academics feel well placed to rise to new challenges. On the other hand, College academics not immersed in this activity feel relatively excluded and continue to be tested by this paradigm.

We will look to organisational strategies and research accounts to disseminate good practice more widely.

What has been the impact on student services? By engaging in a virtual campus these colleagues have learnt new skills that they have applied to the core provision. Now they offer out-of-hours remote appointments, live webinars and drop-in sessions for students that are unable to attend the main campus during daytime hours.

What has been the impact on our online students? We now have a more inclusive environment with their best interests at the centre of our practice. We recognised the ‘ramp’ to participation due to gender, location, language, technology and skills, and we need to continue to work harder at creating a community of staff and students. We appreciate that some will continue to need the additional pastoral support and that academic content designers and module teachers need to continue to improve module scaffolding to develop a deep sense of trust so that everyone feels comfortable and can benefit from the collaborative-constructivist environment and peer learning.

I would recommend investigating ways of strengthening the virtual campus and creating a greater sense of community, be this through new VLE designs or social interventions. Using practice models, I would recommend further analysis of how students engage in peer groups, this would also help us to better understand the group dynamic.

Further research investigation could be conducted using the CoI model to baseline the student experience fully, using the annual feedback surveys as a litmus test of their perceptions. Leading from this it is possible to test the impact of strategic educational planning and pedagogic changes in the future.

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## **THE FRENCH THEMATIC DIGITAL UNIVERSITIES – A 360° PERSPECTIVE ON OPEN AND DIGITAL LEARNING**

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### **Abstract**

This paper presents a 360° analysis of the role of the French Thematic Digital Universities, national consortia of Higher Education Institutions, from the perspectives of policy (macro), institutions (meso) and support for digital teaching and learning (micro). We trace the history of the development of these organisations since their creation in 2005, including insights from a recent report by the General Inspection of the Administration of National Education and Research, highlight the interactions between international, national and local initiatives and provide concrete examples of how the Thematic Digital Universities are contributing to the development of Open and Digital Learning. Key questions include how to reinforce the visibility and reputation of these consortia, including recognition of their transversal role in the French higher education landscape, how to develop engagement with Open Educational Resources and Practices on the part of both teachers and students and how to contribute to furthering interdisciplinary research in the field.

### **Introduction**

The French “Universités Numériques Thématiques” or Thematic Digital Universities (TDUs) are national consortia of Higher Education Institutions (HEIs) dedicated to the production and dissemination of digital learning resources. They total eight in number, covering the major disciplines or disciplinary families.

As we shall see in this paper, the TDUs have a somewhat complex history, are structured in different legal forms and have faced periods of doubt and uncertainty, not least with the advent of MOOCs and the shifting priorities of public policy. This paper draws largely on a recent report by the IGAENR – General Inspectorate for the Administration of National Education and Research (Delpuch de Saint Guilhem, Dubourg-Lavroff, & de Longueau, 2016). At this point, a few words should be said about the IGAENR, in order to understand the importance of this report to the Minister for National Education Higher Education and Research and to the Secretary of State for Higher Education (at the time of publication of the IGAENR report, a single Ministry covered all levels of education and research. Since June 2017, under the Philippe government, HE has been covered by the remit of a separate ministry, the Ministry for Higher Education, Research and Innovation). The IGAENR reports directly to the Ministers of National Education and Higher Education and Research. Divided into six territorial groups, it has jurisdiction over all administrative aspects of the education system, higher education and



research. It monitors the implementation of educational policies and their overall impact (MEN, 2018). The fact that such a high-level administrative structure was asked to produce such a report is a sign in itself of the political importance given to the future of the TDUs, and the report itself thus benefits from a high degree of legitimacy.

The paper also draws on other analyses by French academics of the context of French Higher Education in general (Musselin, 2017) and of the digital learning landscape in particular (Miladi, 2006; Thibault, 2007). It starts with an account of the historical development of the TDUs, placing this in the wider context of evolutions in the national HE landscape, before providing insights into the contribution of the French TDUs to the uptake of digital learning resources and practices since 2005, through the lenses of national policy, relationships with their membership, development of engagement with digital learning among teachers and students, and finally their contribution to research.

### ***Historical development of the TDUs***

As the IGAENR report indicates, the origins of the TDUs can be traced back to the 1990s, with the RUCA (University Network of Self-study Centres) initiative “Premier Cycle sur Mesure” (personalised undergraduate programmes), in which member universities pooled resources in a coherent, unified pedagogical approach. (Delpech de Saint Guilhem et al., 2016).

The early 2000s saw the development of the direct precursors to the TDUs, known as Campus Numériques (CN). While the direct translation of this denomination is Digital Campuses, the CNs are perhaps better understood as Virtual Campuses, with an offer of Open and Distance Learning (ODL) opportunities provided on a broad disciplinary basis by consortia of HEIs.

Thibault (2007) provides a semantic analysis of official texts relating to the CN initiative, noting that it took several years before a clear definition of the CNs was provided. Until then, indications of Ministry of Education expectations are to be gleaned from the successive national calls for proposals, for example in 2000: “develop an ODL offer and promote it at national and international levels”; in 2001: “promote a higher education ODL offer”. In 2002, official texts finally provided the aforementioned definition as follows:

*“A ‘Campus Numérique’ is defined as a learner-centred training system which proposes innovative services via digital technology. It enables the learner to access the course from close or distant locations according to times and rhythms chosen by the learner, and throughout his or her life”.*

There is also reference to collaboration between HEIs, public/private partnerships, international partnerships, flexible modular design, personalised pathways consistent with ECTS, building bridges between Initial and Continuing Education, with, according to Thibault (2007), implicit reference to the European Union e-learning programme. Indeed, in 2002-2003, one of the CNs, CANEGE, is designated by the French Ministry of Education to participate in a case study carried out by the consultancy firm PLS Ramboll as part of the wider European Commission study on Virtual Models of European Universities.

Another analysis of the CNs (Miladi, 2006) presents them in the form of systems articulating learning resources, services (individual and group tutoring using different techniques: phone, email, forums, videoconferences, periodic groupings ...) and logistics (administration of the network and platforms, maintenance of necessary software, management of secure access, administrative management) to achieve the goal of building a flexible offer in initial training as well as in continuing education.

A major shift comes in 2003, with the announcement of the launch of the TDUs. Here the focus is no longer on offering training courses, but on producing resources. Again, no official text formalised their missions, their organisation or their legal status, although their main aims were described as contributing to student success, facilitating academics' digital production through providing access to reusable artefacts and a variety of tools, and offering a wide-reaching national and international visibility of French Higher Education and its "pedagogical heritage" (Delpech de Saint Guilhem et al., 2016; p.5).

From the integrated ODL training systems offered by the CNs (in addition to the long-established ODL programmes provided by individual HEIs), we thus see a move to the production of national catalogues of learning resources, again organised along the lines of the broad disciplinary families:

- AUNEGE: economics and business studies;
- IUT en ligne: technical studies, linked to the national network of Institutes of Technology;
- UNESS: health sciences (medicine, pharmacy) and sport;
- UNIT: engineering and technology studies;
- UNJF: law;
- UNISCIEL: science;
- UOH: humanities;
- UVED: transversal initiative covering Environment and Sustainable Development.

The TDUs take on different legal forms (association: AUNEGE; foundation: UNIT; foundation then Public Interest Grouping (GIP): UVED; GIP: UNJF, UNESS; Scientific Interest Grouping (GIS): UNISCIEL; Inter-university department: UOH) and in 2016 involved 110 universities, engineering schools and research institutes, many of whom are members of several TDUs.

2012 saw another major disruption with the creation of the France Université Numérique platform, part of a wider Digital Agenda for Higher Education but which quickly became overshadowed by the high-profile FUN-MOOC initiative. Furthermore, the development of local institutional strategies for digital education and the merging of HEIs into larger structures (Musselin, 2017) known as COMUE (Communities of Universities and Establishments) weakened both the national approach and the disciplinary groupings inherent to the TDUs. For several years, the TDUs were left in some doubt as to their continuing existence, in the face of dwindling financial support, fluctuating priorities set by the Ministry and the loss of an already fragile visibility both at national level and among their member institutions.

However, the 2016 IGAENR report, while pinpointing the weaknesses of the TDUs (perceived by HEIs as opaque and complex; a lack of notoriety; different expectations of students and teachers with respect to digital learning resources) concluded that the TDUs do in fact have an important role to play in the HE digital learning landscape. Over the years they have not only created a large base of over 34,000 resources, but have also demonstrated their capacity to develop large-scale collaborative projects at both national and European level, and to develop valuable tools to contribute to student success and to the promotion of French scientific and technical culture. The IGAENR report thus formulates a series of recommendations addressed at both the Ministry and the TDUs themselves.

Firstly, it is recommended that the Ministry clarify the missions of the TDUs, develop a multiannual framework setting out the thematic priorities, set up a working group to drive the move towards an integration of the TDUs with FUN-MOOC, reorganise and reinforce the Ministry department for Digital Pedagogy and coordinate the programming of the digital and pedagogical axes of the different national calls for proposals. Still addressed to the Ministry are recommendations to reinforce the communication around the TDUs' actions and resources and to conduct an annual or biannual satisfaction survey.

Recommendations addressed specifically at the TDUs are to join forces under a single legal structure to provide HEIs and COMUEs with a single administrative access point; to mutualise transversal support functions; to harmonise their calls for proposals and their membership subscription fees and processes. Transversal working groups should be set up on issues such as certification, standardised IPR contracts, conditions for opening up the source codes of the resources produced, evaluating and measuring usage of the resources, contributing to a national Learning Analytics model and coordinating relations with the AUF (national Agency for the promotion of French HE in the Francophone world). A final series of recommendations at the Ministry, TDU and institutional levels cover the need to support related initiatives, strengthen links with library services, set up reward mechanisms to recognise the contribution of academics to pedagogical development in their careers, develop Life Long Learning, evaluate the resources produced by the TDUs, integrate digital competency frameworks and initiatives for both teachers and students and initiate a legal study on the distinction between Open Educational Resources (OERs) and other forms of resources.

In the Spring of 2018, two years after the publication of the IGAENR report, progress has been made, in particular in the relationship between the TDUs and the Ministry. They now have a 3-year contract with the Ministry, setting out their objectives and resources for the period, their operating costs are partly covered by annual grants and they are in a stronger position when replying to national calls for proposals. Two of the TDUs (UNIT and AUNEGE) have joined forces under a single legal umbrella structure, while still maintaining their disciplinary identities, and events such as FAN, the Autumn Digital Festival are organised jointly by several TDUs.

After this historical account, we now turn to a thematic approach, looking at the relationship between the TDUs and current national policy, their relationship with their members, how they

are developing teacher and student engagement and finally their contribution to research. The initiatives described are not intended to be exhaustive, but simply to illustrate through concrete examples. There are necessarily many more TDU projects than there is space to describe in this article, and the reader is therefore encouraged to explore further via the individual web portals of each TDU, accessible from the website (<http://univ-numerique.fr>) set up by the TDUs themselves due to a loss of visibility on the current national digital portal for HE (<http://www.sup-numerique.gouv.fr>).

## **The TDUs and national policy**

As with the “Campus Numériques”, the relationship of the TDUs with the Ministry of (Higher) Education has been largely defined by national policy priorities. In fact, as we have seen, the Ministry did not define from the start what it expected of the TDUs. The authors of the IGAENR report conclude that the TDUs have a major role to play, are in line with international conclusions on the need for pooling resources in areas where single HEIs are not necessarily equipped to do so, and recommend focussing on 5 priority areas:

- Producing resources to support the transition from secondary to higher education.
- Producing core resources for bachelor level courses.
- Tools to support bachelor students.
- Technology watch.
- Actions to support inclusion of disadvantaged populations and for the development of the Francophone digital space.

As we can see, support at bachelor level is a clear priority. In the French HE system, any student with the baccalauréat, the secondary school qualification obtained by 87,9% of school leavers in 2017 (MEN, 2017), has the right to a place at university. With the massification of higher education and the diversification of the student population, French HE faces a significant challenge in terms of completion rates at bachelor level.

Prior to the 2018 ORE law (Orientation et Réussite Etudiante, for Orientation and Student Success), the French Minister for Higher Education Research and Innovation Frédérique Vidal addressed the TDU community with a video message at the opening of the 2017 FAN event. This message focussed on Ministry expectations for the TDUs to contribute to student success, with resources and initiatives covering pre-requisites for higher education studies and to support remediation. At this point it should be mentioned that the notion of pre-requisites has faced a certain degree of resistance from staff and students opposed to the idea of introducing a form of selection for entry to French universities, and also that resources alone are insufficient to meet the learning needs of already fragile populations. However, a certain number of existing or new TDU initiatives can be seen to address this issue, for example:

- UNISCIEL – resources covering the core science curriculum and a bank of multiple-choice questions which can be embedded in a university Moodle;
- IUT en ligne – resources to support the transition from secondary to higher education;

- UVED – partnership with an *académie* (regional education body of the national Ministry of Education)
- UOH – ECRI+ – an application for the evaluation, training and certification of written skills in French (both in comprehension and expression) through the co-construction of a shared online service and the generalisation of dedicated training courses in each institution.

## **The TDUs and their relationship with member institutions**

As membership associations, whatever their specific legal form, the TDUs are necessarily turned towards providing services to their members, although one of the criticisms formulated by the IGAENR report was that the reach was somewhat limited, with the majority of teachers using the TDU resources being those who had actually produced them, highlighting the need to address the issue of OER uptake.

While HEIs are officially represented by their governance (Presidents, Vice-Presidents) on the executive boards of the TDUs, participation is frequently delegated to operational staff, with the risk of diluting the strategic advantages to be drawn from membership. UNISCIEL reports making inroads by forging relationships with Deans, consistent with the disciplinary TDU approach and supporting dissemination at Faculty level. Another concrete example is that of a bottom-up initiative, where a teaching team learnt about a particular TDU through their pilot project supported by a local call for proposals and pushed the institution to become a member in order to benefit from the resources and services offered.

A further initiative which is raising the profile of the TDUs within HEIs and particularly at a more strategic level is the ePericles project, which involves both AUNEGE and UOH alongside other HE and private sector partners to develop a quality assessment tool and approach (inspired by the EU Lifelong Learning Programme project SEVAQ+), combined with a second tool for the recommendation of resources based on prior and community consultations, in much the same way as Amazon recommendations.

Finally, the IGAENR report goes as far as recommending that the remit of the TDUs should include supporting merged HEIs and COMUEs in the pedagogy of designing and using digital resources. For this to become reality, not only will the TDUs need to develop a coordinated response, but also to be in a position to recruit and mobilise the human resources necessary for such activities.

## **Developing engagement with Digital and Open Education among teachers**

Over and above the production of learning resources aimed at students, the TDUs also contribute to developing engagement with digital and open education among teachers. UOH has supported the production of an interactive resource for teacher Continuing Professional Development (CPD) as well as a MOOC on mobilising social media for teaching and learning. The annual FAN event provides opportunities for exchange of practice among teachers, and the

TDUs participate in disciplinary, national and international events, although again much more could be done in particular at local level with a focus on usage of the resources in addition to the support for production.

## The TDUs and their contribution to research

Although research per se is not within the strict remit of the TDUs, they contribute to research in two main ways. The first is that the learning resources are produced by academics who are both teachers and researchers. To highlight just two examples: a webdocumentary co-produced by UOH not only made available a corpus of historical documents but also included a methodological angle to support students in developing a scientific approach; and as part of the major uTOP project coordinated by UNIT, a research lab is creating a demonstrator for the valorisation of research through digital resources and training courses. The second approach is more directly targeted at furthering research in the field of digital learning: in 2016, AUNEGE integrated a research theme into its strategic development axes, with the aim of becoming the French reference for research into digital pedagogy in the field of business studies and economics, and in 2017 held the first meeting of its research group, with the challenges of interdisciplinary research high on the agenda.

## Discussion

Two years prior to the publication of the IGAENR report, the EU project POERUP (Policies for the Uptake of OERs) produced a series of policy briefs, at both sectoral and national levels. While the IGAENR report does not explicitly reference the France Policy brief (POERUP, 2014) we propose to examine the IGAENR recommendations in the light of those produced for the POERUP project by Université de Lorraine.

Table 1: Comparison of POERUP and IGAENR recommendations

POERUP recommendations (2014)	IGAENR recommendations (2016)
Contribute to student success at bachelor level	Clarify the missions of the TDUs via thematic priorities: Producing resources to support the SE-HE transition Producing core resources for bachelor level courses Tools to support bachelor students Technology watch
Provide better support to disabled students Support international mobility	Actions to support inclusion of disadvantaged populations and for the development of the Francophone digital space. Set up a working group to drive the move towards an integration of the TDUs with FUN-MOOC Reorganise and reinforce the Ministry department for Digital Pedagogy. Reinforce communication around TDUs
Simplify and coordinate the way TDUs function	Conduct an annual or biannual satisfaction survey Create a single legal structure
Simplify and coordinate the way TDUs function	Mutualise transversal support functions

Simplify and coordinate the way TDUs function	Harmonise TDU calls for proposals, membership fees and processes.
Position the TDUs as support to HEIs	Provide support to HEIs and COMUEs in the pedagogy of designing and using digital resources
Train teachers, manage disciplinary communities and support pedagogical innovation	
	Set up transversal working groups
	Strengthen links with library services
Contribute to the recognition of teacher engagement	Set up reward mechanisms
Contribute to developing Life Long Learning in HE	Develop Life Long Learning
Meet the needs of working students	
	Evaluate the resources produced by the TDUs
Valorise transversal competences	Integrate digital competency frameworks and initiatives
	Initiate a legal study on the distinction between OERs and other forms of resources.

As we can see from Table 1 above, the majority of the IAGENR recommendations had already been formulated by the POERUP project, although it is unknown whether the IAGENR authors actually had knowledge of the prior work. If indeed this was unknown to them, the convergence is in itself a sign that both initiatives recognised similar weaknesses and areas for improvement with respect to the TDUs form and activity, support from the Ministry and structural challenges such as teacher training and recognition. The main POERUP recommendation not reflected in the IGAENR report is that of preserving knowledge and competences in rare disciplines, perhaps a preoccupation specific to the academic TDU stakeholders. Finally, the question of OER uptake, or rather the lack of it, is not specific to the French context, as discussed for example by Conole and Weller (2008) and Ehlers (2011).

## **Conclusion**

This presentation and analysis of the French TDUs is voluntarily restricted to the French national context. It is intended to provide the reader with insights as to how these structures developed and an understanding of their contribution to the national digital learning landscape, the challenges they face and how they might overcome them. Further analysis of the TDUs in terms of comparison with initiatives in other countries would be welcome, to build on the considerable work already done by the POERUP Lifelong Learning Programme project.

Finally, both the TDUs and the Ministry of Higher Education, Research and Innovation should continue to stay up to date with European and international developments in the field. While the TDUs in their current form will continue to be largely dependent on national policy, they are still in a position to develop a clear identity for themselves, taking a stance on Open Education and exploring different business models to contribute to their sustainability.

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## **A COLLABORATION & LEARNING ENVIRONMENT TO ENABLE TO BE A UNIVERSITY LEADER IN EDUCATION INNOVATION**

*Willem van Valkenburg, Delft University of Technology, The Netherlands*

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### **Introduction**

Delft University of Technology was founded 176 year ago as an engineering school. It is a traditional brick-and-mortar university in engineering, science and design with 24,000 students on campus.

In 2014 the executive board embraced the online learning development and started the innovation programme on open and online education (TU Delft, 2014). The objectives of the programme are to educate the world and enhance the quality of education (for both the online and campus programmes).

This new programme combined with the changing needs in campus education required a new learning management system (LMS) that is both flexible and stable in a rapidly changing world.

### **Selecting a new LMS**

Part of enhancing the quality was selecting a new LMS for both our campus and online students. TU Delft was using Blackboard since 1999 and it was time for a change. In the preparation for the European tender process we organized pilots with some of the popular platforms in the market to use that experience in formulating our tender document. Three important lessons we learned from this:

- The implementation is much more important than the system.
- We need a system that is not only easy to use, but also very advanced in its capabilities.
- We should look for a partner that will work together with us to enhance our education.

For the tender we used a Best Value Procurement, which is a new method of tendering. Instead of listing all your requirements, you describe your vision, mission, strategy and conditions and the suppliers are asked to come up with their best possible solution.

Desire2Learn with the Brightspace Learning Platform delivered the best proposal. As Ovum (Johal, 2016) concluded Brightspace is the #1 LMS for next-generation online teaching and learning. As part of our project we decided to brand the system as Collaboration & Learning Environment (CLE) to emphasize the goal of the project. It is not about the management, it is about the collaboration between teachers and students and learning of students.

## **Implementation**

From the start the project team identified the implementation of Brightspace as an opportunity to enhance our education. We defined the implementation as an education project, not as an IT-project. The educational quality improvement for the students is leading in the strategy and decisions of this project.

To lead the implementation, we composed a team of experts from within the university and hired experts from around the world, such as instructional designer from Portugal and a learning developer from the US. The project leader is not a traditional IT project leader (using Prince II method), but an educational technology expert with project management experience.

## **Phasing of the migration**

When started to design the migration process we first decided on the priorities for the change and migration strategy. The most important premise is the educational quality improvement (relative to current use of Blackboard). After that followed the unburden of teachers during the migration process. The third premise was that teachers only have use one platform, it was less important that students have to use one platform. The fourth premise was high-quality support for teachers and students.

Next to these premises we also set some other goals and starting points:

- Focus of the new platform should be on supporting the collaboration and learning process. In the past Blackboard was also used as portal for students.
- After 17 years of Blackboard use we wanted to start with a clean slate, so no automatic migration.
- The student experience is crucial:
  - more structured way of setting up courses by teachers through a standard course structure;
  - less flexibility for teachers to change some components; and
  - importance of mobile and offline use.
- Extensive involvement of faculty and faculties. We didn't want it to be a system of the central service, but an environment that we co-created together to make it work for everyone.

Based on this premises and other goals we evaluated more than ten different scenarios. After careful consideration we decided for a two-stage migration.

### ***First Phase***

The first phase is focused on the migration of all the courses into Brightspace. This ensures that all teachers and student have one platform to use. Important part of this first phase is that all courses will use the same basic course structure.

The course structure addresses a big complaint of many students that every teacher organizes his course differently and that it is hard to find what they need.

The downside for teachers was that it limited their *academic freedom* as some would say. But when we presented the course structure the members of our change advisory committee, both teachers and students are represented, were all in favour of forcing all courses into this structure.

The actual migration is done by a rolling migration as shown in Figure 1. This means that the migration team started in May with the Q1 courses, in September with the Q2 courses and so on.

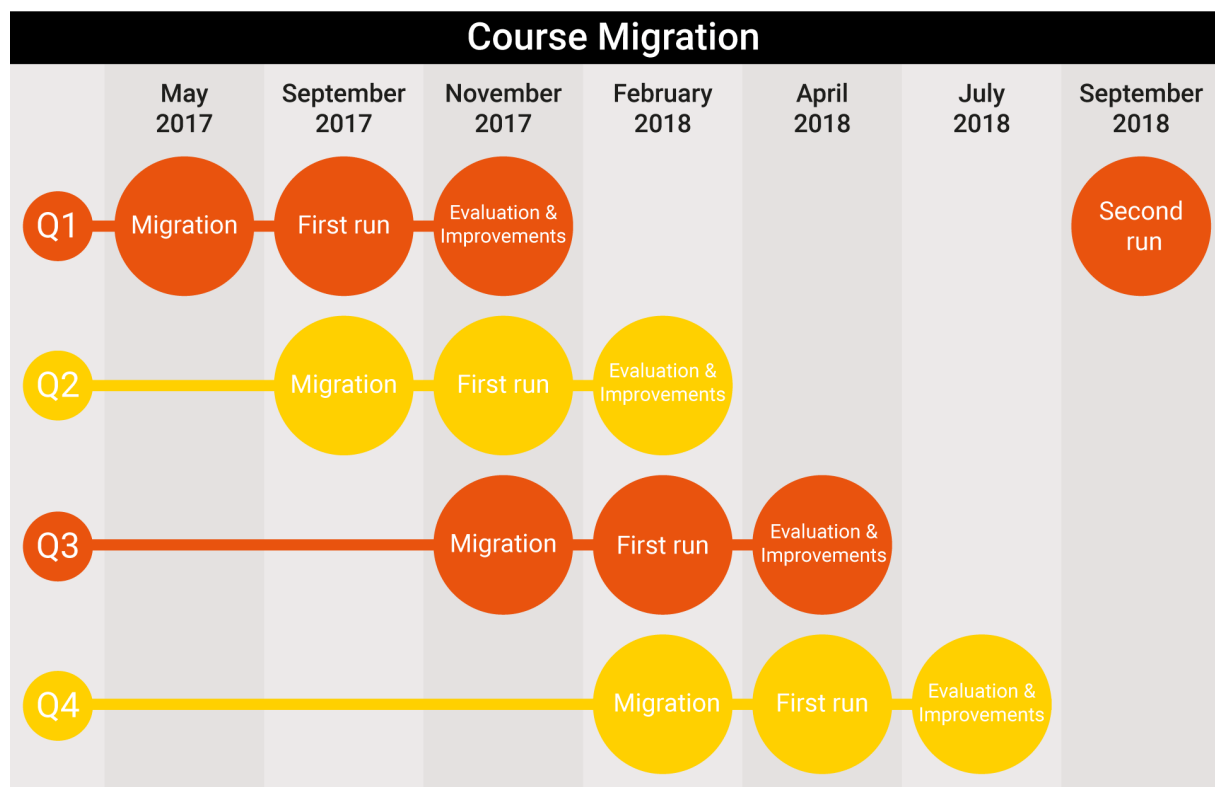


Figure 1. Course Migration process

Because the focus in the first phase is on getting all the courses in Brightspace, the need for support was more focused on many hands and less on didactical support.

The actual migration was done by a team of student assistants. Of course they were not allowed to migrate courses they would be enrolled in the upcoming year. The advantages of using students:

- they understand the courses and programmes;
- they are fast learners and are tech-savvy; and
- they know the teachers and faculties.

Currently the migration is under way and following the planned rolling migration process.

## **Second Phase**

In April the migration of courses will be completed. This means that the second phase can start. The focus of the second phase is on improving and innovating courses. Student and teachers are used to the platform and are open to advancing their courses. We also will use the learning analytics capabilities of Brightspace to improve the courses.

## **Support**

As part of our strategy we offered extensive support to faculty and teachers. They could choose what kind of support they wanted ranging from they do it themselves to will migrate their course for them. If we migrated the course for them, they still had to approve it, because they are still responsible.

We offered a wide range of workshop, training, work sessions, open office hours and an extensive support website (<https://brightspace-support.tudelft.nl/>) to facilitate their needs and prepare their courses.

## **Lessons Learned**

1. “Changing a LMS is an educational project” with a strong connection to educational leadership in the faculties and schools. It should not be seen as an IT project.
2. “It is a great opportunity to clean the house.” There will appear opportunities to change rules, regulation and policies, don’t waste those opportunities. But also, be prepared for the issues in current rules and regulations.
3. “There should be no exception in rules and regulations.” Be very strict and allow changes only for everyone or for none. Make sure to update your governance model for this and it helps to have a “Friendly Dictator”.
4. “Support is crucial.” There can’t be too much support for teachers. It is better to cancel a training or workshop because there is no interest than that teachers complain about support. Also make sure you invest in the training of your support team and keep a focus on improving your support.
5. “Be prepared.” During such a large project unexpected issues will appear, deal with it! Keep your focus on your strategy and create a flexible team to solve the issues.

## **Conclusion**

The key message is that implementing a LMS is the perfect opportunity to enhance your education, but this only works if it is an integral part of your strategy and all your decisions.

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## **BAVARIAN VIRTUAL UNIVERSITY – BEST PRACTICE FOR A NETWORK OF HIGHER EDUCATION ONLINE**

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### **Introduction**

Virtuelle Hochschule Bayern (vhb) / Bavarian Virtual University (BVU) is an institution set up by the universities and universities of applied sciences of Bavaria, one of the 16 German federal states. Its primary goal is to improve studying conditions for the growing number of students who require flexibility both in terms of time and place. This flexibility is best offered by virtual teaching and learning environments. The BVU funds developing as well as conducting of its online courses to guarantee sustainable operation and use of the courses. In order to get the most out of this expenditure, the Bavarian State Ministry of Education, Cultural Affairs and Science supports the coordinated and practice-oriented development of courses for use across all Bavarian universities via BVU.

With a portfolio of nearly 500 courses, the BVU considerably extends the range of offerings made available by Bavarian universities. Nearly 90 courses are currently in preparation. The academic year of 2016 / 2017 saw more than 180,000 course enrolments by more than 60,000 students.

For more than 17 years the focus of the BVU has been “blended learning at the macro-level”, not at the micro-level of a single course. Priority was given to asynchronous forms of communication; offering courses which are completely online, thus facilitating the import and export of online-courses between all 31 member universities and allowing for a maximum of the students’ flexibility. Characteristics of these *classic courses* of the BVU are their integration into the curricula of courses of study at face-to-face universities, exams to earn credit points, support for students by online tutors and matching of the course duration with semester intervals.

Now the BVU is expanding its portfolio. One of the new fields of activity will be the development of learning materials for blended learning scenarios on the course level. All teachers of our member universities may use these materials. The other new line of funding programme will be a range of open courses which meet university standards, with the general public as target group.

## **The role of the BVU**

### ***Organisation***

Bavaria is one of the 16 German federal states and has a population of 12.9 million. According to the German constitution, all matters of education lie within the exclusive jurisdiction of the federal states, not the federal government. This federal structure causes a diversity of approaches and solutions which also apply to the implementation and organisation of online teaching and learning at university level. Most of the states leave strategy-building for e-learning completely to their universities, and by far not all of the German universities have developed a comprehensive strategy for the use of information technology and multimedia in teaching, learning and administration. Bavaria is among the minority of German states which actively motivate and support cooperation between universities in online teaching.

Typically, German universities are government-financed. Within the jurisdiction of the Bavarian State Ministry of Education, Cultural Affairs and Science there are nine universities and 17 universities of applied sciences. In addition, in Bavaria there exist universities and universities of applied sciences administered by the Protestant and Roman Catholic churches, art colleges and music academies, and the University of the Armed Forces (Universität der Bundeswehr) in Munich. Five of these not directly state-administered universities are also members of the BVU. In the winter term 2016/2017, in all Bavarian universities together there were 392,000 students (<https://www.statistik.bayern.de/statistik/hochschulen/>).

The BVU supports its member universities in providing high quality education for growing numbers of students. The aim is to complement the programmes of the traditional universities, not to replace them. With the support of the BVU students can earn credit points in individual courses of the classic course programme, whereas they obtain their degrees at their home universities, as the BVU does not offer complete study programmes. BVU courses help students to organise their individual studies in a more flexible way, which often helps to prevent extending the duration of their studies. To be able to study wherever and whenever you want is especially valuable for the growing number of students who have to care for children or other relatives, for students in employment or for those who spend time abroad.

### ***The organisational structure of the BVU***

The current organisational structure was adopted in 2005. The main body of the BVU is the Assembly of Member Universities, in which each member university is represented by a commissioner, who in turn is the key person for all BVU affairs within the home university. The commissioners usually are members of the governing body of their university. The Assembly elects the Programme Committee and the Steering Committee.

The Steering Committee consists of three people. Both the President and the two Vice-Presidents are presidents of member universities and represent the BVU in the Conference of the Presidents of the Bavarian universities and the Conference of the Presidents of the universities of applied sciences. The Programme Committee consists of eight people. Five of those must be Vice-Presidents for questions of teaching and studying at their respective

universities. Under the direction of the Managing Director administrations, finances, project management, PR & communications, student registration and technical support is run by the office located in Bamberg.

31 member universities send one commissioner

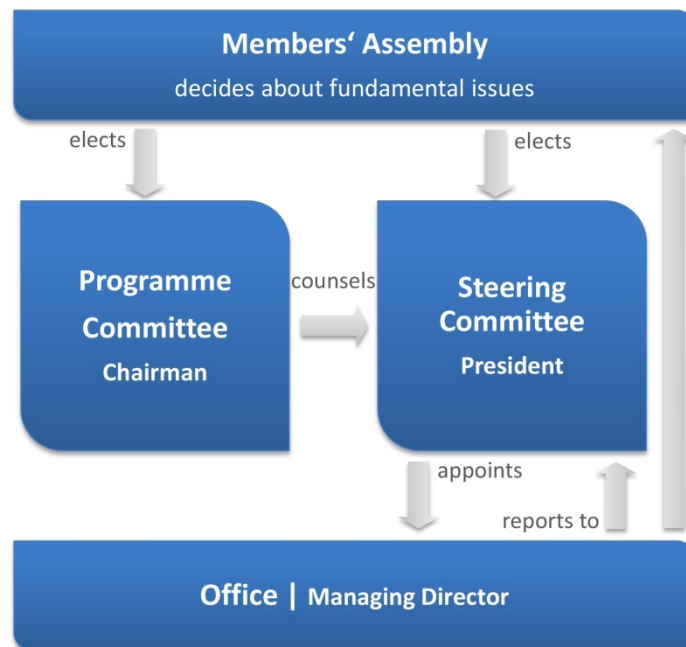


Figure 4. Organisational structure of the BVU

## Principles, targets and tasks

In order to function successfully as an institute serving the needs of 31 universities by providing high-quality education in a cost-effective way, the BVU has to follow certain principles. The principles for the classic courses, which will continue to be an essential pillar for the BVU, are *blended learning* at the macro-level of the course of study, intensive tutorial guidance for the students, a programme policy oriented towards the needs and the demand of the member universities, and an elaborate quality management. Within the BVU concept and framework e-learning works as an integral element of higher education, and is financed by the state accordingly.

### ***The classic concept of BVU: Blended learning on the macro-level***

BVU has focused on macro-level blended learning with the aim to offer high-quality teaching with intensive tuition in a cost-effective way. By macro-level blended learning we understand the integration of single online courses into courses of study or curricula which otherwise (and for the most part) consist of *traditional face-to-face courses* (seminars, lectures et cetera). Thus, students can earn some credits in online-courses, but not their complete degree. This combination of face-to-face courses with courses that are delivered completely online (possibly with the final examination being held face-to-face) allows students a high flexibility. At the same time students enjoy all the benefits of a traditional face-to-face university. Therefore, macro-



level blended learning minimises the dangers of social isolation sometimes associated with e-learning.

Moreover, with online courses being developed once at one university, but used at several universities, the comparative cost-effectiveness is obvious. Thanks to macro-level blended learning, universities can *import* courses from other universities, including even the support of their students by tutors of the *exporting* university. In contrast to micro-level blended learning, this kind of import also helps universities to compensate a possible lack of teachers as well as room shortages.

### ***The new fields of activity of the BVU***

#### *Blended learning on the micro-level*

Many experts are reading blended learning as a combination of face-to-face teaching and web based teaching within a single course. We call this type of blended learning – as against the macro-level blended learning – *micro-level blended learning*.

The didactical design and high quality of teaching may demand a close linking-up between theoretical input, practical issues and hands-on training within one course session with a mix of the teacher's input and web based learning materials. Some educational goals can be reached best with an inverted classroom. The students will prepare what used to be the professors reading via web based trainings at any time and the precious time in the lecture room is better spend with discussing problems and deepening the knowledge.

With a new line of funding BVU is going to respond to this demand and to reach further target groups by blended learning materials beyond the classic courses. These smaller units may consist of videos, tests, simulation texts, again taking into consideration the needs of the universities.

#### *Open courses – Open vhb*

The Bavarian government passed a plan of action to enhance digitization, the “Masterplan Bayern Digital II” with an investment of 2.5 Billion Euro for the years 2018–2022. IT and digitization as a mainstream strategy are intended to improve and enrich all areas of life. The aim is to support people on their way into the future especially in the fields of education, work, mobility, health, housing, public administration. The BVU is part of the plan with the task of establishing a platform for open courses. Target group is the general public as well as future students. The courses are also supposed to promote Bavaria as an attractive place to study.

Which needs do the courses of *open vhb* have to meet? The courses should deal with topics which are of interest for people/learners outside universities to make them suitable for their personal and/or professional development. Open courses can be used every time with no regard to university lecture intervals (semester, trimester). The courses for the general public will have a smaller scope than university courses, but they must meet university standards as far as content is regarded. One of the categories among the open courses is intended to give support to future students who need to bridge knowledge gaps, no matter if after school or in transition

from bachelor to master courses as well as to facilitate the start at a Bavarian university for international students. These courses can have the regular scope of two weekly hours per semester.

### ***Programme development and financing***

In the summer term of 2018, the BVU offers approximately 500 complete online courses in the following fields of study: Business Science and Economics, Business Informatics, Computer Science, Cultural Studies, Engineering, Health Care Management, Introductory Courses, Key Skills, Languages, Law, Medical Science, Natural Science, Social Sciences, Social Work and Teacher Training. Approximately 90 additional courses are in preparation.

The first open vhb courses are expected to start 1 October 2018 as well as the development of blended learning units.

How does the BVU develop and enlarge its programme? A prerequisite for an application for the funding of classic online courses, preparatory or gap courses and blended learning units is the orientation towards the demand of the member universities. A consortium of at least two member universities is entitled to apply for course funding. The function of the consortium in this case is to assure the quality.

Twice a year, member universities are invited to submit funding applications to establish new university courses and open courses. The applications are submitted in a standardised form which can be downloaded from the BVU's website (<http://www.vhb.org/ausschreibung>). The interested universities build a consortium with a consortium leader. Both define the curriculum or curricula (courses of study) in which the new online course will be employed, and they give an estimate of the number of students they expect to participate per academic year. Open courses are enrolled by a consortium as well. The consortia and their courses do not function as *closed shops*. All member universities are entitled to employ the courses and blended learning materials, and students of all member universities can attend free of charge.

The funding applications are examined by the BVU's Programme Committee. The Programme Committee selects the applications most suitable for funding and passes its recommendations to the Steering Committee, the Steering Committee decides which applications to fund.

The production of classic courses with an equivalent of two hours per week and semester can be funded with up to 45,000 €. In order to enhance the quality of media didactics applicants will get up to 5,000 € additional funding if university media experts / university media centres are involved. In order to support the internationalisation of the member universities further funding with up to 10,000 € is possible if an additional course version in a foreign language (mostly English) will be produced. Open courses will be funded with up to 30,000 € for the equivalent of one semester weekly hour. For the production of learning material on the micro-level of blended learning a funding agreement with the member universities will be concluded.

In order to be accepted as a producer of a given course, a contract has to be concluded with the BVU where the exclusive right to use the course in online form is transferred to the BVU. Regarding to sustainability all the courses have to run for at least five years.

### ***Tutorial guidance***

Learning is to a large degree based on interaction. To minimise a possible dropout rate courses are supported by online tutors. Moreover, the idea of state-wide use and exchange of courses between universities would not be viable if there was no funding for the tutoring of students from universities other than the university of the course provider. There must be a sufficient incentive for this additional teaching effort. Therefore, the BVU funds the tutorial guidance of the students in standard courses with 30 € per student who has taken part in the final examination. The BVU funds the training of online tutors for its classic courses. Staff members of the BVU's course providers can take part in the training programme at the expense of the BVU. Furthermore, the BVU supports competence development for professors of its member universities by organising workshops on e-learning.

However, in open courses there will not be a close tutorial guidance; neither will there be the option to obtain a certificate or digital credentials. Financial support will be fixed for keeping the courses up to date.

### ***Quality management***

Evaluation and quality assurance are pillars of sustainability. They play a central role in the BVU's overall concept. The development of every new course, be it classic or open, is examined by the Programme and Steering Committee: moreover, it is closely accompanied by experts from the consortium which applied for funding and by the project management of the BVU office. Students' evaluations as well as experts' evaluation are taking place periodically. The results of the peer evaluation are discussed by the Programme Committee and the Steering Committee and with the course providers. They can apply for the funding of the updating of courses.

### ***Technical issues***

In the BVU with its 31 member universities a variety of learning management systems (LMS) is in use. This is a consequence of the variety of the subjects taught as much as of the history of the BVU. For the classic courses, no central server is used; all courses are on servers of member universities, and they are administered by the responsible persons of the member universities. While unification of LMS for the classic courses has never been an urgent issue, an authorisation and authentication infrastructure (AAI) based on Shibboleth was implemented. In case of open courses as well as in case of blended learning units a specific server will be used.

### **Conclusions**

The success and the further development of the BVU depend on considerations of sustainability and the BVU's ability to serve the needs of four target groups: students, teachers, universities

and the general public. By serving the needs of these target groups, the BVU serves the needs of society and state, which in turn provide the necessary funding.

Students profit from the flexibility of online teaching which is especially important for *non-traditional* students. Therefore, the BVU concentrates on asynchronous forms of communication. Students of the member universities do not have to pay any additional fees.

The quality of the courses is assured by an elaborate system (cf. 2.5). The possibility of developing e-learning literacy while studying a subject as part of the curriculum enhances the employability of the students without requiring additional effort.

Teachers experience a wider range of pedagogical possibilities. Many of them also appreciate the possibility of reaching more students with their teaching. Where online teaching is accepted as part of the professors' workload, they also profit from the flexibility online teaching permits. By offering tutored online teaching on standard subjects, teachers can focus their face-to-face teaching on more advanced or specialised subjects. With the new line of blended learning units at the course level teachers will be able to enrich the instructional design of their face-to-face teaching with quality assured learning material. Working within the BVU network is also attractive for professors because of the grants by which the BVU funds the development and improvement of online courses and because of the financing of tutors.

Universities profit from the BVU in several ways. By using BVU courses and learning materials, universities considerably enhance their teaching capacities. Not only can they offer additional subjects, they can also restructure teaching capacities and use them for subjects less suitable for online teaching. Generally, universities face times of more intensive competition. But this does not exclude cooperation. On the contrary, in order to survive in a world of growing competition, universities will have to cooperate not only in research, but also in teaching. The BVU is an excellent example how to create and establish a properly functioning cooperation. One of the positive effects of this cooperation is the establishing of common quality standards for online teaching. The BVU avoids competition with its member universities. With the classic course programme for macro-level blended learning BVU has been holding a stake in university teaching since 2000. With the new fields of activity such as knowledge units for micro-level blended learning and open courses the BVU will even further improve its services for the member universities and society on the whole. Supporting the digital strategies of the universities means to respond to their demands of managing diversity and tasks of internationalisation.

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## **TRADITIONAL AND ON-LINE UNIVERSITIES, A PARTNERSHIP FOR THE PRESENT AND THE FUTURE OF EDUCATION**

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### **Background: the challenges to the University in the knowledge society**

New technologies allow a direct connection between the university and the user, by means of a simple PC, a tablet or a smart phone: lessons, multimedia products, databases, self-assessment systems, exams organisation and other training materials can be quickly forwarded and this promotes collaborative learning processes inside dynamic virtual environments. In the *virtual classrooms*, it is possible to reproduce teaching-learning activities as it happens in actual classrooms, but it is also possible to significantly increase the amount of information and start up multiple interactions in real time among individuals belonging to different cultural levels, having different traditions and experience and coming from educational environments of different countries of the world.

Physical distances are overcome and the communication global system allows delocalising the delivery and use of a globalised knowledge. In this context the idea itself of education and training is changing and this requires targeted public policies. The cognitive society creates new educational needs as well as the tools and solutions to meet them.

The challenges that educational institutions, and the University in particular, are called to face are linked to the fact that classrooms or lecture halls are no longer the only places where one can follow study courses: anybody from anywhere, if he has the required technological equipment and the appropriate materials can build his own environment to carry on his own educational and self-learning process.

In order to educate and train citizens, together a new model of social ethics, it is necessary to establish new systems, new public policies and also new organisational models for universities at local, national and international levels. We will witness an uncontrolled process that will lead us towards a more and more de-schooled society; it will be up to the agencies separated from the educational institutions and software designers to create for tomorrow's citizens the new competences that society requires.

Therefore, the problem is no longer whether education reproduces social inequalities or not, but rather today's question, common to all universities worldwide, is how to adjust to this system and create, in the framework of globalised economy, systems that could develop integrated teaching and learning processes, since they use different languages to communicate

knowledge. These should also be open processes, since they should have no spatio-temporal limits. Educational and training policies should guide this process and this should happen by starting a stable dialogue among different environments, since the entire world is involved in great changes that are still in progress.

## **The renaissance of the University**

Internet has evolved into global platform ever richer in content and is becoming the prevailing infrastructure for the exchange of knowledge between people. The generations of new students, the digital natives, will no longer do unless you use the network to develop knowledge and skills. The transformation of the University is really happening.

The creation of a global network for Higher Education in which teachers and students from different parts of the world participate in the collaborative construction of knowledge is not a utopia, indeed it can be a cure to bring a new vitality to the University by featuring them on the networked economy global.

The University of the twenty-first century should increasingly be characterized as a global network, an ecosystem, should make deep structural changes while many universities around the world fail to meet the learning needs, the majority of undergraduate courses churn skills that are not required by the labour market, more and more students around the world enrol in college courses online or distance universities. In fact, e-learning is a reality in full growth; nowadays is estimated approximately \$91 billion, and is expected 168.8 billion dollars by 2018. In the United States, according to the National Centre for Education Statistics (2012) is progressively growing – for the ninth consecutive year – the number of students enrolled in at least one online course and at the end of 2011 had exceeded 6.7 million, among the student population (Koller, 2012). The 69.1% of Deans and Presidents of U.S. institutions of higher education online learning in 2011 considered a key factor in the change of traditional universities (Babson Survey Research Group, 2013). The birth and development of initiatives MOOC (Massive Open Online Courses), with an overall target, they made up these numbers even further.

The European Union in 2011, was the second largest market for e-learning, has a growth rate of 5.8% per annum, which leads from 6.1 billion dollars in 2011 to the expected 8.1 billion dollars of 2016. There are approximately 3 million students enrolled in online courses, half of whom were enrolled in Distance Teaching University and Open University, while the other half at traditional universities that offer distance learning courses.



Figure 1. Growth rates for 2011-2016 global macro-regions

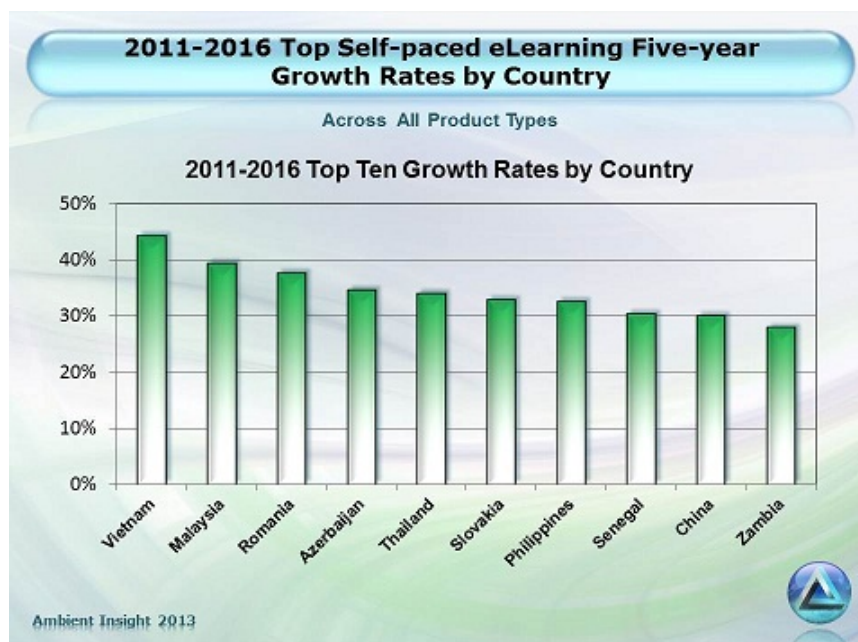


Figure 2. 10 countries with the highest growth rate in the field of e-learning (METAARI, 2016)

## **Distance Universities and International Alliances for a shared networks of knowledge**

The process, enhanced by telecommunication technologies, tends to build a pedagogical society inside the knowledge society. The awareness of this fact highlights the fact that it will be ever more crucial to establish cooperation relations among academic institutions of various countries of the world to be able to produce academic contents to be delivered online and to jointly create systems and structures for the new models of distance universities and quality e-learning. In this new setting the distance university can help traditional universities to develop new shared networks of knowledge capable to overcome geographical frontiers. In principle,

everybody recognises that knowledge, know-how and everybody's skills are the sources of all richness. In principle, everybody believes that the development of a country, its reforming and change processes can be put into practice only if there are people capable of realising and managing these reforms, to participate in the change in a constructive way. Otherwise, these facts are reduced to mere abstract rules. Education is also a tool by which a new model of truly globalised society can be realised.

Today, to start up cooperation relations among academic institutions of different countries of the world and to jointly develop Internet-based training contents is of highly important from a strategic, cultural, political and economic perspective. The production of Internet-based educational contents by lecturers coming from the best universities allow to develop a quality e-learning model and promotes the cultural and industrial development of a society based on Knowledge Economy.

A distance university that is born from a multicultural partnership allows to:

- promote universities' internationalisation processes;
- design and implement common curricula enabling to experiment and implement what is provided for in the Bologna and Sorbonne Declarations;
- supply those attending it the skills required to live in a globalised world
- promote the production of Internet-based multimedia educational contents also in different languages.

These considerations are at the basis of our personal engagement and of that of the group of people who, in these years, have been working with us to realise, jointly with the International Telematic University UNINETTUNO, a Euro-Mediterranean and international Area for Education and Research resulting from the cooperation among distance universities and traditional universities.

### **The case of the International Telematic University UNINETTUNO, approach and models**

The International Telematic University UNINETTUNO was established further to the success of the Med Net'U – Mediterranean Network of Universities project, which boasts the participation of 31 partners belonging to 11 Mediterranean countries (Algeria, Egypt, France, Jordan, Greece, Italy, Lebanon, Morocco, Syria, Tunisia and Turkey). All partners worked together and created a true technological network based on receiving and transmitting digital satellite technologies. Today, all partners can produce, broadcast and receive educational contents, via Internet, via satellite and on satellite television. A technological network that is supported by a network of people, of intelligences that can interconnect and share their knowledge and the jointly developed a virtual area for higher education and for the circulation of knowledge in the Euro-Mediterranean and capable of giving rise to the International Telematic University UNINETTUNO. The development of Med Net'U from project to system, with the birth of the International Telematic University UNINETTUNO, was supported by the Governments of the partner countries and was made effective by the conclusion of academic



agreements with several universities of the Arab World. We jointly succeeded in developing the International Telematic University UNINETTUNO and make it rapidly become one great university in which prestigious lecturers of important European and Mediterranean Universities deliver their courses in several languages in various faculties including engineering, philosophy, conservation of cultural heritage, law, economics, psychology and communication sciences. Thanks to the cooperation of the professors of different universities did we succeed in creating in the Internet ([www.uninettunouniversity.net](http://www.uninettunouniversity.net)), where teaching and learning are carried out in 5 languages: Italian, French English, Arabic and Greek and very soon even in Russian. The students of the International Telematic University UNINETTUNO come from 130 different countries of the world; they, with no more space and time limits, can attend the university and they can choose whether to studying the language they prefer on television and in the Internet. In the Didactic Cyberspace it is possible to access the different learning environments: get digitised videolessons linked in a multimedia and hypertextual way to books, texts, selected bibliographical references, lists of websites and virtual laboratories. In the virtual classroom the professors and tutors of each subject interact with the students and support their learning processes. Through forums and chats intelligences get interconnected and knowledge is exchanged.

### ***Common and shared curricula a successful model***

In these years the International Telematic Univeresity UNINETTUNO has been designing and realising common curricula that are recognised in Europe and in some countries of the Arab World. In the process of definition of the study programmes UNINETTUNO made reference to the guidelines provided for by the Bologna/Sorbonne process and by ECTS, European Credit Transfer System as it regards the programmes structuring. In particular, all our degree courses follow the European Qualification Standards. For instance, for the design of the Psychology Study Programme UNINETTUNO took into account the standards of the EuroPsy, European Qualification Standard for Psychologists, as it regards the scientific-disciplinary sectors and training credits to be allocated to each discipline and therefore it is accredited among the EuroPsy certified courses. This process of adjustment to the international standards enable these study courses and titles being recognised at European level.

As it regards, instead, the partner Universities based on a country that did not join the Sorbonne/Bologna process, UNINETTUNO developed a model for the design of common curricula that has been already successfully tested. A concrete example is the one that enabled the conclusion of an agreement aimed at a double title jointly with Helwan University; after a first phase of analysis of the contents of the respective study programmes for the degree course in Computer Engineering both at a general structuring level and at the level of contents treated in the individual course, it appeared that, in spite of the different timing structure, the issues and courses treated in the 3 years of UNINETTUNO degree course corresponded to the first four-year course delivered in Egypt. As a consequence, we designed a common study programme according to which the students get an Italian (and therefore European) study title that is further integrated by including the subjects that are envisaged by their fifth year of study – and that are not comprised in UNINETTUNO three-year study programme – thus enabling

them to get an Egyptian five-year study title. This process of analysis, comparison and integration can be extended to any other country and degree courses: the analysis and comparison of the programmes allow for integrating the study programme that it will be possible to complete at local level, thus enabling the student to be awarded a Italian three-year degree and complete their study path and get a four-year or five-year degree in their own country of origin, taking the exams covering the scientific/disciplinary sectors that are not envisaged by UNINETTUNO three-year degree courses. Another model of cooperation between the International Telematic University UNINETTUNO and the Universities of other countries is linked to the possibility of harmonising the three-year study programme adopted by UNINETTUNO to five-year study programmes; in these cases, the study programme proposed to the students will include the UNINETTUNO 60 ECTS/year standard programme adding up courses and contents corresponding to further 20/25 ECTS enabling the student to be awarded a three-year degree allowing him, at the end of these three years, to complete the first four years of the five-year study path of their country of origin, thus following a path that he will complete adding one final year and the final exam.

The analysis and integration of the study programmes allow for the realisation of study path able to supply the competences required by the new labour markets. The great value of this process of integration of the study programmes and creation of competences at global level is that the outcome of this integration meets the actual needs of the society in which we live. On the contrary, if Universities are cut off from the outside world, the answers they give to the needs of the current society will be inadequate.

### **The internationalisation of the University**

The approach and the model developed by the International Telematic University UNINETTUNO can make educational context of various countries of the world and of the Mediterranean Region and worldwide, cooperate and create shared knowledge networks that enable to enrich the curricula with new contents. Thanks to the mutual knowledge of their cultural, religious and political specificities, belonging to the history and cultures of the different Countries, it is possible to create, through the cooperation with other universities, a new training model, based on ethical values able to qualify, in terms of moral and social terms, the coherence of the study programmes, that are enriched by the cultural specificities supplied by each university and teacher involved.

Today we work together and operate within a Euro-Mediterranean Common Area to launch a process of harmonisation of the Euro-Mediterranean educational and training systems by sharing psycho-pedagogic models and human and technological resources. Our working group is aware of the fact that this cooperation enables to create a new model of distance university within which one can move without boundaries and where, thanks to the new technologies, beside the physical moving of professors and students, the mobility of ideas is easier and easier.

The experience made with the International Telematic University UNINETTUNO in the Mediterranean Area confirms that it is possible to share study programmes and to create new educational models.

So doing we really succeeded in starting new fruitful alliances that allow providing the new generations with knowledge and tool required to meet the challenges of the labour market of a globalised society and to dialogue with the various cultures of the world.

## **Conclusions**

Developing knowledge helps consider cultural, religious and political differences as a resource for mankind and not as tools for conflicts and wars. In my opinion, the respect for differences is not possible if educational and training systems are still based on study courses that are exclusively related to the contents of the culture of a single country. In our educational institutions, history, philosophy, law, religion, art and literature are often taught by delivering contents which are too stuck to the local context and which do not provide the appropriate tools to enable people to live inside a globalised society.

Television and the Internet can bring knowledge and expertise to the homes of every citizen of the world with no limits of space and time; everybody can attend courses to acquire literacy, to attain new skills, but also to consolidate a system of shared values.

If one wishes to build and transfer knowledge, borders are uncertain, frontiers are places of continuity and not of conflicts.

Democratising the access to knowledge helps reducing ignorance, feeding the minds of all men and women, and to allow everybody to start from the same starting point and thus eradicating the slavery of ignorance.

Today, knowledge networks can generate new wealth, they can offer the teachings of scientists and of the best intellectuals of the world to everybody in an open and democratic way. Distance university allows interaction between teachers and students from different universities and actually gives a prompt answer to demands for internationalisation of the training and educational systems to build the competences required by the new global labour markets.

When the Internet-based courses contents and the modes of delivery are carried out by university teachers at international level, control upon contents' quality is performed by the academic world and users are guaranteed as "consumers of education" since courses suppliers are easily identifiable. If it is right, that the quality brand will determine the competitive challenge on education global market, a distance university based on a network of the best universities of different countries, will certainly win the challenge. Today distance university can meet the requirements of the new knowledge market: show its quality label; guarantee the user; help in transforming the university into an open system, fit for keeping up to date and integrating all knowledge available in the Web and for realising knowledge interchange at global level.

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## **BLENDED LEARNING TEACHING: THE STORY OF A SOCIAL NETWORK WITH A HISTORY**

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### **Context of the experience**

#### ***Blended Learning as a teaching mode***

Blended-Learning, which combines face-to-face and online work, has opened the door to a variety of possibilities that draw on the advantages of both face-to-face and virtual teaching. The work that is made possible has its roots in the classroom, but continues outside of it. This development of learning without walls, allowing students to connect how and when they want is the main teaching proposal for channelling the interplay between face-to-face and virtual spaces, the roles of students and faculty, the interaction among students and the interaction between students and teachers.

The selection of a virtual environment and its characteristics is a fundamental decision because of the characteristics and peculiarities that each option entails, and the effect it can have on issues of both the “visible” and regulated curriculum, as well as the so-called *hidden curriculum*.

As some authors have said, despite the significant use of social networks outside of the academic space, students and teachers are reluctant to participate in these spaces within the scope of formal education (Hamid, Waycott, Kurnia, & Chang, 2014). Specifically, in university teaching its incorporation is progressing slowly, (Dabbag & Kitsantas, 2012). The orchestration (Prieto et al., 2014) of these experiences in formal educational institutions requires a meticulous and complex planning process, involving a reconsideration of different aspects of teaching and learning processes.

This paper presents the developmental path of an academic social network used as a virtual space for Blended-Learning teaching in Higher Education. The key elements of the teaching proposal as well as its implications for students and teachers are analysed. Finally, lines of research that have emerged to better understand what happens in the social network are described

#### ***A social network as a space to complement the classroom. Why?***

Outside the walls of the classroom, social media and specifically social networks are a source of informal learning for many people and are beginning to slowly gain momentum in the world of formal education. The relationship between these two axes, learning and social networks, has

led to various dynamics: learning with social networks, learning through social networks and learning in a world of social networks (Castañeda & Gutiérrez, 2010).

These spaces have brought forth new concepts, such as collective intelligence, prosumers, influencers, tags, likes, followers, and so on, which reflect the importance they have acquired in our daily lives. Educational proposals in a society with idiosyncrasies must establish a relationship with their context and prepare for a reality that already exists. We have gone from an economy where the important thing was tangible capital (machinery, raw materials, etc.) to a knowledge economy where knowledge is what generates value. In this scenario, some authors have indicated that value “is not what you know, but who you know. Who you know defines what you know” (Daly, 2010). Gallo and Adler (2014) also suggested the idea of “going where the students are” (p.215). Opening up to social networks makes it possible to erase the (artificial) barriers between leisure and academic spaces, and to maintain a permanent feedback loop between them (Siemens & Weller, 2011).

However, integrating social networks into education requires, or should require, a proposal providing critical and comprehensive answers which go beyond introducing technologies into a space, because artifacts (hardware and software) do not, by their mere presence, solve or enrich anything. Thus, as Dussel (2011) stated, it is necessary “(...) to introduce a more complex understanding of the context that surrounds us, a more rigorous language, and more complex arguments. With respect to this, social networks and the media in general are moving in the opposite direction: they are increasingly simple, for immediate impact and with scant rationality, less argumentative and more sensationalist” (p.41).

Despite all the opportunities, as well as the greater or lesser risks, they may entail for education (Manca & Ranieri, 2017), social networks are not all the same and not all scenarios are valid for educational practices (De Haro, 2010). Teaching with social networks implies, therefore, significant challenges for teaching, because it imposes transparency on processes that are generated from the interventions carried out in each situation. Integrating a social network into teaching involves pedagogical and technological challenges and also has political implications, since an open environment can give rise to questioning by students of teacher’s didactic proposals or the underlying educational conception (Manca & Ranieri, 2014).

It is not enough to simply consider a scenario for teaching and learning, instead it is necessary to rethink the questions of why, where, when, what and how, while getting around the ethical dilemmas (Kadushin, 2012) that will be encountered and that are even more pressing in the higher education context.

### ***Some comments regarding social networks: pros and cons***

There are a variety of social network classifications, but one of the best known within the educational field refers to horizontal and vertical social networks (Leiva, 2009, de Haro, 2010). The former (horizontal) are general and involves joining a large network that already has users. Vertical social networks are created by the users themselves, can be closed off to outsiders, and

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users are usually connected by a common (educational) interest. These are the social networks specializing in a specific topic (Leiva, 2009).

Both types of networks are good digital literacy tools that strengthen students' aptitudes, skills and competences, while allowing significant and formative learning to be built (Belmonte & Tusa, 2010), and thus respond to the social and economic changes of the times. They make it possible to develop self-regulation, co-regulation or socio-regulation capacities (Fiona, Järvelä, & Miller, 2011) that improve self-perception of learning (Thoms, 2011) and tolerance towards peers, as well as reciprocity regarding knowledge and learning (Hew, 2011). The technological environment of a social network generates exchange and feedback conditions that enable the development of learning; as well as student acceptance of others by exchanging ideas and experiences (Hew, 2011).

Although the two types of network have both limitations and possibilities, our experience was carried out using a vertical social network on an institutional server, which sought to resolve issues such as student privacy, security, the mix of personal and professional life, social networks as a source of distraction, network obsolescence, intellectual property, adapting teaching proposals into a network created with non-educational objectives, the use of student data by companies and shallow relationships.

### **The Stellae Social Network: Creation and history**

The Stellae Social Network was born in the late twentieth century for the purpose of enabling both face-to-face and blended-learning experiences. In 2006, the process began of integrating it into courses pertaining to various degree programs at the Faculty of Education Sciences of the University of Santiago de Compostela using the open source ELGG platform, hosted on an institutional server (<http://stellae.usc.es/red/>). This space contains discussion forums, blogs, micro-blogging in the central space, user profile details, friend lists, 140-character posts, an activities screen, personal wall, calendar, favourites and pages (see Figure 1). The platform allows uploading of texts, images, sounds and videos and users must choose who they want to share it with: private, friends, all users on the network or public. The last option allows the content to be fully open to the network and can be shared.

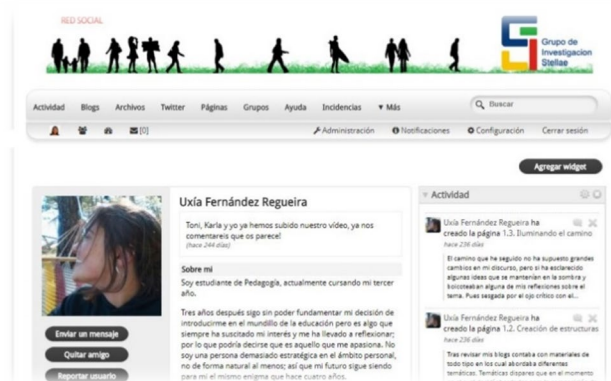


Figure 1. A student profile in the social network showing the available tools

## **The teaching proposal**

Using a space such as a social network as an integral part of a teaching proposal requires consideration of the strategy, the meaning and the value it brings to the subject matter. As Bruner (1969) pointed out, this is fundamental to instructional design, referring to the planning, preparation and design of the resources and environments necessary for learning to take place.

The teaching proposal is based on the idea that students now spend more time engaged in various forms of informal and self-directed learning outside of formal education environments. They aim to take advantage of the Internet in general as a way of learning, and emphasis is placed on curricular design where decision making is influenced by students' opinions and needs (McLoughlin & Lee, 2010).

The idea of using social networks is characterized by breaking with the idea of the teacher as a figure that centralizes all knowledge in a unidirectional way. In the present case, the courses that use the network propose that students make an e-portfolio to record the evidence of their learning. As has been suggested (López-Fernández & Rodríguez-Illera, 2009), this instrument represents an improvement over conventional evaluation systems. The aim is to go beyond marks by putting together a collection of objects as evidence of the learning process and student achievements in order to reflect what they are capable of doing (Attwell, 2007). To this end, students must comply with a small number of compulsory activities, both individually and in groups. But the main activity is to explore the topics addressed in class through an open proposal based on students' own interests. Students organize, compose, restructure and integrate diverse resources (multimedia) to broaden their knowledge on the topics of the course. Thus, the social network itself becomes a swarm of exchanges on different issues by which students share visions and opinions.

Evaluation is based on a rubric that allows students to know the required criteria from the first day. A procedural evaluation is proposed, and at various points during the course (2 or 3 times) feedback on student work is given so that they become aware of the weaknesses and strengths in their process. At the end of the course, with all the evidence collected, students must write a composition demonstrating their understanding of the relationship between the various posts, group work, comments, and so on. Using the *pages tool*, elements can be built and connected to leave a record of how knowledge has been structured and integrated.

## **Analysis and evaluation of the experience**

Over the years there have been a number of analyses and investigations delving into what working in this space with a teaching proposal involving portfolios and an open structure has meant for students and teachers. Some of the results from the quantitative and qualitative research carried out on this experience are shown here, as well as reflections by students and teachers who have participated in this teaching environment



### ***Implications for students***

The experience of working in a mixed mode social network environment, together with creating a portfolio, where the steps to be taken are not restricted, exposes students to new situations. After the first moments of uncertainty, students describe an intense journey involving a change of role from consumers of Internet content to prosumers, producers and generators of knowledge.

Students tend to work with platforms that have very hierarchical teaching structures, focus on content, offer students a role with little relevance, incorporate hermetic proposals, do not provide any type of public projection, and have a very restricted and limited level of activity. Against this backdrop, a proposal is presented here where students are offered the ability to delve into the contents of the course from their own experience and point of view, proposing new documentation not contemplated in the initial program, opening debates on related topics, sharing their concerns as well as their enthusiasm in light of new findings. In this sense, it is pointed out that students start out with varying levels of self-regulation skills (Montes, Ayala, & Atencio, 2005) and thus encountered varying degrees of difficulty.

To this we must add that evaluation using rubric may be a novelty which some students confront a bit fearfully (see Table 1). Even so, after the initial adaptation, students tend to successfully channel the feedback and begin to understand the dynamics, as well as take advantage of the diverse knowledge elements that must be considered.

Table 1: Rubric dimensions. The descriptors for the different levels define the standards that should be achieved.

	1	2	3	4	5
Analysis of the learning process					
Continuity of development					
Use of the social network					
Analysis of the evidence presented and the meaning constructed with it					
Variety and diversity of the documentary elements presented as well as its coherence					

### ***Implications for teachers***

As with students, using a social network and creating a portfolio in a blended learning mode requires rethinking the role of teachers and restructuring certain elements of the teaching process. The use of a portfolio and an open teaching proposal such as the one presented here encourages autonomy and allows students to travel along different pathways. Evaluating a portfolio is much more complicated than merely giving a mark (Klenowski, 2005). This is often considered an obstacle for teachers supporting this methodological framework because they have to deal with a large number of documents associated with each personal space.

The use of a social network environment is also a challenge for the teacher, because it breaks with classical hierarchical schemes that are normal in other types of platform. The horizontal

nature of this space represents a challenge for teachers. It involves a clear and distinct role to support students in the face of the difficulties that arise in the process.

The teacher must manage the s public projection of teaching, because difficulties and differences of opinion between teachers and students may appear in the public network space and lead to debates, controversies and objections by the students to the teaching proposals (Manca & Ranieri, 2014). In this sense, empathy towards students and understanding their difficulties are vital, as is the need to channel possible conflicts without sacrificing the required academic standards.

### **Completed and emerging research**

The research carried out on the social network has addressed a number of aspects that concern the teachers involved, for the purpose improving both teacher and student experiences.

- One of the improvement proposals involved the creation of the Softlearn tool to assist the evaluation of e-portfolios based on Learning Analytics. SoftLearn has three sections that try to facilitate the evaluation task; one to show learning pathways, another presenting various student statistics, and a third listing the content of the course in order to provide quick access to specific learning activities (Vázquez, Rodríguez-Groba, Lama, Gewerc, & Mucientes, 2014).
- The question of how self-regulation skills are built and which skills are necessary for this type of teaching (Gewerc, Rodríguez-Groba, & Martínez-Piñeiro, 2016) was addressed by creating proposals for improving student self-regulation in a mode combining face-to-face and online learning.
- Another line of research delves into the relationships and interactions among members of the network, the level of self-regulation and its relation to course outcomes. The findings of this research highlight the importance of participation (Gewerc, Montero, & Lama, 2014) and the need for a teaching proposal that encourages the participation of all students by helping those with weaker self-regulation skills.

### **Analysis and evaluation of the experience**

The research carried out, which combines qualitative and quantitative methodologies, has made it possible to delve into the possible challenges, ranging from improving the evaluation processes for teachers and students to better understanding student interactions and to helping students make the most of both online and face-to-face social contexts.

In conclusion, we emphasize that using this type of environment in a formal education context requires adapting the teaching process to a perspective that does the following: encourage student autonomy and help develop their self and socio-regulated learning (Fiona, Järvelä, & Miller, 2011), conceive teaching content as something open-ended and in constant construction instead of being packets to be transmitted; understand the importance of collaboration and collective learning construction (Huber, 2008); participate in the concept of collective Internet intelligence, where everyone without distinction can make contributions and become content

producers, conceive the teacher's role as guiding the process and establishing the necessary scaffolding for each student to find their zone of proximal development and to achieve their objectives (Vygotsky, 1978).

The experience of teaching with a horizontal social network for over a decade has made it possible to analyse the changes involved in working in a blended learning mode. The implications for the various parties involved in these practices represent opportunities but also limitations, on which it is important to reflect.

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## MUSETECH: A WEB APP TO ENHANCE 21<sup>ST</sup> CENTURY SKILLS THROUGH HERITAGE EDUCATION

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### State of the Art

As stated in the scope of the conference an urgent need for “people with new, enhanced skills is growing. The volume of information produced and shared in all fields is overwhelming. Building the data economy became part of the EU Digital Single Market. Powerful and sophisticated ICT is part of everyday life, and the world of learning is not an exception.” New ways of enhancing learning are more and more demanded by contemporary society.

The use of digital tools in the field of arts and cultural heritage represents a real innovation challenge: new areas in museum education may be explored to introduce technology and, simultaneously, new teaching and learning methodologies may be developed, especially for the younger generation of users.

With the advance of technology, many types of jobs might appear to be anachronistic, some jobs might even disappear, other jobs continuously change while new roles come into being. These facts clearly testify to how today’s society and job market are completely different from those of the last century. While in the 19<sup>th</sup> century people were trained to perform a permanent job throughout their professional career, nowadays constant changes require the education system to be no longer only focused on technical skills, which rapidly develop, but rather on competences. The latter are to be interpreted as the set of transverse knowledge, skills and attitudes a person can use throughout life.

These competences, which are referred to as the 21<sup>st</sup> century competences, are extensively debated by scholars at international level. Many different institutions, ranging from the European Union to the Organization for Economic Co-operation and Development (OECD hereafter), from national research centres to national and local government bodies, tried to provide a quantitative and qualitative description of these competences. The great interest and debate this topic generates is closely connected with a “new” approach to education and learning which inevitably affects the present and the future of the whole social system.

Arts and cultural heritage prove to be valuable tools to encourage the development and use of the skills people need to adapt themselves to a continuously changing context like today’s society. In this light, the following paragraphs provide an overview of active citizenship and describe how it can be promoted and developed especially in primary schools

The advent of new technologies carries remarkable implications for education due to the different nature of the cultural mediation education is based on. Parry (2007; p.9), an eminent English scholar who often examined the relationship between technological innovation and museum education, makes reference to McLuhan and starts from what he calls *the rudiments* of media theory in order to explain how and to what extent the digital dimension of museums affects the activities and experiences museum audiences are offered. In the postmodern age we live in, Parry's view, which may be agreed with or not, basically concerns the influence that the medium exerts on the message. Indeed, as he states:

Far from being a passive and putative vessel merely carrying content, the medium used (be it television or telephone, t-shirt or text) has a vital role to play in the construction of any communicated message.

According to Parry, every communication technology entails a series of associations and consequences for the audience. In other words, users assign a number of personal meanings to the medium, which are later connected to the very message conveyed; thus, it is necessary to carefully select the medium to convey meaning.

The research group, based at Roma Tre University, which took part in the Erasmus Plus DICHE project, "Digital Innovation in Cultural Heritage Education", carried out its research on the main objectives of the project, which were primarily focused on informing primary school teachers, including both in service and in training teachers, of new education practices which employ technologies and also include the evaluation of their effectiveness in learning.

Roma Tre University Museum Education Centre was in charge of the design of pilot activities taking into consideration the theoretical model of the DICHE project and some of the core activities were devoted to the creation of a web app devoted to integrate technology in heritage fruition within primary school education.

Issues concerning the use of new technologies in teaching and learning have called the attention of policymakers and educators at global level in recent years. The Italian National Plan for Digital Education, which was launched in 2008 and which later served as a central pillar of "La Buona Scuola" school reform (Law 107/2015), promotes the experimentation with new teaching methods, the use of innovative tools, the dissemination of good practices, the development of school curricula, and the increase of laboratory activities. The latter are considered to be central to classroom teaching and learning.

Before providing schools with expensive technology equipment, which rapidly becomes obsolete, it is of paramount importance to enable teachers to use technology and digital tools in general in order to effectively introduce them in courses.

As previously mentioned, the national guidelines for primary school issued by the Italian Ministry of Education in 2012 stress the importance of studying arts and cultural heritage in the early years of schooling, especially in the context of experiential education where children learn about the world through a multisensory approach, based on different techniques:

*“Children’s encounter with art allows them to look at the world with different eyes. Exploring materials through the senses, experimenting with new techniques in the school laboratory, observing places (squares, gardens, and landscapes) and works of art (paintings, museums, and architectures) help children to improve their perceptive skills and nurture the pleasure of enjoying and creating art, thus bringing art and cultural heritage closer to children.”*  
(Italian Ministry of Education, 2012; p.20)

In this light, the Roma Tre research group developed a digital menu of possible teaching scenarios, which includes the use of technologies for cultural heritage enjoyment and which later became an application for mobile devices, which was used by a considerable number of users and evaluated, as discussed in the following paragraphs.

## Research design and methodology

The menu is the digital tool which comprises all the theoretical contributions offered by DICHE partners and which translates the methodological approaches to basic skills’ development into teaching scenarios through cultural heritage enjoyment and technology use. The menu (<http://www.diche-project.eu/resources>) is an online database which contains best practices and education tools for teachers.

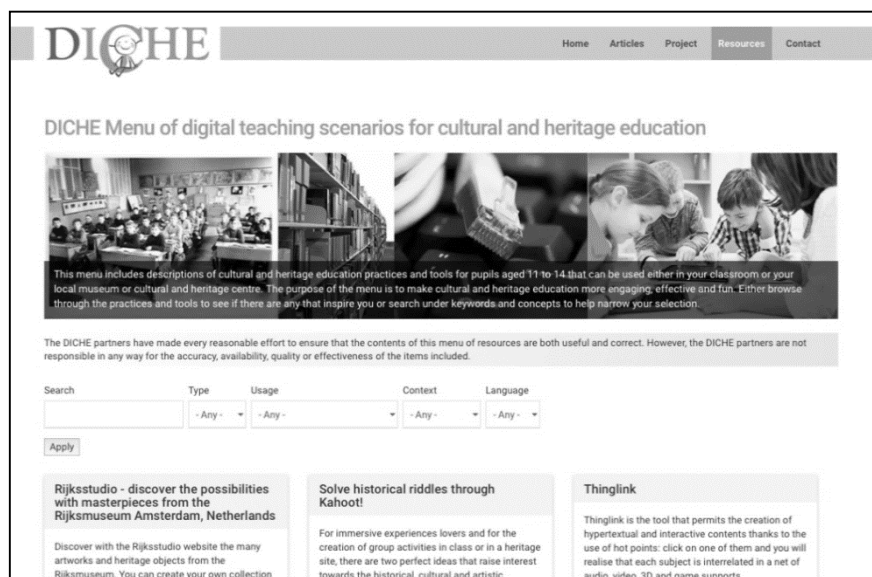


Figure 1. The menu of teaching scenarios of the DICHE project

The menu’s target users are primary and secondary school teachers, together with museum educators, who want to design, create and evaluate innovative programs for students aged between 11 and 14 years, in formal and informal education contexts. The description of teaching practices and digital tools is available in English, Italian and Dutch, to increase the number of potential users.

Research can be carried out by either selecting options inside the menu and typing keywords or filtering the different types of resources (teaching scenario or digital tool), uses (tracking,



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mapping, routing; presenting, reporting; exploring, researching, inquiring; instruction, assignment; recording, collecting), contexts (classroom; museum; heritage site; home) or the language of the digital resources (app, software, website).

The database can also be accessed to read its contents and/or to adapt them to the educational needs of the real-world context of use, and of the tools available.

The menu of teaching scenarios was used during the project pilot phase by Italian and Dutch partner institutions to assess the database effectiveness, the theoretical structure of reference for the project and also the fruitfulness of the teaching scenarios created.

In particular, Roma Tre researchers developed a specific tool for the pilot phase: The *MuseTech* web app (available at: <http://www.musetech.it>).

### MuseTech web app

The name of this web application derives from the combination of the words *museum* and *technology* which represent the foundations of the DICHE project. The idea of designing a web app came into being from the need for a unique application which could be used on different mobile platforms and operating systems, without the need to be installed on devices and/or continuously updated. By simply accessing the Internet, MuseTech allows users to enter the DICHE menu of teaching scenarios and, simultaneously, to evaluate and share their contents.

The introduction of a social dimension in the project is indeed a value which MuseTech adds to the menu: an increasingly higher number of users can be reached, the audience gets wider and wider, and this creates a network of researchers, teachers, students and museum educators / pedagogists / education professionals in general orbiting around the project tools and practices. Like other famous web apps and Internet services (such as, among others, TripAdvisor® and Yelp!®), MuseTech allows users to vote for the contents they find in the menu and like the most thanks to a five-star rating system. Moreover, users can share the contents they voted for on social media platforms such as Facebook®, Twitter®, and Google+® which favour communication and interaction within the community.



Figure 2. Examples of usage scenarios of MuseTech web app

MuseTech was used by students of the degree course in Primary Education Sciences and by primary school teachers Roma Tre University involved in the project pilot phase, as well as by all participants in the events Roma Tre researchers organized for dissemination purposes.

## Analysis of Results and Findings

In order to assess the impact of the Musedtech webapp the research group created a *corpus* made by the Wordpress® comments inserted by the users. The table below lists all the resources included in the webapp and summarizes the quantitative evaluation that users expressed while evaluating the tool.

The size of the corpus is 122,962 words, of which 6,762 unique tokens.

Table 1: MUSETECH resources and their evaluation rates

Title	1 star	2 stars	3 stars	4 stars	5 stars	Avg. stars	# of comments
SMartART	0	0	4	10	21	4.5	31
Digital Storytelling	0	0	2	7	3	4.1	9
MOOVLY – animated videos and presentations	0	1	1	9	3	4.0	18
Heritage App	0	2	0	4	3	3.9	5
News school report – creating and writing a news report, supported by BBC	0	1	2	3	9	4.3	16
StoryWriter – A digital tool for collaborative storytelling	0	0	2	4	1	3.9	7
Audacity – Free software for audio recording	0	0	0	2	2	4.5	4
WeVideo – Cloud-based video creation platform	0	0	2	1	2	4.0	4
InHerit, heritage interpretation course materials	0	0	2	3	3	4.1	7
Kamp Amersfoort	0	0	1	1	4	4.5	5
Scatt-Arte – Photos of art	0	1	0	0	10	4.7	11
Augmented Reality for orientation	0	0	0	2	0	4.0	4
Toolbox with 4 basic Heritage tools	0	0	0	1	0	4.0	1
Radio Local – make a radio report of a local interesting place	0	0	2	2	2	4.0	9
Around the church – making an animation after local church visit	0	0	0	0	6	5.0	9
Participatory mapping with Story Map	0	0	1	2	1	4.0	5
Edublogs – The largest education blogging platform on the web	0	0	0	0	2	5.0	2

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Popplet – A mind-map tool to organize ideas	0	0	0	3	2	4.4	7
Answer Garden – A minimal feedback tool to get attention	0	0	0	0	0	0.0	1
Newsela – Online reading platform to develop critical thinking skills	0	0	0	2	3	4.6	8
Huntzz – Treasure hunts and tours across the UK and Europe to experiment gamification	0	0	0	0	0	0.0	0
My Culture Quest – An interactive site to travel across the world	0	0	0	0	3	5.0	5
SMARTART: When the Images Speak of Art	0	0	0	2	3	4.6	4
The history of a village comes to life	0	0	1	1	0	3.5	2
Present history your digital way!	0	0	0	0	0	0.0	0
Use of Padlet in a lesson about the Dutch East Indies	0	0	0	0	0	0.0	0
CSI Leiden – film report of 18 <sup>th</sup> century crime in Leiden	0	0	0	0	0	0.0	0
The Internet Archive	0	0	0	0	1	5.0	2
The Michelangelo project, an overview of the European Fine Arts	0	0	0	0	0	0.0	0
Dutch Arts and Culture Search Engine	0	0	0	0	0	0.0	0
TimeGlider: creating timelines	0	0	1	0	1	4.0	0
Capzles: social storytelling	0	0	0	0	0	0.0	0
Minecraft, create your own world	0	0	1	0	0	3.0	0
12 art and culture lessons for Audiovisual education and Media-art	0	0	0	1	0	4.0	0
Powtoon	0	0	0	2	0	4.0	2
Boomwriter	0	0	1	1	1	4.0	3
Kahoot!	0	0	0	1	3	4.8	4
Thinglink	0	0	1	1	0	3.5	3
Between museums and creativity	0	0	0	1	1	4.5	1
Rijksstudio – discover the possibilities with masterpieces from the Rijksmuseum Amsterdam, Netherlands	0	0	1	0	0	3.0	0
Lupus in Fabula! Discovering animals in Ancient Rome	0	0	1	2	1	4.0	2
Mass communication in Roman Times	0	0	1	0	1	4.0	1
Aqueducts and Baths	0	0	0	1	0	4.0	0
The “Tablets” of days gone by	0	0	2	0	0	3.0	1
The Techno side of Empire	0	0	1	1	0	3.5	3

Gods for a day	0	1	14	68	58	4.3	152
Solve historical riddles through Kahoot!	0	1	9	44	58	4.4	126
MOOCs, critical thinking and museum education	0	2	33	91	42	4.0	185
Recreating artwork through Flash mobs and living pictures	0	0	11	56	118	4.6	208
Creative writing and museum objects	0	5	41	79	39	3.9	183
The Critic Globus experience	0	2	20	52	74	4.3	169
Object Based Learning and 3D Printing	0	2	13	69	63	4.3	171
Travelling Planetarium	1	1	20	66	105	4.4	220
Europeana	0	7	43	47	25	3.7	137
Art Stories FACES	0	8	51	57	39	3.8	177
ArtPlanner – creating a trip planner	0	4	24	77	56	4.1	184
Cardboard, a VR app for Android smartphones	2	3	34	34	25	3.8	116
SMARTART – WHEN THE IMAGES SPEAK OF ART	1	3	23	63	46	4.1	160
<b>TOTAL</b>	<b>4</b>	<b>44</b>	<b>366</b>	<b>873</b>	<b>840</b>		<b>2384</b>

In the app 2127 votes were collected (5 rating system) divided as follows: 4 votes for 1 star rating, 22 for 3 stars rating, 366 for 3 star rating, 873 for 4 stars rating and 840 for 5 stars rating.

The following table instead summarises the characteristics of MuseTech webapp in terms of number of resources, commenters, comments, votes and level of rating.

Table 2: Summary of the webapp content

# of resources	58
# of commenters	204
# of comments	2384
# comments per commenter	12
# comments per resource	41
# votes	2127
# 1 stars	4
# 2 stars	44
# 3 stars	366
# 4 stars	873
# 5 stars	840
resource more commented	Travelling Planetarium (220)

Most frequent words used in the comments are: “a lot”, molto (1746); “interesting” interessante (1293); “children” bambini (1098); “way” modo (740); “useful” utile (579).



Figure 3. Most frequent words in users' comments

## Discussion and conclusive remarks

The rationale at the basis of the analysis carried out was related to the idea of facilitating in training and in-service teachers aware and critical use of technology in their teaching and learning especially as far heritage education was to be integrated in their classes.

Besides the results, which highlight a general appreciation of the tool, it is important to notice that users had the opportunity to know about free digital scenarios and practices that otherwise were completely unknown. Moreover, the possibility for the users to choose a specific scenario or practice according to their actual teaching and learning needs enhanced the effect of the potential technology has to empower certain skills both in the educators and in the pupils who participated in the activities organised.

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## **Authors**

A. Poce coordinated the research presented in this paper. Research group is composed by the authors of the contribution that was edited in the following order (A. Poce (State of the Art, Research Design, Methodology and Conclusive remarks), F. Agrusti (Analyses and findings), M.R. Re (MuseTech webapp)).



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## **BOUNDARY CROSSING: INTERNATIONAL STUDENTS' NEGOTIATING HIGHER EDUCATION LEARNING WITH DIGITAL TOOLS AND RESOURCES**

*Mengjie Jiang, Palitha Edirisingha, University of Leicester, United Kingdom*

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This paper draws on qualitative data from a research on Chinese international students at the University of Leicester in the UK and reports on the appropriation of digital tools during their intercultural adaptation. The paper brings two theoretical approaches to improve our understanding how international students make sense of, and use digital tools and resources when they begin to adapt to a new higher education environment. One theoretical lens is appropriation of cultural resources, the process through which digital tools are shaped in use, which draws on the work of Pachler et al. (2010). The other approach draws on the model of boundary crossing (Akkerman & Bakker, 2011), which provides an alternative route to understand appropriation of digital tools as boundary crossing tools. Adopting such theoretical approaches allows an interpretation that boundary can carry learning potential through the spectrum of transformative learning where students are seen as active agents shaping their learning trajectories. It also contributes to the debates around the deficit view of internationalisation that portray international students as *victims* or *problems* while dichotomies the learning strategies of students from Asia and the West. The study highlights that Chinese international students' intercultural leaning experience involves ongoing engagement with social networks and artefacts. There is also an aspect of the expansion of their capacity at a personal level and strategic agency to appropriate digital tools and services to cross different sociocultural contexts such as bridging political, cultural and language differences. Understanding this is important in a context where learning becomes increasingly mediated by technologies which can contribute to improving pedagogical approaches for using digital tools and services to engage international students.

### **Appropriation of digital tools and services for boundary crossing**

Diversity and mobility in education presents both paramount opportunities and challenges: International students are regarded as vital to UK higher education sector due to their cultural and economic contribution, with China being the largest source of postgraduate (PG) students (British Council, 2014). Yet, international students embark on universities bringing with them their own diverse characteristics and experiences, which has led to growing attention on the process of international students' intercultural learning (Gill, 2007). Intercultural learning is "acquiring increased awareness of subjective cultural context (world view), including one's own, and developing greater ability to interact sensitively and competently across cultural contexts as both an immediate and long-term effect of exchange" (Bennett, 2009; p.2). Our

focus of intercultural learning is placed on one form of transnational higher education, namely the studying abroad programs. Empirical studies show tensions occurred when encountering a distinct cultural experience is more overwhelming at the initial stage of students' adaptation, particularly for postgraduate students since most full-time postgraduate programmes in the UK is expected to be completed within a year. Nevertheless, such intercultural experience can lead to a transformative learning process in which international students negotiate learning as a dynamic interplay between challenges and professional developments (Gill, 2007; Gu, Schweisfurth, & Day, 2010; Tran, 2013).

This cross-cultural learning experience essentially involves *boundary crossing*: meaning “a person's transitions and interactions across different sites” (Suchman, 1994). A boundary means “sociocultural difference leading to discontinuity in action or interaction” (Akkerman & Bakker, 2011; p.133). Boundaries can be viewed as discontinuities in various form of practices: such as discontinuities in a community of practice and social activities and intercultural learning (Walker & Creanor, 2005). For example, Singh (2005) found that while Chinese international students continue to experience a sense of “strangeness” of the host culture, politics and pedagogies in Australian universities, they become autonomous agents of their life-changing experience and take responsibilities to participate in the intercultural community of learning. Boundary objects are artefacts doing the crossing by fulfilling a bridging function (Star, 1989). This paper prefers the term of *boundary crossing tool* over *boundary objects*, as it stress the agency of learners and we view them as a form of *cultural resources* that “integrates media, mobile devices, internet tools and services under the functional description of resources”. The concept of boundary crossing emphasis the focus on ongoing, dimensional actions and interactions between contexts rather than one-sided transition (Akkerman & Bakker, 2011).

The notion of boundary crossing is associated with how Bhabha (1990) used the notion of *third space* in intercultural learning. Bhabha (1990) called attention to the way that the encountering of two different cultures may open up a third space where meaning is negotiated. Burnapp and Feng (2007, cited in Burnapp, Feng, & Zhao, 2012) extended the concept of third space to investigate the possibility of a virtual third space. Later, Burnapp et al. (2012) studied how Chinese international online distance students use the Internet and social networking sites and concluded that the creation of mixed online communities of Chinese and British students facilitate intercultural learning in such a way that leads to a hybridity of previous and new expectations. This paper provides a sociocultural perspective to learning using digital tools within transitional experience. It respects a learner-centred collaborative leaning approach, wherein it is essential to explore the influence of cultural practices, social relations and community of learners (Prieto et al., 2016). From the viewpoint of sociocultural theorists, learning involves meaning making process mediated through interaction both with other learners and artefacts (Vygotsky, 1978).



## **Research Methods**

Qualitative data collection took place from mid-2014 over 15 months, and research participants were Chinese international students on master's programme at the University of Leicester. Data collection instruments included mind maps, semi-structured interviews and photographic journaling.

### ***Mind maps***

Mind maps were used as a tool for preparation for interviews. Participants were invited to create mind maps to map out their use of various digital devices and technologies for educational purposes. Participants were encouraged to provide details, such as rating the relevance of different technologies, and to write descriptions of how they use certain technologies for learning. Wheeldon (2011) explained that qualitative research serves as an important means to explore meaning through looking into the ways of how individuals construct and frame their accounts of knowledge, experience and perception. For the depth of the qualitative data, mind maps facilitate a more comprehensive reflection of experiences through enabling participants to develop the rehearsed narratives (Hathaway & Atkinson, 2003). Fourteen participants (out of a total of 30 who took part in interviews) produced mind maps.

### ***Semi-structured interviews***

Semi-structured interviews were used as a primary method to elicit participants' viewpoints of the topic without pigeon-holing the responses of those interviewed, and in turn semi-structured interviews allowed the researcher to identify unexpected things revealed by interviewees and so further probing. Thirty participants took part in interviews and the interview schedule began with demographic questions that asked their education background, subjects studied at undergraduate and postgraduate levels, the demographic area in China and IELTS examination results. The sequence of the interview questions was from general to the more specific. Participants were asked about their general studying experience such as the formats of the assignments and assessments, they were then asked to share their experience of using mobile technology to study those activities.

### ***Photographic journaling***

The use of photographic journaling was inspired by several works on social science research methodologies and empirical study, including Experience Sampling Method (Hektner, Schmidt, & Csikszentmihalyi, 2007), the Day Reconstruction Method (Kahneman et al., 2004), and the Day Experience Method (Riddle & Arnold, 2007). Experience Sampling Method (ESM) is a way of collecting data about context and content of participants' daily life relevant to the focus of the study. ESM has the potential to generate a rich and in-depth perspective on moments in a participant's life (Hektner et al., 2007). The implementation of this method was inspired by Riddle and Arnold (2007). WeChat (instant messaging app similar to WhatsApp) groups were established with the research participants. With prior agreement with the participants, they were prompted at several random points by instant messages. If participants

were doing study related activities, they were asked to use digital devices (e.g. mobile phones or tablets) to record their learning scenarios and the use of materials and devices they have at hand. Meanwhile, they were invited to answer some questions at the time of the message if they were doing any study-related activities. The questions included information about the time of the day when they were studying, with whom they are studying, study location, general feelings and issues about study. Out of 30 interviewees, 4 took part for the photographic journaling activity that lasted a month, and participants were invited to return message on a day each week.

## **Results**

Data were analysed based on Akkerman and Bakker's (2011) framework that identifies four learning mechanisms regarding the process of boundary crossing. These are:

- Identification – (re)defining intersecting cultures in light of each other.
- Coordination – mediating artefacts and procedures enable common practices in distributed work.
- Reflection – observing and explicate differences and similarities between practices and thus to value each other.
- Transformation – changes in practices and even hybridity of practices.

We studied how Chinese students appropriated cultural resources in their intercultural learning experience, and report themes in relation to the above four learning mechanisms.

### **Identification**

The mechanism of identification takes place by interpreting one practice in the light of another, focusing on differences and similarities. In turn it leads to the underlying need to a renewed understanding of different practices and the reconstruction of identities to overcome discontinuities (Akkerman & Bakker, 2011). As observed in interview data, the participants were consistently comparing their experience in relation to uses of digital technology and social media. For example, Blackboard serves as the main Virtual Learning Environment (VLE) in UK universities. However, only 5 out of 30 students reported that they used VLE for their undergraduate study in China. Some of these students mentioned uses of different VLEs in undergraduate study in China such as: Moodle (P5, male, age 23, Management), Zhengfang Learning Management System (LMS) (P8, female, age 23, Translation), while the use of VLE during their undergraduate study was mainly restricted to selecting courses, submitting assignments and checking the outcome of their exams (P5, P8). Others also mentioned differences, such as:

*“Basically, the undergraduate university’s website was used mainly to promote the university and to announce events. We also had university account that allows users to download articles from CNKI [a nation-wide central database] for free. However, unlike the website for postgraduate study [at Leicester], it does not have a system that works like Blackboard as a central platform for learning resources. There were not many things to be downloaded and to view.*

*[Undergraduate] tutors did not share slides and materials. Maybe some did share, but only those famous teachers and in well-known disciplines” (P22, female, age 23, Media).*

*“I feel now I can make use of online resources because we have Blackboard. I mainly used printed books and CNKI for undergraduate study. But now the Leicester university database provides easy access to journal articles” (P1, male, age 23, Translation).*

Understanding the social media and technology space in China is important for educators who try to engage Chinese international students. In China social media sites like Facebook, YouTube and Twitter are inaccessible without a VPN (Virtual Private Network). These conditions underscore how different China's Internet is compared to that in the West. In China, the National Knowledge Infrastructure (CNKI) serves as the most-used academic online library, and it contains comprehensive databases and resources such as journals, doctoral theses, masters' dissertations, e-books, newspapers and so on (Wan, Hua, Rousseau, & Sun, 2010). Most of the interviewees (n = 25) reported using CNKI to search for resources when they had written assignments (e.g. essays), mainly driven by their undergraduate institutions. As it can be seen from the transcripts, students are comparing their previous practice with new practice. A lot of students mentioned about their uptake of Google Scholar, University A-Z database, Wikipedia and YouTube for learning purposes during postgraduate study. Some students were introduced to discipline-based databases by their tutors, such as using Lexis to search for news (e.g. P10, female, age 23, Public Relations). Most of participants (n = 19) noted that to email their tutors and course representatives about studying issues or to arrange meetings is a more common practice in the UK (e.g. P28, female, age 22, TESOL).

### **Coordination**

The second learning mechanism is referred to as coordination, focusing on identifying effective methods to enable connections and cooperation in communication to maintain the flow of the work (Akkerman & Bakker, 2011). The analysis of the interview showed that all interviewed students use mobile technology on a daily basis and most of them can compare different practices and use different social media services to cross sociocultural boundaries (i.e. the participation gap caused by different experiences and formal-informal gap). In China, WeChat as a mobile communication service gained prominence and has become the most widely used social networking service (Lien & Cao, 2014). WeChat has WhatsApp-like messaging, a Facebook-like news feed known as moments, and a PayPal-like wallet, together with other built in applications which seemingly does most things for users, such as, booking taxis, shopping online (CIC, 2015). Although our research participants have varying degrees of experiencing technology – some had more experience with Facebook and YouTube because of their previous overseas experience developed during student exchange programmes (P6, P11), undergraduate (P15) and postgraduate (P8) studying experience. Nearly all participants reported clues that shed light on their process of sense-making of the new experience, as in this case:

*"I have a Facebook group. Because I did a course 'academic media' at Leicester's English Language Teaching Unit [where students learn English and academic writing skills]. There were 14 people in the group. The tutor named it as 'new media', and we used it for discussion. Students post questions and comments. Now, I do not use it very often. There are many Chinese students now in the university. So, I still use WeChat for communication as a dominant tool. And even some foreign students have been influenced by us to start using WeChat"* (P14, female, age 24, Media).

*"Facebook has some educational uses. For example, because it is an international environment, like we have Japanese, Hungarian students and students from other countries in the group. And they might not use WeChat, so we use Facebook and Messenger to discuss about the group assignment and arrange time for group meetings"* (P10, female, age 23, Public Relation).

P14 described her adoption of Facebook as a result that Facebook was explicitly designed into a learning activity as a tool by her tutor to integrate the physical and virtual learning opportunities to cross the formal-informal boundary. Although Facebook was not designed to be used in formal classroom learning, it was used outside classroom to connect students who are working towards the same goal and to extend their learning and support. Although P14 mentioned that she still uses WeChat as a dominant communication tool, and that Facebook group was only active within the course time, later she talked about that she continues to add more contacts on Facebook and WhatsApp. These were used for groupwork, discussion and distribution of tasks and consequently helping her in her development of intercultural understanding and language skills. In another case, P10 pointed out the educational value of Facebook to bring students from diverse cultural backgrounds together for learning and to break the geographic boundary.

The photographic journaling activity also reveals similar themes. For example, P12 returned some photos of using WhatsApp for group work and was invited to talk about how he discusses questions with his classmates. As he lived in another city and was not able to travel to the University everyday, he often uses a photo-sharing tool to ask questions from one of his classmates. They also distribute work and make phone calls to explain questions when necessary. Examples are shown below:

## Boundary Crossing: International Students' Negotiating Higher Education Learning with Digital Tools and Resources

Mengjie Jiang, Palitha Edirisingha

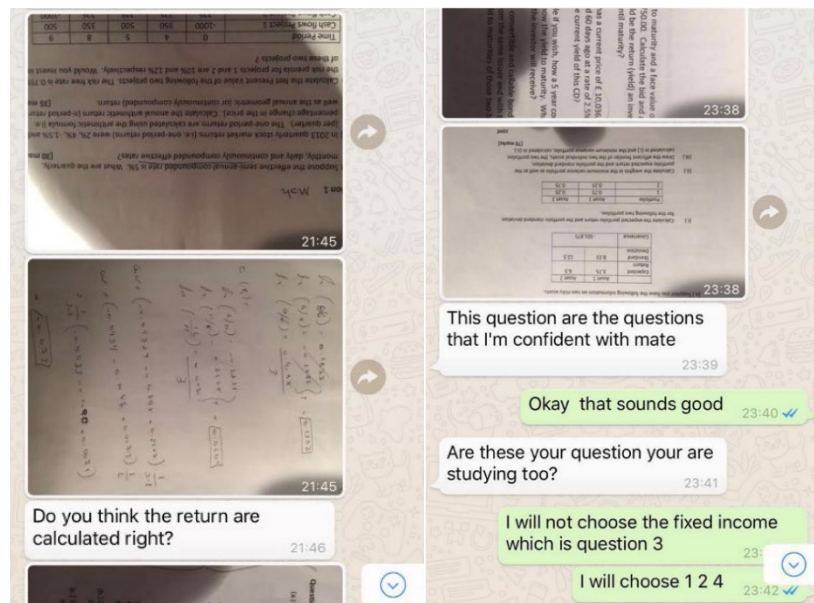


Figure 1. The example of using social network (e.g. WhatsApp) for discussion (P12, male, age 23, Financial Mathematics and Computation)

From P12's description, he did one group work with this peer and they added each other on WhatsApp to discuss group work. P12 said that although he was not in the same group for the following assignment with this classmate, they were still discussing course-related activities on WhatsApp. The analysis of data reveals mobile tools and social media such as Facebook and WhatsApp are appropriated by students to cross boundaries in different ways, such as: (a) technological boundary: students from different contexts use different technology under the wider dynamic environment, and some Chinese students perceive this different and start to use Facebook or WhatsApp to connect their peers when necessary. (b) temporal and geographical boundary: because the formal classroom is time constrained, and, social media can assist in bridging communication connection and increasing immediacy to smooth coordination. It can be seen that mobile devices, especially with convergence of social media allow for *seamless* and *just-in-time* learning opportunities to support information sharing and collective contribution (Sharples, Taylor & Vavoula, 2007).

### Reflection

This mechanism involves reflection as a means to define differences between practices and will in turn learn own and other's practice (Akkerman & Bakker, 2011). The reflective impact involves dialogical inquiry, to scrutinize oneself from the others' eyes and eventually engaging multiple perspectives (Boland & Tenkasi, 1995, cited in Akkerman & Bakker, 2011). Students' response entails how a self-reflective process facilitate them to rethink their biases, transcend limitation of knowledge and engage in cross-cultural dialogue, as in the case:

*“At the beginning of the course of ‘the politics of digital media’, some lectures covered sensitive topics, which often offended Chinese students as they were feeling great about China. For instance, when the tutor was talking about the Fa Lung Gong [often understood as a spiritual practice in the Western context],*

*he thinks the Chinese government is controlling the freedom of a normal organization. But some Chinese students argued that Fa Lung organization is an evil threat. I think it is because we have different mind-set. For them, they may think people have the free rights to do things to court others' attention. But for us Chinese people, we think social order should not be disturbed. But because I took that course, I read many Western comments about the Chinese politics which make me feel it is difficult to say which one is real and I started to be critical about the Chinese media as they always report something in a different way compared to the Western media.” (P14, female, age 23, New Media).*

P14's account reveals that conflicts and misunderstanding might occur when sojourners first enter the host country because teachers and international students were affected by different political discourse. P14, some were able to reflect on their experience and developed understanding that media representation is not neutral and she learnt to critically compare different media representations. Later, she also described her observation of Sina Weibo (a social media web tool in China) users to accomplish an essay about writing sensitive words online developed her awareness of self-censorship behaviour among Chinese social media users.

### **Transformation**

Transformation is discerned as the changes of practices or creation of new practices that stands in between the established practices (Akkerman & Bakker, 2011). Referring to the boundary-crossing interdisciplinary research of scientists, Palmer (1999) suggest that transformation denotes creation of hybrid field that does not abandon existing practices but maintaining value of the intersecting practices to one another. With interpretation, the analysis of data show participants embrace an aspiration to transform in a sense that while maintaining their established digital practice, they also benefit from drawing other cultural resources both for independent and collaborative learning with others, as in the case of the mind maps shown in Figure 2.

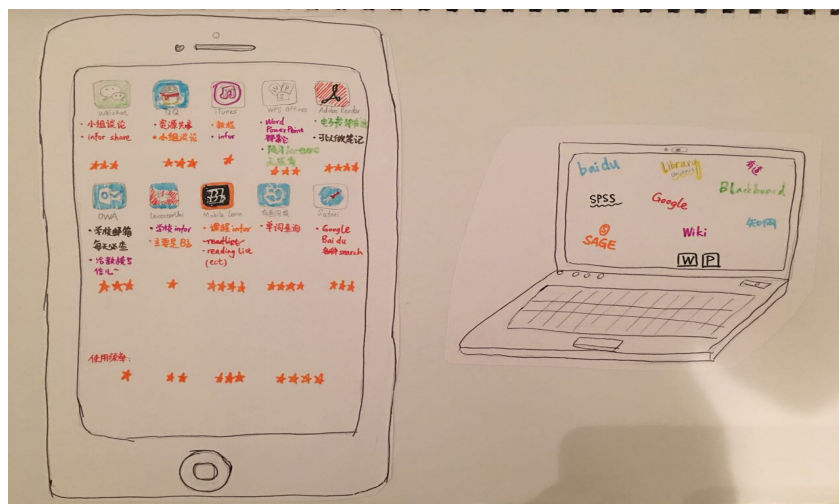


Figure 2. Example of frequently used digital sites and application for learning (P13, female, age 24, media)

The above figure shows a set of digital tools as well as services that are used most frequently by P13 for learning purposes. As it can be seen, P13 drew various tools that she often uses on the laptop and these tools include both tools that predominantly use Chinese language and those dominated by English language. On her drawing of her iPad, it not only shows an array of applications, but she also wrote the activities she conducts with the help of these applications. She also uses number of stars to indicate the frequency of use among these applications: more stars means that she uses such tool more often. The above figure implies that P1 has expanded the knowledge of newly experienced tools into her cognitive structure and developed a strategic attitude towards the uses of digital tools, integrating available tools and using them purposively dependent on context to achieve specific goals. Other mind maps and interview data also confirmed that students do not simply transfer one practice to the other, rather they expand their knowledge and combine Western sites with Chinese sites.

## **Conclusions**

The students who took part in this study can be considered as sojourners – who live in the UK academic and cultural environment on a temporary basis. The present study found that these sojourners' initial encounter of challenge and conflicts can be translated into a new capacity to personal expansion and transformation. Technology and social media are useful cultural resources to cross boundaries in a variety of ways such as across culture, time, locations, formal-informal and physical-virtual (Pimmer, Linxen, & Gröhbiel, 2012). Sometimes, tutor act as the designer of co-creative learning practices, as in the case of Facebook group, which later contributed to students' increased social capital (which broadly stands for the resources accumulated through the relationships between people), and mobile-based multimodal representation can be used to facilitate an iterative learning cycles and discussion.

Evidence showed that students are constantly assimilating and accommodating their learning through expanding something unknown into their cognitive structures and making sense of the contextual influences with changing cognitive structures. This is in line with the concept of situated learning (Lave & Wenger, 1991). For example, students use mixed pedagogical strategies. They made use of Blackboard, tutor's slides, and other web-based learning opportunities to lessen the stress of initial entry of changed academic context (e.g. P22); they use different social media to foster communication connection both with Chinese friends and students from other cultural backgrounds (e.g. P14); they research on Chinese sites to look into case studies for their essays and search on English search engines for academic journals to produce English writing (e.g. P13). The use of digital tools and resources can be seen as an act of agency as Chinese international students "strategic making and remaking of selves, identities, activities, relationships, cultural tools and resources" (Moje & Lewis, 2007; p.18). This appropriation process also entails social negotiation, which represents "the internalization of the pre-given world of cultural products" (Pachler et al., 2010). Changes in their identity can also be seen from their employment of mixed learning approaches, their changing

relationship to peers and their acceptance of alternative perspective and norms, which indicates that identity is multiple, evolving and contextually reconstructed rather than fixed and static (Banks, 2008).

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## **SUPPORTING LEARNING IN TRAUMATIC CONFLICTS: INNOVATIVE RESPONSES TO EDUCATION IN REFUGEE CAMP ENVIRONMENTS**

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### **Summary**

The issue of mass migration and population movement has dominated European discourse for at least 40 years. Since the invasion of Iraq and the various destabilization efforts against countries like Libya, Syria and Afghanistan, however, an entirely new phenomenon has erupted onto the centre stage – millions of people fleeing failed States, violence, terrorism and despair. Especially in the case of Syria (now in its fifth year of war) the problem of millions seeking to depart from the chaos has become huge.

We are now entering a period of real transition however. Far from the malicious impact of war and violence, new problems arise around family fragmentation, emotional trauma, and the need to rebuild lives. Education provision for refugees is simply not being done in a consistent and qualitative manner in Europe. In this paper, we outline how creative measures have been implemented in Greece, through work originating with the team of Lesvos Solidarity, initially solely operating in the Pikpa Camp on Lesvos. This initiative reflects the engagement of the authors at theoretical, design and implementation levels in addressing conflict resolution theory with practical steps to support learning in crisis or traumatic environments.

Lesvos Solidarity began as a response to the crisis that developed on the Greek islands, especially Lesvos, in 2015. It is a self-organized autonomous space, run with a small core team and many volunteers. Lesvos Solidarity is the only open camp in Lesvos and its main objective is to work in active solidarity with refugees and address European immigration policies. Awareness and advocacy work is undertaken in cooperation with local people to promote community and sustainable action, and services have developed and expanded since 2015 to provide other supports, particularly in the educational sphere.

### **Context**

The desperate plight of Syrian people is now a shocking reality whose full dimensions are not appreciated in the wider world. As of June 2017, there were 5.5 million Syrian refugees (UNHCR statistics). From the Summer of 2015 on, hundreds of thousands have attempted to enter the European Union. These desperate people have often survived traffickers, criminal gangs, corrupt police and other exploiters in their journey. The human cost of drowning,

disruption, injury and deaths on land has only underlined the legal obligations of international law and treaties – the requirement for States to provide sanctuary and succour.

This has not been done consistently. Although the warning signs were there, the scale and intensity of the refugee problem seemed to catch the European Union by surprise. The responses were uncoordinated, fragmented and often counter-productive. While many Member States were unprepared, others became actively antagonistic. Driven by a rising tide of xenophobia, they began to erect barriers not seen for decades in an effort to repulse these often-desperate populations. Only one EU country articulated an initial policy of acceptance and welcome - Germany. For other countries in the front line the social and economic impact was significant with the burden falling particularly intensely on Greece, Italy and Malta.

The situation has continued to escalate with the ramifications of a rising tide of racism and discrimination in many Member States matched by a highly prejudicial mass media and incoherent policy response from the European Union, whose landmark Schengen free-travel initiative is itself now under grave threat.

Initial responses were well-intentioned and genuine, but underestimated the scale of the task. As the crisis develops, we are now looking at a situation that is expected to continue for a number of years. And just as Europe addresses its needs and policy in this area, it often neglects the fact that the main burden of coping with refugees from the wars and killing fields of Syria lies not in Europe but in adjacent countries to the conflict – Turkey, Lebanon, Jordan.

As we enter 2018, the situation has developed into a number of needs: as the constant arrival of refugees and the political lack of response means that the humanitarian *response* continues, but as the numbers of refugees trapped for extended periods continues to grow, the need to develop concrete *supports* has emerged. These supports need to engage (and benefit) host communities so that mutual advantage can be sustained. The next stage, therefore, entails a move from support to *integration*, as some refugees stay in the camps indefinitely, and many receive Greek residency. There has been the potential for considerable conflict which has erupted in physical violence at times, and in many instances ongoing unrest between some locals and the refugee population. This entails the need to concentrate on the classic tools for meaningful and sustainable integration as a core tool in alleviating this conflict and leading to a more harmonious co-existence. In both the short-term responses to refugee welcome and support and in the longer-term need for integration and conflict resolution, “Education, Training and Employment” are the means to afford most opportunities to develop inclusion.

## **Potential of Education and Training**

UN statistics indicate that some 55% of Syrian refugees are under the age of 18. This fact underlines the huge opportunity for all to benefit from a proactive educational response. This means however that host countries need to ensure quick access to quality education and training opportunities. If this is done well and consistently, this young but severely disadvantaged generation of refugees can acquire the tools to succeed. This success can be

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achieved either in the new host country or, in the case of return, eventually back in their home country.

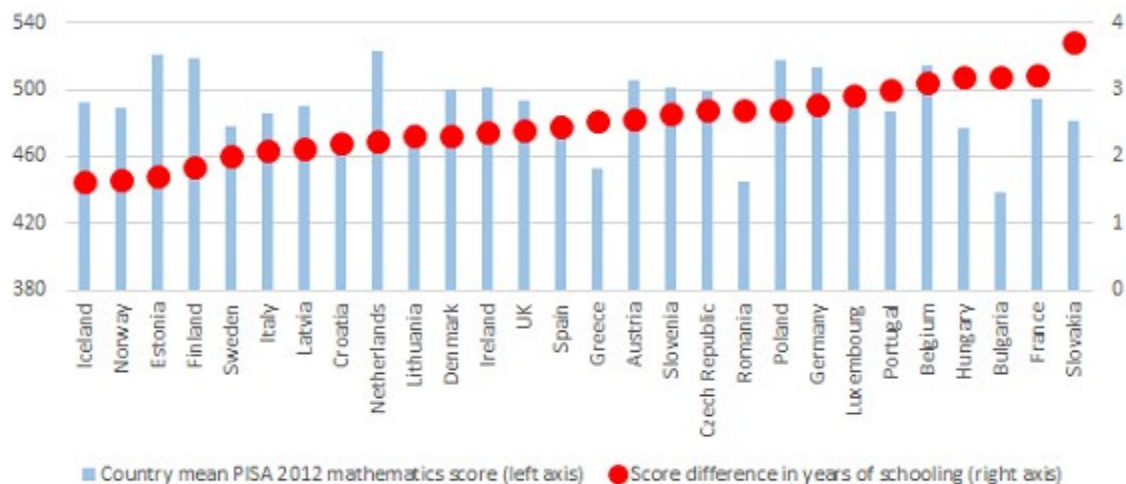
It is an established fact that education benefits both host and refugee communities. However, in general terms education systems in Europe often do a poor job in providing opportunities for existing disadvantaged students, let alone vast numbers of new (and often traumatized) populations. The evidence of PISA research, for example, demonstrates a gap between rich and poor students in Europe which is significant and was already growing before the refugee crisis emerged. The socio-economic crisis since 2008 exacerbated this. The reality is that education systems in most EU countries are not inclusive.

Segregation is often seen by school type: students from disadvantaged backgrounds tend to be disproportionately in vocational secondary schools. In these the quality of schooling appears poorer and the resulting reading and mathematics skills are weaker. Immigrant children end up in poorer schools, usually vocational, and problems multiply into a systemic crisis of low expectations and inadequate outcomes.

Refugee children and youth need targeted support as they enter these already challenged school systems (such as intensive language and general induction programs to allow them to participate in mainstream classes as soon as possible). Some also present with war trauma, suggesting that schools need to offer psychological support. But beyond that, refugees will benefit from measures that make education systems more inclusive.

This includes:

- ensuring students are not segregated into different types of schools based on socio-economic grounds;
- promoting early childhood development and education programs;
- making parents part of the education process;
- offering remedial programs; and
- equipping teachers with tools to provide support to students with multiple disadvantages.



Source: OECD PISA 2012

Figure 1.

This situation is likely to persist for some time. Meeting the needs of migrant and refugee populations has been described as the “new normal” in an already ageing and unequal Europe. Refugee children face other obstacles. If unable to provide evidence of past educational achievements, they are placed in grades lower than their actual educational levels. Many schools do not have teachers qualified to address the unique needs of these students. Many lack the specialized resources necessary to help refugee children integrate into school activities or embrace diversity within the curriculum. Where local language courses exist, they are not always sufficient to enable young people to acquire the skills necessary to receive a mainstream education. As a result, these children sometimes drop out of school, forfeiting any chance for educational and personal advancement.

UNHCR has urged each country in the region to create policy and practices, which will give these children greater access to formal and non-formal education of an adequate quality, and will eradicate discriminatory and xenophobic practices in its school system.

In the EU, this has simply not been done. The development of Education, Training and Employment opportunities through Lesvos Solidarity (and its allied organization in Mytilini, Mosaik), offers a strong model for successful integration. The use of advanced ICT supported learning in such environments offers new and creative options for teaching and support. In this way, the tragedy of producing a “lost generation” can be avoided by constructing a proven example of linkage and innovation that can serve as a model for best practice throughout the EU.

### **The Lesvos Solidarity and Mosaik Education, Training and Employment Model**

This model has been designed to build on identified needs and to construct a model of learning that is meaningful, flexible, adaptable and beneficial to all stakeholders. It includes deployment of digital learning supports to address competence-based learning, as well as best practice early-

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years education, integrating both local Greek and refugee children. Another element has been the advocacy and achievement of organizing of primary school age refugee children to attend local schools (often in the face of significant and intimidating local opposition). The model finally supported innovative vocational education for the older children not in school as well as vocational classes for adults.

The model proposed and developed was one of a learner-centred strategy. This multiplied the benefits by linking learning methods to practical outcomes in a coherent and multidimensional manner.

The development and inclusion of an education and training dimension in the mission of Lesvos Solidarity Camp and Mosaik has served several purposes:

- Fitting the ethos of the camp through benefit to residents in a rapid, demonstrable and timely manner.
- Enabling Lesvos refugees in other camps to be trained and supported.
- Creating added value of competence-based learning for refugee youth.
- Opening paths for community development based on inclusive education models.
- Serving as a sustainable model for education and social integration in other refugee camps in Europe. This would be a crucial outcome from the perspective of the EU which has no template at present.
- Outputs are designed to be sustainable and usable. They will also form part of an integrated and planned earning strategy that will grow to encompass use of ICT, social media, entrepreneurship, Advisory skills and STEM related subjects.

Additional benefits include supporting the critical thinking and reflection needed to develop understanding of past trauma. This entails a deployment of principles of conflict resolution and diversity management within learning programs to encompass the need to adjust and integrate (either temporarily or over a longer time), intercultural competence, counselling support, cultural mediation, empathetic communication and innovative adaptation of advanced digital learning platforms.

Specific examples of the outcomes of the intervention can be noted.

### ***The Early Years Program***

This was designed to address the needs of the younger children. This began in May 2016 with a kindergarten within the camp based on the Irish curriculum framework for the age group 0-6, Aistear. The use of Aistear (with its core themes of *Well-Being, Identity and Belonging, Exploring and Thinking, and Communication*) and the emphasis on child-centred learning through free play in a semi-structured environment, afforded the best opportunity to support the children as they settled into a stable routine and structure following their traumatic experiences in journeying from their war-torn and violence-ravaged homes, through the camps in Turkey and their final usually arduous sea crossings. The kindergarten has developed into the first integrated kindergarten in Greece for both Greek and refugee children. Operating within Pikpa

Camp, it is a forest school called now *Mikros Dounias* and run jointly with the local Greek community and Lesvos Solidarity.

### **Primary School**

The children in the camp began attending primary school in November 2016. Once the children are over six years old and have received their vaccinations they are eligible to attend.

### **Mosaik and Vocational Education**

Designed for both young people and adults, the Mosaik Centre opened in August 2016. It is operated by both Lesvos Solidarity and an NGO from Germany called Borderline. Mosaik runs a variety of classes: ICT; languages (Arabic, Greek, Farsi, English); vocational workshops in various skills such as candle and soap making, carpentry; music lessons; meditation; yoga. It has been fully subscribed at all times, with waiting lists for many classes. Teachers are drawn from both the local and the refugee community. Those attending now include refugees from all the camps on the island as well as local people.

### **Mosaik and employment**

Mosaik operates workshops which offer meaningful employment and skills development to refugees. The main output is the 'Safe Passage' bags and other items that are produced by repurposing the lifejackets which were left over from the people crossing to the island in the boats. In addition, the output from the workshops on crafts and wood are showcased. Money raising efforts are supported through regular craft fairs.

### **Choirs at Mosaik**

An important element of the social and healing fabric for both children and adult refugees has been the development in late 2016 of two choirs, *Polyphonica* for children (which now also operates in Athens) and *Cantalaloun* for adults. These choirs are fully integrated, and offer opportunities not only for singing, but for drama and theatre skills development through circus skills, body percussion for example. These choirs have put on major successful shows in Lesvos which serve to offer the opportunity to the wider community to engage with refugees, volunteers and those in support of them. The use of shared choral musical training and performance has proved to be highly innovative and successful.

### **Other Informal Activities**

Many expert groups and individuals come to volunteer in the camp and at Mosaik, and these provide short term opportunities to learn and develop. These have included Clowns without Borders; Flying Feet dance company; Shadow Puppet Theatre; Music and Art classes for all ages; Craft classes. These shorter-term supports are valuable in helping to develop variety and interest as refugees live in this transition period on the islands, and as some move to residency in Greece.

The entire initiative has been designed to use the installation of ICT supported learning and digital resources to produce a resource of permanent value to the Camp, enhancing self-



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sufficiency and autonomy, while at the same time delivering parallel training and upskilling methodology to provides permanent benefit to refugee participants. The secondary benefit is construction of a viable and transferable training system and content that enhances the career prospects and employability of trainee beneficiaries.

The ultimate aim has been the construction of a model of best practice that, in addressing the needs of vulnerable and often traumatized populations, additionally creates a learning paradigm of benefit to Greek communities, teachers, students and employers. Multiplying the social benefits and reducing potential areas of conflict are designed not simply to improve communications and social engagement. They are also powerful tools in constructing a shared learning community, united by diversity, where joint benefits can create and sustain real learning outcomes and skill-acquisition innovation.

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## **HAPTIC PROTOTYPE ASSEMBLY TOOL FOR NON-SIGHTED, VISUALLY IMPAIRED AND FULLY SIGHTED DESIGN STUDENTS, STUDYING AT A DISTANCE**

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### **Abstract**

Designers are known to use a blend of manual and virtual processes to produce design prototype solutions. However, often virtual processes can limit the designers' feeling of being "hands-on" with materials and processes. The rise of virtual haptic tools has afforded great potential for designers to feel more "hands-on" with the virtual modelling processes. This paper presents an investigation of an inclusive educational haptic tool and interface. The Geomagic Touch™ device is the selected haptic technology used within the investigation. It is a sophisticated haptic technology which allows users the chance to interact with 3D design via a single point of contact. The haptic rendered interface was designed to facilitate a prototype design process for non-sighted – visually impaired and fully sighted distance learners from The Open University. The parameters examined were (a) *Duration* – measured against an industry standard time taken to assemble a four block prototype, and (b) *Collision rate* – caused by participant between colliding with 3D geometric block during assembly. The results showed that the duration data was within the accepted industry standard, of 5 minutes, and there was little significant difference between duration and collision rate between-groups, indicating that the haptic and designed interface had offered an open accessible tool to both NS-VI as well as FS design students.

### **Introduction**

The haptic prototype assembly project was funded by the eSTEEeM project award board at the Open University, Milton Keynes. The eSTEEeM awards focus on funding research which will develop STEM teaching and learning for distance learning programmes. The study was inspired by the researchers' previous study work (Bowers et al., 2013) which examined non-sighted (NS) artisans lack of access to Graphical User Interface (GUI). The essence of the lack GUI access is linked to the emphasis on the *graphical* nature of the interface, which limits NS users to singular sense (audio) interactions. The previous work showed that machine haptics can assist NS artisans to locate and interact with 3D objects on-screen and within a shorter duration ( $m = 16.5$  secs) than the sighted control group ( $m = 18.9$  secs). This study examined the use of a novel multimodal haptic interface working with new groups namely distance design students studying at the Open University.

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The study requested that all participants (CFS, NS, and VI) worked through *all* conditions, e.g., manual and machine haptic shape assembly tests. This paper initially presents literature which gives a background to human and machine haptics but moreover it evidences that haptic technology is able to assist non-sighted and visually impaired students to gain greater access to applied learning (Wall & Brewster, 2006) through the virtual realm. It then goes on to examine the specific kinaesthetic haptic technology, and reflects on the limitations of GUI to interact with computer aided design (CAD) processes. This project seeks to test whether haptic technology could afford NS, VI students, need to use CAD as part of their learning modules. A dual sensory interface was designed to assist all NS, VI participants to overcome visual barriers through touch, and to spread their learning interactions across multiple senses channels.

### **Haptics**

Touch is one of the earliest sensory developments in the human body, as a foetus in the womb we are able to touch and feel and once a child is born touch is an important sense to connect the child with their parents; it is believed to be an important part of human development and for human interactions (Stanford Encyclopedia of Philosophy, 2015; Minogue & Jones, 2006). The sense of touch, confirms the properties of the objects and the surrounding environment. Although many laypeople may ascribe to a singular form of touch, defined as human skin, digits and/or palm, being in contact with an object. In fact, there are two main subcategories of touch (a) cutaneous touch – feedback with skin and (b) kinaesthetic touch – the location and movement of limbs in space. Seminal works in touch perceptions by Klatzky and Lederman (2003) argues that there is an importance to learning more about the patterns of touch and how we explore and manipulate objects. They assert that many daily exploratory perceptions (EPs) are perceived with little conscious thought, such as, fastening a button without looking first. Often when our sight is unavailable to sighted individuals, through environmental conditions, it is still possible to locate objects through touch, for example, switching on a light in the dark. Klatzky and Lederman (2003) also highlighted how we identify common objects, through contour following. This is defined as a common EP defined as tracing the exterior and interior surfaces and edges of objects using one/several digits of one hand. Contour tracing is typically defined as a kinaesthetic EP and can establish shape, form and textural surface of an object, in a relatively short period of time. The Geomagic Touch device, used in this study, employs contour following as the main interaction technique, and using the devices single point tip (end effector) on the stylus, users can pick up and put down objects or push objects back and forth around the environment at will.

### **Haptics and education**

Minogue and Jones (2006) assert that the critical role of touch permeates educational language. They describe how we discuss *grasping knowledge* or *getting a handle on learning*. Within the discipline of design educators assert the benefits of students gaining fuller access to hands-on learning as a crucial part of design development. Hands on learning is often difficult to facilitate within distance learning due to the nature of the complexities and access to specific real world spaces. The early phase (germinal phase) of the design cycle is typically where hands-on

development and concept realisation is more fluid. As a consequence, this paper examines the use of haptic technology at the early phase of design to aid students design thinking and firm up shape and form concepts effectively in a short period.

Haptic technology is a relatively contemporary growth area within the area of Technology Enhanced Learning (TEL). More recently educational institutes are recognising the benefits of haptic technology and its ability to interact with virtual data in a more innate and meaningful way. Over the last five years there has been a growth of haptic technology; and disciplines such as design and engineering are exploring the field of haptics along with the creative and cultural industries where haptics is used as a tool to touch the 'untouchable'. Often in museums and art galleries visitors are requested not to touch valuable exhibit pieces, this can limit NS visitors who naturally use touch to examine objects. Previous studies by Brewster (2005) have shown haptic technology being used to provide instant tactile feedback from 3D simulations of artefacts, thereby allowing all visitors to engage with "untouchable" objects online or onsite. Further work by Brewster, Wall, Oakley, and McGee, (Wall & Brewster, 2006; Brewster, 2005; Oakley et al., 2000) support the use of kinaesthetic haptics to engage additional sensory needs users with digital practices, this type work was also shown by Colwell and Petrie (Brewster & Brown, 2004; Colwell et al., 1998).

### ***The prototype process***

Since the beginning of the Bauhaus School (circa 1919-1933) design students' have been trained to craft, sculpt and model early phase prototypes by hand. However, since the Bauhaus ethos of crafting objects have diminished due to the invention of CAD. CAD has facilitated designers to be highly skilled at 3D digital crafting processes, thereby reducing the need for hands-on skills. Cheshire, Evans, and Dean (2001) state that there is a strong groundswell of opinion that tactile product development is beneficial to the final products form and so a way should be found to combine the craft based techniques with digital product development. By combining hands-on skills with digital efficiencies designers will be able to maintain modelling skills but using new sensory interactive platforms to showcase their design talents.

### **Method and materials**

The following outlines the materials and methodologies of the Shape Prototype Assembly Test, set within the Esteem funded project. The test was answer two specific research questions, (a) Can machine haptics (MH) convincingly mimic all users touch interactions to assemble a physical shape? (b) Specifically could NS, VI participants be able to not only understand the touch perceptions but to assemble the shapes to make one finished prototype, within the given standard time of 5 minutes. The assembly test was a focused proof of concept test and as such used a mixed method case study approach to gain a wider assessment of haptics performance. Quantitative results were shown by running between-group data tests using SPSS v10, specifically analysing duration and collision rates and comparing them across all groups and between manual and machine modes. Qualitative data results were assessed using NVivo v21,

## **Haptic Prototype Assembly Tool for Non-Sighted, Visually Impaired and Fully Sighted Design Students, Studying at a Distance**

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to enable all participants' evaluations and feedback to be refined and assessed, qualitative data was gathered from (a) Think-Aloud technique, and (b) Pre and posttest Lickert questionnaires.

### ***Kinaesthetic single point haptic device***

In order to select the correct form of haptic device the specific attributes for user interaction were analysed, with particular reference given to the user interactions for NS, VI participants. One of the main required attributes of the device was rising scales of force feedback; the device would need to guide the NS, VI users using a varied scale of force (gauged in Newtons) to allow the NS, VI users enough guidance to trace the contours of objects, to establish location and to guide effectively within a standard setting of time. The Geomagic Touch device was justified to be the appropriate device for this study as it was most suited to all of the user attributes, as well as working on similar principles to known tools for CAD such as the graphical stylus and tablet. The Geomagic Touch™ tool is a personal haptic device which is presently desk bound. Using the Geomagic Touch, with a single point stylus, allows users to feel and trace the contours of 3D virtual objects on-screen, whilst the software tracks the exact location of the stylus tip in virtual space. The Geomagic Touch can offer up to 6 degrees of freedom (6DoF) allowing the user greater freedom of movement offering 3x dynamic and 3x passive. The most limiting factors of the Geomagic Touch tool is that it is single stylus and used by the dominant hand. Many NS, VI users track and trace objects using both hands, and use cutaneous and kinaesthetic modes of haptics to gain maximum feedback. As at the time of this paper, there is currently no commercially viable device which could mimic all the aspects of human haptic feedback, then the Geomagic Touch with 6 DoF and the similarities to graphic tools was selected as the most appropriate for these users.

### ***Prototype design***

In order to make the focus of the study about usability and haptic performance of a novel interface and less about the aesthetics, form, surface of the prototype, the researcher designed a specific prototype model prior to testing. The model was designed to offer reference to the origins of craft and design – Bauhaus School. Therefore, a *pastiche* of the Walter Gropius chair (circa 1934) was created. The original Gropius chair is shown as image Figure 1, and the pastiche chair is shown in image Figure 2 (Appendix 1). The Gropius chair was selected due to its iconic status, but moreover its simplicity, and brevity of parts to aid rapid assembly. The pastiche chair was 3D scanned and then transcribed to the virtual bounded space, and a 3D model of the prototype was printed using a 3D printer to enable NS, VI participants the chance to establish the form and shape of the prototype they were requested to assemble.

### ***Participants***

Twenty participants, (n = 10) non-sighted and visually impaired and (n = 10) sighted design students were invited to join the Shape Prototype Assembly Test via The Open University student research teams, and selected for the test by the researcher working on their experience and abilities within design and prototype methodologies. (Table 1, Appendix 1).

### **Manual haptic condition**

Participants were requested to assemble 3D geometric blocks in two haptic modes. The first mode assembly was manual and the second was machine. All participants were seated at a table and presented with four 25 x 4 x 23mm (palm sized) foam shapes (1x arch 3x cuboids). A single foundation block was magnetically fixed to the table, and three further blocks were placed by the participant's dominant hand. Participants were requested to initially select one cuboid, from the box, and to push it until it connected with the foundation block this was repeated until only the arch shape was left. The final arch shape was then picked up and placed in top of the foundation block which completed the assembly. The duration of the manual shape assembly test was recorded using a digital stopwatch and completion was the final block being placed and the participant removing their hand from the model. Both manual and machine mode tests were recorded using a handheld camera.

### **Machine haptic conditions**

As with manual test participants were seated at a desk, however, in machine haptic mode participants were presented with a single 21" display screen. The screen was specifically aligned with the Geomagic Touch haptic device. On the startup screen, a bounded virtual environment was presented. NS-VI participants were initially allowed to track and trace the bounded space prior to the official test starting up, to allow to mentally map the space and the 3D blocks. On startup the screen featured two blocks 25 x 4 x 23mm (simulated foam shapes). A yellow cuboid was the foundation block fixed to the floor of the environment and a red cuboid was setup in line with the foundation block. Participants were requested to use push actions to connect shapes, and each time they needed a shape to summon it via pressing down the space bar on the keyboard. This process was repeated until the final arch block, which was simply picked up and stacked on top of the foundation block. The digital stopwatch embedded in the virtual interface would time up to the allotted 5 minutes and designed to shut down all activity at 5 mins.

All participants were requested to complete a short training test prior to the main test. As previously discussed NS, VI group participants were permitted to touch and explore all manual blocks, the 3D prototype chair, the virtual bounded space and the Geomagic Touch™ device prior to commencing the test. This was permitted to allow for the lack of sight and to offer the NS, VI participants a full mental picture of the materials and technology used.

As previously discussed, all participants were requested to complete a pre-trial training task to familiarise themselves with the "feel" of the haptic force and guidance. The pre-trial test was a simple "pick up and put down" task Figure 5 (Appendix 1). CFS Participants were requested to "pick up" the cube and "put down" the cube according to the floor markers, NS, VI participants were asked to use audio and haptic guidance force to pick up and put down the block.

### ***Dynamic haptic actions***

In order to co-ordinate a consistent action, used throughout testing, all participants were asked to use one action to connect shape blocks, namely the push action (see Figure 6. and 7., Appendix 2).

Figure 6. and 7., (Appendix 1) visualise the “push action” using a blue arrow to emphasise the direction of force, in both manual and machine modes. The push action was selected over the pre-trial pick up and put down action due to the simplicity and brevity of this action, moreover the action was considered more user-friendly to NS, VI participants as it used the environment to guide the action, which is akin to real-world interactions for non-sighted individuals. All participants confirmed that the action was easy to understand completed it successfully throughout the assembly tasks.

## **Results and analysis**

### ***Qualitative***

The qualitative results were obtained via the data gathered from using the Think-Aloud technique throughout the test. All participants contributed qualitative data. The raw data was prepared initially by transcribing the Think-aloud then creating a coding scheme within NVivo v 21, and then reacting to correlate emerging themes. First level data analysis showed that the most commonly repeated word used was “easy”, and the second two were “understandable” and “interesting”. Further analysis on the themes revealed some sub theme headers, these were set around cross referenced nodes relating to user’s feedback on tool use usability, understanding, and fit for purpose.

#### *Agreements (moderate and extreme)*

There was a consensus of moderate and extreme agreement between NS-VI participants was set around the initial perceptions of the haptic device and the actual perceptions from using the tool, 50% of NS, VI participants noted that the interface and device was easy to control which was contrary to their pre-trial statements, which revealed that they believed the interface would require higher level mathematical or programming skills to use and control the tool. There was also a moderate agreement by NS-VI participants that they could perceive the mass of the geometric shapes on screen and that they could understand the assembly techniques as it was described to them. Participant NS9 stated

*“It was satisfying accomplishing something which I had thought impossible/very difficult in a relatively easy manner”.*

He went on to say:

*“Moving from a mental picture to creating a prototype was satisfying. Without the interface I can’t conceive how the task could be accomplished on my own.*

*Only [sic] other alternative would have been a sighted assistant to do all the work”.*

There was also a shared extreme agreement across all groups that specifically using the single point kinaesthetic device (Geomagic Touch) made the process simple and intuitive to control. However, one participant NS8, indicated an innate need to use both hands to interact with the virtual 3D objects on-screen, he stated:

*“It was also somewhat confusing at the cognitive level, that while holding the pen in the right hand and clearly feeling a virtual wall, the left hand did not feel anything”.*

The CFS group showed an extreme agreement with how well haptics offered more refined sensitivity of pressure and touch, than 2D graphics tools. They noted specifically that when the probe connected with the virtual walls and objects they could perceive that they were touching the walls and floor and that they knew the shapes were foam rubber and softer in surface than the environment walls. They appeared surprised at the convincing noise feedback of the end-effector as it connected to the bounded wall, participant CFS5 commented, the device was easy to hold and intuitive to use. I was impressed by the feel of the boundaries in the interface when converted to resistance in the device. Being able to feel the weight of the object was also a pleasant surprise.

Overall the consensus was that the haptic interface was useful and usable and allowed for ease of use of the haptic device and assembly task for both groups. However, both groups also stated that they would like to select more function audio feedback functions and alter the pressure of the objects as they felt necessary.

### **Quantitative**

The raw data for duration and collision rates did not have a normal distribution when examining raw data across both groups and both test modes. Therefore, a non-parametric statistical test was used in the form of a Mann-Whitney U test this was used to understand whether there would be any significant difference in the results from between-group, and between haptic mode data. The metrics examined in both between groups analysis were duration (time recorded up to 5 mins) and collision rate (nCollisions – contact with other objects on screen e.g. walls, floor, other shapes).

Table 2, (Appendix 1) shows that by running a Mann-Whitney U test, there was no statistically significant difference between between-groups, as shown by the  $p$  values and  $z$  value. The box plot, shown above in Figure 8 and 9 (Appendix 2), revealed that the manual mode on between-group test resulted in very little difference in time taken to complete the prototype task, but there was a moderate difference overall between manual and machine. Sample data for machine haptic between-group test, again showed contextually a small difference of time, with the longest duration shown as an outlier for a non-sighted participant.



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The *nCollision* was pre-defined as a single block colliding with another block or environment whilst in the process assembling the prototype. The *nCollision* data was initially transcribed from recordings of every participant in manual and machine modes. The data was then analysed by two inter-raters, the second rater's sample size was calculated at 80% coding sample calculated using Cohens Kappa ( $k$ ) which resulted in a moderate agreement result (0.50), meaning that between the two inter-raters, there was a moderate agreement of the collisions made. The collision rates showed again little statistical difference between-groups, and between modes.

### **Discussion**

Scali et al. (2013) assert that the use of CAD can stifle designers' creative sensibility and that touch needs to be held as a key interaction within the early phase of the design prototype cycle. Design students in particular need to maintain a key sense of tactile interaction with materials and process to aid learning. This project aims were to find new ways to allow design students the opportunity to maintain the qualities offered via hands-on interaction within the early phase of design. It was important to the researcher that the facilitation of tactile interaction should be utilized to aid non-sighted and visually impaired students greater access to digital design processes. The research question 1 and 2 could be answered positively, RQ1, using qualitative feedback it has been shown that all participants could understand and perceive the environments and the objects within. RQ2, using a mixture of qualitative and quantitative it has been shown that all participants could use the tool to assemble one prototype well within the standard time. The metric data showed moderate differences between manual and machine haptics which highlights there is still work to do to develop the haptic device force and guidance. It could be feasibly hypothesized that the difference between manual and machine haptics could be due to lessened practice as the machine haptic are still novel to the participants and more training could be offered in future testing.

### **Future**

Future work will examine how to enable users a bespoke and more realistic haptic feedback for drawing and developing shape with tactile line. For students with additional needs the element of easily tactile drawing lines could extend to more exploration of meaningful drafting and drawing lines and line adjustment on the fly. Therefore, future work proposes to review a user-led case study of design students registered with the Open University, and aim to analyse how haptic feedback can be conveyed to user and which model of HCI could be used to afford the most innate interactions.

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## Appendix 1

Table 1: Participant Demographics

Participants	No.	Dominant hand (L/R)	Age (Years) Mean $\pm$ SD
Males (NS/VI)	5	2/3	42 $\pm$ 22.8
Females (NS-VI)	5	1/4	47 $\pm$ 14.9

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Males (FS)	7	0/7	33 ± 13.1
Females (FS)	3	1/2	29.6 ± 5.5
Total	20	20	37.9 ± 8

Table 2: Mann-Whitney U test results

Test	Z result	P value
Both groups, VP, Duration	-2.27	0.82
Both groups, VP, Collision	-1.43	0.52
NS Duration VP & MP	-1.06	0.28
FS Duration VP & MP	-1.37	0.17

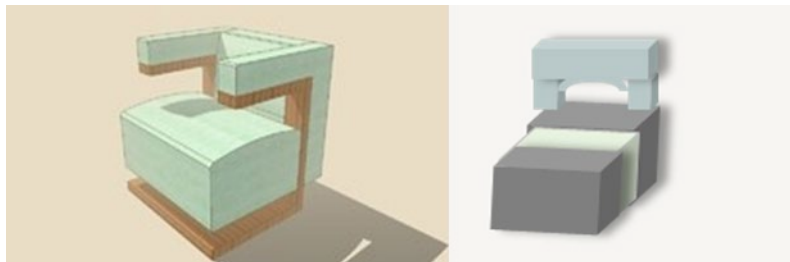


Figure 1. An Example of Walter Gropius block chair  
Figure 2. A sketch model of a Bauhaus inspired block chair



Figure 3. Manual prototype blocks

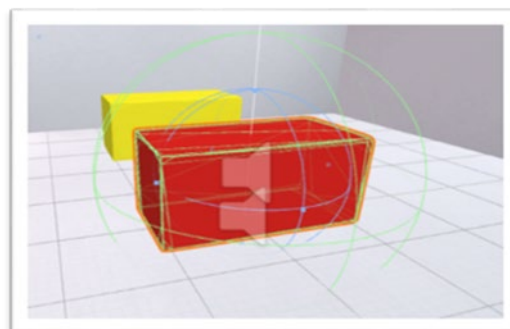


Figure 4. Virtual screen shot of the prototype shapes within the environment



Figure 5. Preliminary training screen using a “pick up” and “put down” task

## Appendix 2

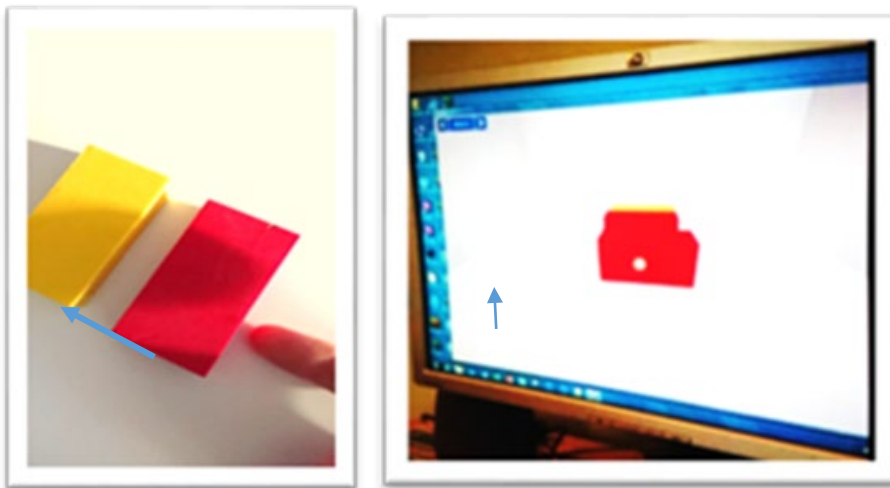


Figure 6. Manual prototype showing the push technique employed in this test  
Figure 7. Machine haptic prototype showing push technique employed in this test

## Results Qualitative

Table 3: Coding, Phase 1 Haptic

“It was satisfying accomplishing something which I had thought impossible/very difficult in a relatively easy manner”.	Prior perceptions of difficulty Satisfied at completion
“Moving from a mental picture to creating a prototype was satisfying. Without the interface I can’t conceive how the task could be accomplished on my own. Only [sic] other alternative would have been a sighted assistant to do all the work”.	Mental imagery Autonomy
“It was also somewhat confusing at the cognitive level, that while holding the pen in the right hand and clearly feeling a virtual wall, the left hand did not feel anything”.	Request for both hands enabled to interact

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## Results Quantitative

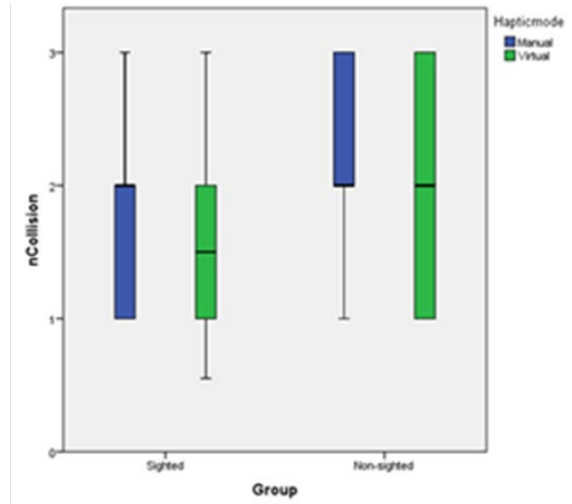
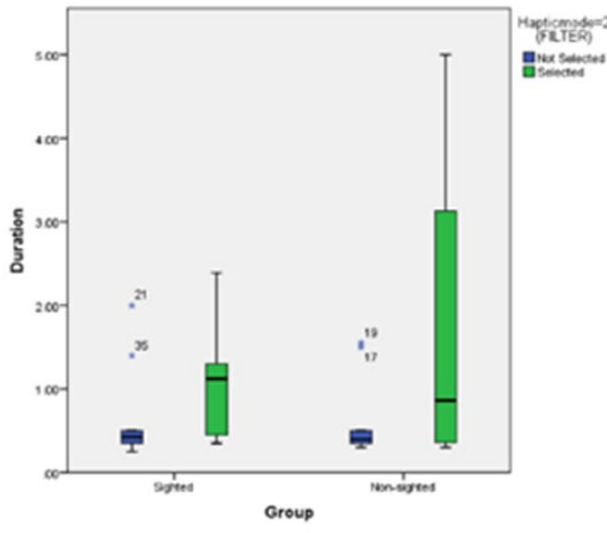


Figure 8. Box plot featuring non-sighted and sighted time to complete task in M and MH modalities

Figure 9. Box plot featuring non-sighted and sighted collisions in M and MH modalities



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## **USING MICROLEARNING MODULES IN AN INTEGRATED TALENT ACQUISITION FRAMEWORK TO ENHANCE CORPORATE TALENT MANAGEMENT PROCESS**

*Teemu Patala, Context Learning, Finland, Alan Bruce, Universal Learning Systems, Ireland*

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### **Introduction – the changing nature of work sets new challenges for learning**

The constant change and diversification of modern society are shaping demand for products and services, and the expectations of clients in many businesses/fields. Many traditional jobs and work functions either disappear or change in nature (often to more complex). In many operational positions employees must manage a wider range of issues and responsibilities. For example, gas stations are transforming into integrated energy markets where petrol sales only represent a part of the whole offer. The station's function might include a full range of food products, catering, postal services, energy solutions (e.g. solar panels), car repair and maintenance services – all under the responsibility of customer service staff. Such new work roles require a wide range of knowledge and expertise (e.g. everything from car-related technical issues to customer service and cleaning) that job seekers seldom have. This change raises the bar for employers to find suitable employees with the required skills who are also motivated and committed to work in the longer term. Employees seldom have a realistic picture about positions they apply for, which may lead to disappointment or even inability to perform all the required work tasks.

In a wider socio-economic perspective, the changing labour market faces a challenge of how to match available jobs with suitable workers. It also needs to discover how to fill in knowledge and skill gaps that prevent individuals from performing well in available jobs. Employers try to manage this by implementing various talent management practices and tools. *Talent acquisition* is a term used to define processes that “aim to assess critical talent needs, determine performance profiles, source and screen candidates, and then hire and onboard people” (Bersin, 2010). Despite many efforts to make the process more efficient and smooth, companies often have to invest massive amounts of time and resources to fill available jobs with suitable employees. One Nordic energy company receives about 10,000 applications every year to fill 750 positions that become available. Very few employees stay in their position for long periods. Employee turn-over is high, causing a lot of extra work for employers in recruitment and causing many employees to end their work contract sooner than they had planned.

Globalized engagement can affect highly skilled and low-skilled workers differently. Changes in demand then have an impact on the wages of high- and low-skilled workers (as well as the

## **Using Microlearning Modules in an Integrated Talent Acquisition Framework to Enhance Corporate Talent Management Process**

*Teemu Patala, Alan Bruce*

ratio between the two). In this respect, globalization affects workers differently based on their skill endowment (Feenstra & Hanson, 1995). Upgrading towards technologically and skill-intensive jobs may be the preferred option in the long run to address skills gaps and the impact of vocational change and transformation. But whether or not this is feasible will depend on the productive capacity of an economy or sector. In this respect, policies to enhance technological capabilities, technology transfer and the development of skills, including on-the-job training, are essential (ILO, 2013). This in itself challenges traditional models of learning and educational provision.

Context Learning (Context) is Finland's leading company focusing on Learning Experience Design, Development of Digital Learning Solutions, E-learning Content Development and Digital Curriculum Design. Since 2006, Context has designed and developed educational solutions and digital learning programs, and provided consultancy services in digital learning projects for more than 200 client organizations in private and public sectors. ChangeLearning is an alliance founded by Context and its Irish partner Universal Learning Systems. The alliance provides added value to quality training and strategic organizational development consultancy services in diversity management, health, inclusion and organizational transformation. Context and its alliance partners work on the global scale to provide workplace organizations with solutions and insights to help them excel in the rapidly changing business environment.

### **Further exploration of the problem and potential solutions**

Within Context's corporate client base the increasing challenges of finding a suitable workforce with required skills and competences was identified some years ago. It is well known among HR professionals that in most cases the first few months of new employment define to large extent how successful and committed new employees will be in their new work (Hogan, 2015). After discussing potential reasons and solutions, Context established a project with its corporate clients and alliance partners to design a framework that provides solutions for HR professionals to enhance the acquisition process of talents and supports in the first months of employment.

So far, the process had been managed mostly manually. There had been significant mismatch between the recruitment process for new employees and how well they engage with their new work. With the large volumes of applicants and open positions the coordination of the process has been very labour intensive. One of the most critical problems to be solved was how to extend the time new employees stayed in their new position. This is one of the root causes why companies spend so much effort and resources on talent acquisition. It was discovered that the problem had to do with candidates' lack of understanding about the work tasks they were applying to. Training would therefore play a key role in addressing this challenge.

### **Defining the framework**

The framework design was to provide a means for job seekers to learn about the company, the work in general and about work task related skills and required competences. Another aim was to find ways to automate those parts of the process not requiring manual administration. The

motivation, readiness and suitability of candidates was to be assessed during the process. The framework would provide efficient and easy to use ways for HR managers and those responsible for recruitment. The whole process needed to be as transparent as possible to applicants. Discussions with employers revealed that job seekers value fast recruitment processes. The aim was to complete the whole process from first contact until recruitment decision in 7 days.

Talent acquisition is an enormously complex and interconnected part of talent management, consisting of the following elements:

- Sourcing (of potential workforce);
- Candidate pools;
- Assessment (of work candidates, their capabilities and quality);
- Employer brand;
- Recruiting;
- Selection;
- Onboarding;
- Talent mobility (Bersin, 2010; Hogan, 2015).

The needs identified among Context clients pinpointed the importance of candidate assessment against performance measures to help improve sourcing of employees, the recruitment phase and to support early stages of employment. The role of training in its many purposes and forms (induction, role/function-specific, on-the-job, recurrent, face-to-face, blended, online etc.) was considered critical. It was included as an integrated component in the framework. Due to large numbers of users and the many benefits of well-designed e-learning modules, microlearning modules (micromodules) were applied as the primary learning instrument.

As Cable, Gino, and Staats (2013) state, studies on employee engagement demonstrate that encouraging new employees to apply their personal strengths increases their commitment levels towards the employer and increase the likelihood that they commit to working longer in the company. To allow this, it was necessary to foster dialog between job candidates and the employers throughout the process. In this dialog, employers needed not only to be open to candidates' expression of personal interests and strengths, but to encourage them to state how they feel they can best contribute in their desired work role.

### ***The Talent Acquisition Funnel***

The funnel model can be used to describe a process where large masses are targeted with a message to raise their interest and then attracted towards a specific goal or decision. The purchase funnel is a typical example – it “describes the theoretical customer journey from the moment of first contact with your brand to the ultimate goal of a purchase” (Marketing-made-simple.com, 2009). Eventually, the aim is to close sales with customers. We are using the funnel model to define the process of acquiring suitable employees from a mass of potential candidates which may be interested to work in the company (Figure 1).



## Using Microlearning Modules in an Integrated Talent Acquisition Framework to Enhance Corporate Talent Management Process

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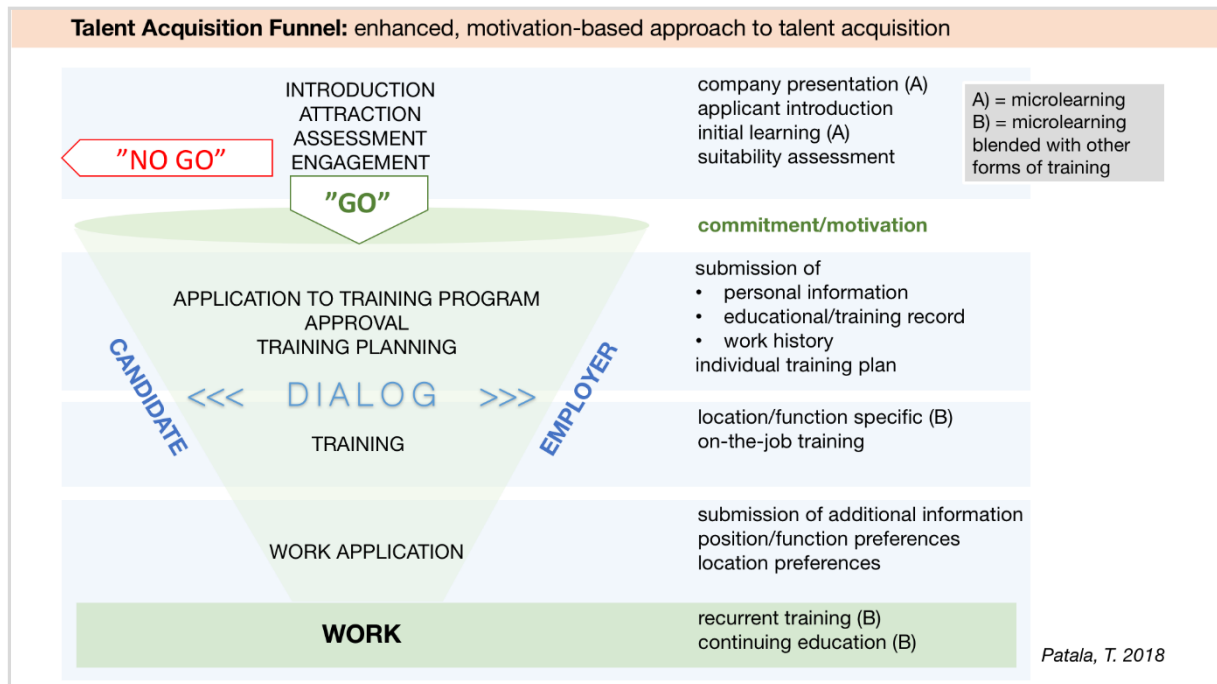


Figure 1. The Talent Acquisition Funnel

During the first phase, employers introduced to the objective of raising the interest of candidate employees. The candidates are provided with information about the company and they access initial training modules (micromodules) that teach basics about the business and operations of the company and about possible work roles. Their capabilities to relate with this information and motivation to learn are being assessed as well as their suitability for available work position(s). The primary aim of this phase is to create engagement towards the employer and the work in question within those candidates considered suitable and capable for working in the company in specific positions. At this stage, it is important to give a realistic picture of the future work to the applicant to prevent candidates from applying to a job that does not meet their expectations. Through these steps undertaken by candidates, greater levels of commitment and motivation can be achieved and demonstrated.

Candidates who have passed the first stage are provided with an opportunity to participate in further trainings where more personalized training plans are designed for them. These are based on the information candidates have submitted regarding their personal competences, experience (work/study) and preferences.

Once candidates engage with the training program they are given the opportunity to apply to work positions/functions they desire and they can choose locations (e.g. department/division, office, geographic region), where they want to work. Work applications are processed transparently – persons in charge of recruitment are allowed to book candidates for interview and the status of each applicant is visible to all until a work contract is signed. Once the work-relationship has been formed a range of activities will follow based on the company's talent management strategy to ensure a successful and long-lasting career in the company and to support the employee's personal development.

## Benefits and added value of using micromodules

There are several reasons why micromodules are used as an integrated part of the talent acquisition funnel. Selection of appropriate learning methods should be based on understanding about learning objectives, expected levels of motivation within the target group and understanding about learners’ learning preferences and readiness to learn the topics in question.

We have implemented a model to align the Types of Learning Interventions with Desired Learning Outcomes (Figure 2). The model is based on Bloom’s Taxonomy (Bloom et al., 1956).

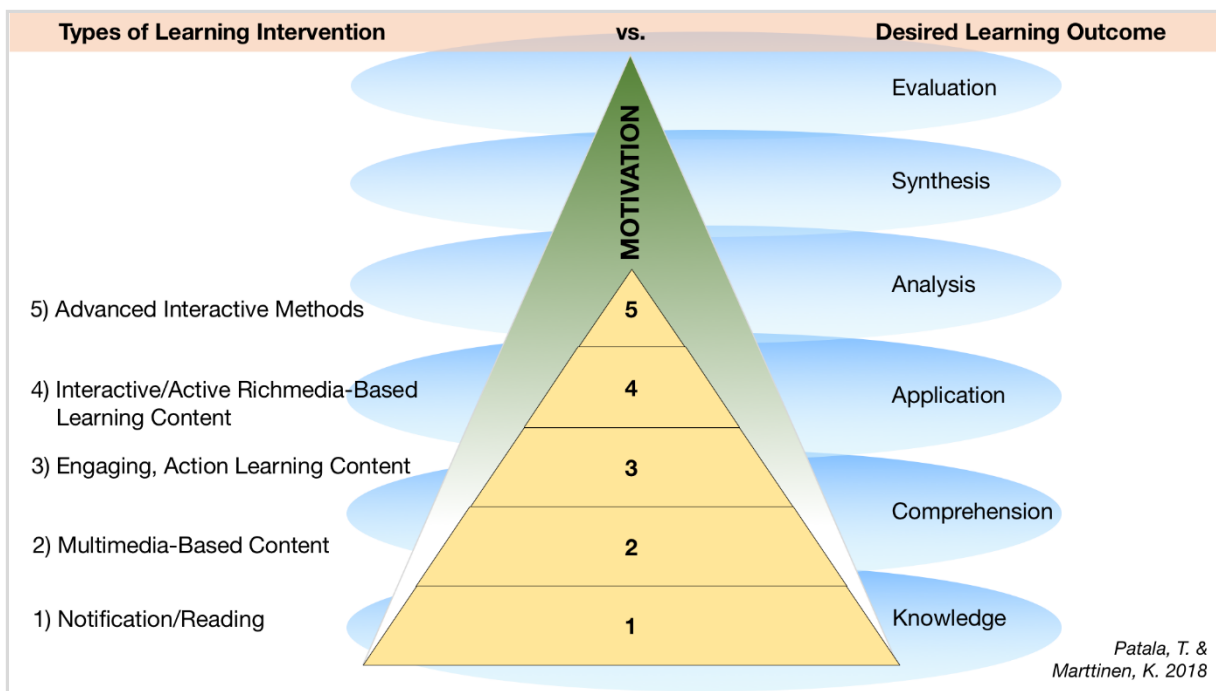


Figure 2. Types of Learning Intervention vs. Desired Learning Outcome

The model is useful for learning designers to choose the appropriate level of intervention for each learning challenge and further define methodologies to be used. Learner engagement, interest and motivation have been pointed out in educational research as the key drivers for efficient learning (Hidi & Renninger, 2006; Mikkonen et al., 2009; Mäkinen et al., 2004). If the initial motivation to achieve the learning objectives is high and “internal” we can expect better learning outcomes with less intervention. When designing learning for larger groups we should, however, expect that not all learners are self-motivated, and apply interventions that also address their motivation. Considering the challenge employers face with high levels of employee turnover, motivational issues are considered critical for the whole initiative. The process aims to establishing realistic pictures about the nature and variety of work tasks open for candidates and to provide new employees with concrete supports to acquire missing skills and capacities.

The decision to use online micromodules as the primary training instrument was based on the fact that, as Hogle (2018) states, micromodules have been found extremely useful “in giving workers easy-to-digest topic skills that they can immediately apply and change behaviors”. In

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this increasingly complicated employment setting, the provision of precise learning modules that establish understanding on the essentials of new work and provide skills that can be applied immediately, was considered critical. Microlearning is also known to create about 50% more engagement than traditional online learning among employees that participate in corporate training programs (Westfall, 2016).

As studies prove that a simulated environment can be highly engaging for students (Bulger et al. 2008; pp.138-140), a simulative approach to multimedia presentation is applied when learning these skills. According to Smith (2003) learning for the workplace is best facilitated when it is designed in the context of actual workplace problems. We use interactive/active methods such as simulations that take place in the actual working environment and situations (illustrated by video and photo-based animation) to enable a contextual learning experience. To maximize engagement, it is essential provide a personalized experience. Micromodules are extremely useful in this regard. By mapping the required skills and capabilities per work task and matching them with candidate profiles, candidates are guided through micromodules that complement their existing skills and capabilities. “Unnecessary learning” of topics that candidates already master is not required.

### **Conclusions**

During the writing on this paper, one of Context’s clients, a Nordic provider of energy services and solutions, is piloting a talent acquisition program which based on the framework described earlier. The first observations made based on the pilot, raise the issues of improved efficiency of scanning, identifying and selecting of potential new employees for the company. The initial process from raising attention among potential candidates until the “GO” decision is semi-automated - meaning that full manual review of applications and applicant information is not needed. While both manual and automated methods are combined to make the matching process (employee candidate vs. open position) as smooth and efficient as possible, we should expect more precise outcomes and more committed employees who prefer to remain in the position for longer. The old model of recruitment did not give applicants sufficient understanding about the work tasks they were to apply, so many decisions were made based on inadequate information.

In the wider employment context, the experiences gained from the pilot will be very interesting. As the whole, work life and careers are changing the same challenges we are addressing now are faced in many companies and fields. Challenged by the early success of this initiative, Context is examining the potential of extending the initiative to address talent acquisition challenges in cluster-specific and national contexts. The role of advanced technological tools and e-learning has also become a key focus in the literature and research undertaken internationally. The use of advanced technologies powerfully reinforces learning for adults and provides a rich resource in terms of techniques and methodologies for teaching staff and facilitators. Parallel to this macro-economic context is the growing impact of the emerging digital world and the contours of employment it is shaping. This new, emerging digital world has created a range of new

professions and skillsets, which are literally and figuratively unprecedented. In other words, these new professions cannot be studied in advance. But they represent a range of professional skills, behaviours and attitudes that professionals are obliged to learn in a hands-on manner, in dynamic and evolving job configurations.

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## HIGHER CREDUATION – DEGREE OR EDUCATION? THE RISE OF MICROCREDENTIALS AND ITS CONSEQUENCES FOR THE UNIVERSITY OF THE FUTURE

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### Summary

The predictive power of academic certifications for job success is eroding. It has never been outstanding but for a long time it was felt to be an important – at least hygienic – factor for job applications to have an academic or a good academic certificate. This starts to erode recently. More and more alternative credentials start to come into focus and develop value. Different pathways from the traditional higher education system emerge and become increasingly relevant for employers. These different pathways are often credentials earned in post-secondary education or professional training after initial academic graduation. Microcredentials are a fairly recent development that has grown in popularity in multiple discipline areas. They represent mastery of a limited set of skills or competencies rather than broader and interrelated sets of skills – like full bachelor degrees or alike – represented in current credentialing systems. Unlike these current and traditional credentialing conventions, usually summarized by a certificate or transcript with no connection to explicit evidence of the earner's competencies, micro-credentials are directly linked to digital artefacts that explain the nature and criteria of the credential as well as evidence contributed by the earner.

### Introduction

The title of this paper refers back to a question recently asked by Kevon Mc Guthrie in a Blog post from 2016. It relates to the current discussion about the decline of college and university degrees as a suitable factor for job success in recruiting processes, as a recent study by Earnest & Young reveals (Lam, 2015). For higher education institutions (HEI) this is a major earthquake in the configuration of their function in relation to the labour market. It has not only to do with a demand for new skills but with a demand for a new way of communication, shaping and communicating the evidence of skills and competencies. The demand for new skills is even better described by an OECD study released in 2016 in which 60 OECD countries are surveyed and their view on futures skills for graduates is analysed and reported (OECD, 2016). Across the board these are skills and competences which in traditional higher education curricula are hardly found on top of the agenda: creativity, decision making, perspective taking, responsibility taking are amongst the first five mentioned there.

At the same time, it more and more becomes clear that higher education is undergoing an enormous change due to two developments: The first has to do with the fact that, on the long

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term, more than 50% of an age cohort will choose academic education (Teichler, 2014; Baethge et al., 2014; Alesi & Teichler, 2013; Dräger & Ziegele, 2014). These are not just the few talented young people who later on want to pursue an academic career higher education institutions are used to, but the majority demands for clear job preparation through higher education institutions (Schofer & Meyer, 2005). In addition, an academic turn is becoming visible: the greater part of academic education will be needed accompanying a professional life throughout the lifetime and not – as it is today - just occur at the beginning of a career as a first cycle education like it is today, due to many factors, amongst them increasingly rapid knowledge development cycles and faster changing production cycles in industry. The fast change of professions and rapid development of new job profiles is hindering to proceed developing curricula on basis of typical job activities and leads to the need of education for being able to successfully deal with situations of uncertainty in the future. The second major development is the digitalisation of education in teaching, learning and organisations of educational organisations. In short, education can today can be organised in a flexible, personalised and individualised setting between multiple educational organisations and carried out in patchwork study patterns to suit the personal preference and life situation of the learning individual. Digital technology allows for unbundling and flexibleizing the provision of educational experiences and certification services.

The main breaking point is currently that higher education institutions are still clinging to being the sole actors in the game who can certify the entire degree. The advent of alternative credentialing, like microcredentials, is therefore a major game changer for higher education institutions. It positions the reins of composing an educational experience back into the hands of the learners. Open badges, digital artefacts which are designed to certify a certain educational achievement are the new development on the block which currently is rapidly developing. Microcredentials, the form of alternative credential which refer to smaller learning units, are therefore emerging to become more and more important. This paper explores the extent, nature and shape of the introduction of microcredentials and will discuss its consequences for higher education.

Microcredentials are a fairly recent development that has grown in popularity in multiple discipline areas. They represent mastery of a limited set of skills or competencies rather than broader and interrelated sets of skills, like full bachelor degrees or alike represented in current credentialing systems. Unlike these current and traditional credentialing conventions, usually summarized by a certificate or transcript with no connection to explicit evidence of the earner's competencies, micro-credentials are directly linked to digital artefacts that explain the nature and criteria of the credential as well as evidence contributed by the earner. We would like to suggest the following definition of micro credentials: Microcredentials are a form of credentials which represent competencies, skills, and learning outcomes derived from assessment-based, non-degree activities and specify a location for evidence of the content of the earned achievement.

Central to the microcredentialing system is the display of a digital representation, often referred to as a badge, that allows the owner and those with whom the representation is shared (e.g., employers, other educators) to explore the badge requirements and evidence of learning. Because badges are digital images with embedded metadata, the exploration is usually initiated by clicking or touching the visual digital representation. The term badge comes from similar representations in gaming systems, and so the term has negative connotations for educators. The digital credential trend is rapidly being adopted in the labour marketplace, as leading global organizations like IBM, Microsoft, Oracle, AICPA, GED, AHIMA, and many others from various industry sectors have embraced open badges for their verified learning and professional credentials. Gamrat, Bixler, & Raish (2016) describe four kinds of badges:

1. Competency-based with simple binary outcome – either the learner did or did not demonstrate the competency.
2. Stratified badges are similar to traditional grading. Tiered credentials are awarded for attaining different levels of quality or performance (i.e., gold, silver, bronze, A, B, C or novice, proficient, expert).
3. Hierarchical badges, that reflect a progressive series of learning challenges or skills that build upon each other.
4. Meta-badges and pathways guide learners along a complex or comprehensive learning path.

## **State of Research on Microcredentialing**

The latin root of the word *credential* is *credence* which relates *credential* to the concept of credibility. Credibility in terms of learning outcomes or achievements is usually associated with solid learning and assessment design, backed by trusted, experienced educational organizations. A literature review about implementing microcredentials identified the following issues: Microcredentialing can provide evidence of learning or competencies to individuals and organizations (Gibson et al., 2015; Priest, 2016). It provides greater transparency about specific accomplishments than more conventional credentialing options like e.g. a full bachelor certificate and can show the progress of learners on a learning pathway (Grant, 2016; Peer 2 Peer University, 2012). They can also motivate learners to continue through further learning – due to the fact that they validate and value each step of learning (Gibson et al., 2015). Microcredentialing can map out flexible learning pathways that “cut across traditional courses and educational settings” (Priest, 2016; p.6). Gibson et al. 2015 state that microcredentials can support the credibility of learners beyond a single learning community (e.g., a university or school district). Due to their transparent nature they can help learners engage in broader communities of professionals with similar competencies (Gibson et al., 2015; Grant, 2016; Peer 2 Peer University, 2012). Microcredentials can provide incentives or motivate learners, but not everyone is motivated by badges in the same way (Boticki, Seow, Looi, & Baksa, 2014; in Grant, 2016), and, naturally, different kinds of badges motivate people in different ways (O’Byrne,



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Schenke, Willis, & Hickey, 2015; Priest, 2016). The broader discussion about Microcredentials emphasises furthermore the following issues:

There is a lack of research on effectiveness of microcredentials: Only very little research exists on the effectiveness of alternative credentialing, especially in the domain of professional learning. Because microcredentialing programs only develop recently, no formal research studies have explored microcredentialing programs deeply, or gathered the evidence to support their effectiveness or connections to student achievement (Grant, 2016; Priest, 2016). Proponents suggest that micro-credentials – if designed correctly – could provide more credible evidence of professional learning and individual competency (Gibson et al., 2015; Grant, 2016; Shields & Chugh, 2016).

Microcredentials represent a paradigm shift: Moving towards a microcredentialing system represents a paradigm shift in educational conventions of authority and credibility in terms of what people can do, how they developed those skills and knowledge, and what they have done concretely to demonstrate them. This can appear frightening to people who believe in current conventions of credibility in education (Buckingham, 2014; Grant, 2016; Peck, Bowen, Rimland, & Oberdick, 2016; Priest, 2016; West & Randall, 2016). It could be argued that the first step to take seems to be to recognize that many of the current conventions of authority in education are actually not credible, as there are e.g. courses, grades, credits, degrees, certifications, seat time, attendance, etc. West and Randall (2016) go so far as to call them “vague and meaningless” when compared to demonstration of a given competency. Microcredentials provide a solution for acknowledging or providing evidence of the non-curricular skills many employers recognize as valuable (e.g. creativity, critical thinking, communication, and collaboration, other 21<sup>st</sup> Century Skills, or Deeper Learning skills). Parker (2015) links them to skills associated with Bloom’s affective domain (Parker, 2015). Although instruction sometimes addresses these desirable skills, current conventions do not show evidence of these skills but several microcredentialing programs have (Gibson et al., 2015; Shields & Chugh, 2016).

Design of microcredentials and assessment rigor: The design and assessment rigor of the microcredential is a concern to current practice. Providers of microcredentials need to define and describe the competencies well, and ensure that the credential matches the actual competencies it declares (Grant, 2016). Not only the earner of the credential, but anyone the earner might provide the credential to should be able to trust in its accuracy. For this reason, microcredentials may align with professional, industry or content standards and involve experts from stakeholder groups in their development. Buckingham (2014) suggests four ways to increase the credibility of microcredentials: (a) the design process is transparent. Criteria are clearly articulated, sometimes involving relevant stakeholders; (b) the criteria for earning the badge are easy to understand; (c) the candidate for the badge is required to produce a “tangible digital learning product” directly aligned to the criteria; (d) the competencies addressed by the badge are formulate precisely and understandable. Providers should consider whether microcredentials need an expiration date (Peer 2 Peer University, 2012) or carry a required renewal by a date certain. This is especially true when considering that industry and career sees

knowledge and skills shifting quickly. Reliability, when assessing evidence of learning, should be high. Not only must providers of microcredentials identify and clearly articulate desired competencies, they must also describe how to meet those competencies and what type of evidence to submit to demonstrate those competencies (Gamrat, Bixler, & Raish, 2016).

Credentialing needs to be part of a learning ecosystem: The credentialing ecosystem (technical infrastructure) must be designed to easily store, retrieve, organize, and share credentials. There are many considerations for the technical infrastructure that go beyond creating a platform that provides successful earners with a digital badge. Some of the technical considerations do relate to the design and usability of the digital badge or whatever digital format the credential takes, but the earning and sharing of credentials is couched in a broader technical infrastructure that allows earners to, among other things: (a) search and find potential credits; (b) determine what actions and evidence are required to earn the credential; (c) interact with providers, assessors, and others; (d) share their evidence of learning; and (e) manage and share credentials earned. In addition, assessors and program managers may review evidence submitted by earners and provide feedback, and, ultimately, award or decline the credential. IMS Global Learning Consortium has developed an ecosystem with the components and links among different technical platforms, found on their website and called Technology Interoperability Platform (TIP). Some Learning Management Systems (LMS), like Edmodo and Blackboard, already embed their own badging systems, but these systems may not be usable outside of the LMS. Systems that offer badging or credentialing only to those customers who are themselves part of the platform are referred to as closed systems (Grant, 2016).

## **Emerging Frameworks and Tools for Alternative Credentialing**

The predictive power of academic certifications for job success is eroding. It has never been outstanding but for a long time it was felt to be an important – at least hygienic – factor for job applications to have an academic or a good academic certificate. This starts to erode recently. Following an internal Ernst & Young UK study demonstrating that degrees had no correlation to job performance, degrees will henceforth be disregarded in that firm's hiring process (Lam, 2015). Google is America's most outspoken company on this issue with its Senior Vice-President of People Operations stating that grades in degree programs are "worthless as a criterion for hiring". More and more alternative credentials start to come into focus and develop value. Different pathways from the traditional higher education system emerge and become increasingly relevant for employers. These different pathways are often credentials earned in post-secondary education or professional training after initial academic graduation. The Lumina Foundation has built a platform called the "Credential Engine" used to count all credentials of value in the labour market (not just degrees). The Foundation wants to ensure that by 2025 60% of adults have postsecondary credentials. Similar to that, the UK government has announced a \$200M+ investment in new postsecondary institutions with the aim to offer 15 distinct pathways tailored to the needs of regional industries and employers, and develop credentials different from the traditional academic ones.

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Although alternative forms of credentialing are only just emerging, the tools, platforms and concepts associated with it are already starting to develop fast. For the area of technology, for example, a platform called “GitHub” has become the standard platform for showcasing code to potential employers. In finance, students are using “EquitySim” to demonstrate trading and portfolio management skills to investment banks. Across a wide range of dynamic sectors of the economy, students are uploading papers, presentations and problem sets to “Portfolium” to demonstrate capabilities. And skill passports on “Viridis”, or digital credentials from “Credly” are allowing employers to find exactly the competencies they’re seeking.

In addition, “LinkedIn” is currently building a competency marketplace that has potential to influence higher education stronger than any prior digital technology: By assembling profiles of people and their learning experiences on the one hand side and of jobs on the other hand – and then matching one to the other on the basis of competencies, the “LinkedIn” competency marketplace has the potential to become a network of education and human capital development. On this note, it becomes important to thoroughly debate the question of ownership of competency metadata. “LinkedIn” is already providing tools like e.g. the “Field of Study Explorer” and the “University Finder” to recommend programs and universities to its audience. It also allows students to automatically add competencies to their profiles from select online training providers and universities. In 2014, “LinkedIn” spent \$120M+ on “Bright.com”, a company that focusses on developing algorithms for parsing competencies from job descriptions and resumes, and matching them. And finally, now “LinkedIn” has announced to spend \$1.5B+ to acquire the online training company “Lynda.com” and to take this strategy further. In comparison: So far, “Uber” has not launched its own fleet of self-driving taxis. And “Airbnb” hasn’t built its own hostels. But by acquiring “Lynda.com”, “LinkedIn” has signalled ambitions beyond owning the marketplace.

### Consequences for Higher Education

The system of higher education institutions is a system in which everything which is connected to higher education is currently from one source: Education, certification, counselling, information, archiving, issuing, re-issuing and validating certificates. Through digital technology, a distribution of these different functions across several organisations is starting to become possible. In addition, the concept of unbundling education into smaller units below entire bachelor degrees leads to the idea that higher education can consist of a menu of modules coming all from different educational organisations. While in reality, this approach is not yet entirely realised, it is clear that a part of the higher education system will follow this development with those, being in the field of expensive fee models moving first.

The unbundling process has consequences which we would like to map out in this chapter. Its total evaluation and a judgement on the consequences for higher education as a system of society needs to be researched and rigorously done.

Table 1:

Dimension	Modern HE model today	Postmodern, future HE model
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Degree	Goal is to reach a clear defined comprehensive degree, degrees are awarded through the institution.	Study is a sequence of smaller units and modules that can also be from different higher education providers. There will be more short courses, certificate courses, contact study formats, patchwork study cycles, that can altogether be combined to greater units, like a full degree, or else which can be awarded through an HEI.
Recognition of prior learning	Recognition possible but in practices little in use.	Recognition as usual practice, professional processes for recognition will be developed.
Certification / assessment	Teaching, (Tutoring, Course delivery) and assessment and certification are bundled together in one institution.	Teaching, (tutoring, course delivery), assessment and certification are unbundled and can in principle come from different institutions.
Study pathway	The study pathway is determined through a study plan and defined by module and assessment structures. Programme is structured according to time-structures and learning outcomes (ECTS). Differentiation between full time and part-time programs.	Study pathway is flexible and has in large parts flexible electives. Programme is structured according to interest. Flexible and individual time-structure. More professional development and life-long learning models.
Curriculum	There is a clearly defined qualification structure that is binding for all students alike and from which content and methods of modules are derived. Defined job profiles are the normative paradigm for content of study. The canon of methods and contents is oriented at the foundations of the scientific discipline.	Content is aligned to long-term employability and oriented towards individual education goals, interests and needs. Emphasis is on competences and acting successfully in unknown future contexts and more overarching abilities and skills.
Organisation	Little digital import of content/ curriculum Institutional Structure: A higher education institution is the provider of an academic program and the place of study.	The curriculum is rather oriented at problems of a field of practice. The problem-orientation is leading to a strong interdisciplinary approach – the question is: what a discipline can contribute to solve a particular problem? Lots of digital cooperation and in- and export of curriculum between academic institutions Institutional diversity: Several academic institutions are involved Students organise their study/ course framework and a flexible and need oriented study process.

Some developments are more obvious than others, and more likely to happen, e.g. recognition of prior learning and connecting learning achievements from before into a next education episode is already reality in many institutions. Others are more challenging and question the

current status Quo of higher education strongly, e.g. the institutional diversity, academic education may face in the future. As it is with all future scenarios it remains to be evaluated if an evolved system which follows the cornerstone aspects presented here, serves peoples learning needs. In disaggregating the process and its parts into smaller units, the benefits of exploration of entire knowledge fields in a comprehensive academic programme might be reduced. the question how a professionalization process of a person which follows the idea of growing into a knowledge community from the periphery to the centre, as Wenger describes it, can be still experienced. And Vygotsky's "Zone of proximal development" needs attention if learning is broken down into small episodes. In order to build coherence into learning pathways, the role of counsellor, advisor and learning coach might be emerging stronger in favour of a flexibelised system of the future.

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**Higher Creduation – Degree or Education? The Rise of Microcredentials and its Consequences for the University of the Future**

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## ONLINE DISTANCE COURSES FOR OLDER WORKERS: A MALTESE CASE STUDY

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### Abstract

Europe has an ageing labour force. However, major surveys confirm that, while the overall participation of older workers in lifelong learning is increasing, there remains a consistent gap in participation between younger and older workers (*older workers*, in this paper, refers to those persons aged 50 and over and who are gainfully employed). There is also a mismatch between the training content and forms, and the needs and aspirations of older employees. The literature is thereby arguing that older workers must have access to other, more innovative forms of education and training programmes, such as those offered online.

In Malta, as in other European countries, SMEs are a driving force for its economic success. This paper presents the findings of a qualitative investigation of the perceptions of manager-owners and older employees in Maltese microenterprises about online training programmes. This case study is part of a three-year project that is investigating the possibilities of online learning for Maltese workers. The project is co-financed by the Ministry of Education and Employment (Malta) and the European Structural Cohesion funds (under Priority axis 3). The main data-gathering tool was the semi-structured interview. The analysis of the empirical data was achieved through Grounded Theory approaches, including constant comparison, coding and memoing.

The findings indicate that owner-managers and older employees have a negative attitude towards training in general, and company-related e-learning efforts in particular. Various factors were identified. However, the data suggests that, if the online courses are designed to meet the demands of both owners and employees, and if they have a non-formal, non-directive form, like *work-based learning*, they can encourage the participation of older employees for training.

### Introduction

In the first quarter of 2017, the gainfully occupied population in Malta stood at 192,277 (National Statistics Office, 2017). 75% of this work force is employed in the private sector which is dominated by SMEs. There are 30,494 small and medium sized businesses (SMEs) in the Maltese islands. These constitute 99.8% of the private sector enterprises and employ 78% of the employees in this sector (Eurostat, 2017).



The profile of European Union (EU) labour markets is similar: 99.8% of all enterprises in the EU28 are SMEs and two thirds of all private sector jobs are within the SME sector. Collectively, in 2015, these produced €3.9 trillion, that is, more than half the total “value-added” in the European economy and employed 90 million people (Muller et al., 2016; Nairn & Mann, 2017).

Further analysis shows that almost 93% of European SMEs are microenterprises with less than 10 employees, and approximately half of these have no employees at all (Muller et al., 2016). The situation in Malta is similar. Indeed, it has the largest share of micro enterprises in the EU, these accounting for 95% of all enterprises in Malta and employing 43,576 – slightly more than one third of private sector employment. Only around 350 companies are classified as medium or larger enterprises in Malta (Eurostat, 2017).

According to the OECD, SMEs have weathered the storm of the global financial crisis (OECD, 2017). Martin (2013) notes that, in Malta, this success was achieved despite the many obstacles that exist in the local business environment. Her investigation suggests that one of these obstacles is the lack of investment in the training of employees.

### **Training in SMEs and the case for older workers**

The literature agrees that training can further increase the success of these small businesses (Blackburn & Hankinson, 1989; Chi, Wu, & Lin, 2008; Antonioli & Della Torre, 2008; Pérez-Bustamante Ilander et al., 2016). However, Manimala and Kumar (2012) argue that SMEs are “hardly aware of their own training needs”. Moreover, because of their economies, most European SMEs can neither afford an in-house training department nor the outsourcing of training programs. Consequently, their record of investment in education and training has remained notoriously low and employees of SMEs undertake much less training than employees in larger firms (Stone, 2012).

The literature also indicates that there is a mismatch between the available and needed training programmes. There is also a mismatch between the training cultures of educational institutions and SMEs (Stone, 2012). Ekanem and Smallbone (2007) thereby argue for training with an “informal” character which is “conceptualized as an experiential learning approach”. Admiraal and Lockhorst (2009) explain that this type of learning is “embedded in work activities, such as observing, asking questions, problem-solving, project work, secondment, coaching and being part of multi-disciplinary teams”.

The situation is complicated further for older workers. Statistics from major surveys, including the “Survey of Adult Skills” of the OECD (2016), confirm that, while the overall participation of older workers in training is increasing, there is still a consistent gap in participation between younger and older workers (Cedefop, 2012). In SMEs, particularly in microenterprises, the participation of older workers is restricted further because of the owners’ reluctance to invest in their training because of a perceived lack of return in investment (Stone, 2012). This participation is also low because of the workers own negative perceptions for training (Stone, 2012).

The number of older workers in the Maltese workforce has increased gradually over the years (National Statistics Office, 2017). The same trend is observed in Europe (Eurostat, 2017). The rising proportion of older workers is mostly due to healthier lifestyles, a smaller fertility rate and the consequent ageing of the population but these are not the only reasons (Chłoń-Domińczak et al., 2014; European Commission, 2014). Rising labour participation rates of older workers, less attractive early retirement arrangements and tax incentives have also contributed (Thijssen & Rocco, 2010; Ministry of Finance, 2017; Formosa, 2013). 40% of SME employers in Malta now have at least one employee who is over the age of 54 (Eurostat, 2017).

### ***E-learning in SMEs***

E-learning programmes can contribute immensely to this culture of “informal learning in SMEs”. Moreover, owners and workers do not need to abandon their job to participate in educational and/or training programmes. Cedefop, the European Centre for the Development of Vocational Training, has, for over a decade, been considering e-learning, through its “flexibility and facility of access, to be a major enabler of lifelong learning” and “a catalyst of change” for small and medium-sized enterprises (Attwell, 2003). It argues that online courses can help improve the SME business in the local and also the wider European market (Attwell, 2003).

However, while e-learning, has had a major impact in tertiary education and has also become a very significant and alternative education and training dimension in large companies (Admiraal & Lockhorst, 2009; Bowman & Kearns, 2007; Guiney, 2015; Daneshgar et al., 2008) the research indicates that there was only a limited uptake of e-learning in SMEs (Averill & Hall, 2005; Daelen et al., 2005; Hamburg et al., 2005). The little research that exists however indicates that older workers can participate successfully in e-learning programmes (Bowman & Kearns, 2007). That notwithstanding, the literature also indicates that the participation of mature workers, particularly those employed in SMEs, in e-learning efforts is very low (Admiraal & Lockhorst, 2009).

### **Research Method**

A sample of 15 employers and 23 employees was selected from a larger pool of prospective subjects who answered a call for participation through an e-mail sent by the Research Unit of Jobsplus on behalf of this researcher to all Maltese microenterprises employing persons who were 50 years or over. The respondents represented 12 enterprises from the top 12 categories (in terms of the business demography statistics of the National Statistics Office, 2017) as per the NACE Rev. 2 classification system (Eurostat, 2008).

This researcher used “intensive qualitative interviewing” (Charmaz, 2006) which created “conversations with a purpose” (Burgess, 2002) that were “open-ended yet directed, shaped yet emergent, and paced yet unrestricted” (Charmaz, 2006). The interviews were conducted in the Maltese language and a topic guide was used. In general, the interviews with both owners and employees lasted about an hour. The interviews were recorded, on agreement with the respondents, and on the understanding that the information provided would be treated with

strict confidentiality. They were then transcribed and later translated into English. Later they were analysed inductively using a Grounded Theory approach through which a system of key codes, categories and memos emerged from the data.

## **Study Findings**

### ***Attitude towards training***

The majority of the owners looked at training as necessary, primarily, to set up the business. However, when talking about their business in the present, the majority of owners shared “a lack of interest in training” (OW1 – to ensure anonymity, in vivo quotes from owners have been assigned the pseudonyms OW1 to OW 12, while those from employees, were given the pseudonyms EM1 – EM23.). They even claimed that, once they had set up their business, they never participated in “formal” education and training programmes, even if these were provided by government agencies or training institutions against no payment. They only made exception to training that was “imposed” (OW3) on them – such as, training in health regulations and skills. Most also did not invest in training programmes for their employee/s. This was confirmed by the employees. One employee (EM4), an assistant to the same carpenter for 30 years, argued that:

*“as long as I have worked with Michael I never trained. Never went to training. Never felt the need. All that I know, all that I needed, I learned from work, and from Michael. Michael taught me all the tricks.” (The name of this employer was changed to guarantee anonymity.)*

The employers provided many reasons for this “lack of interest in training programmes” (EM6). These included “the cost of the available courses”, their perceived “ineffectiveness”, the owners’ overconfidence arising from the business successes and the inability for them and their employee/s to leave work to participate in courses. Releasing employees for training in formal settings was difficult for the entrepreneurs. Lost working time was an especially important constraint for these owners who have to carry out multiple roles within the business as OW6 describes:

*“well ... Mario and I are both graphic designers but we’re also the salesmen, the cleaners and tech guys. At times ... it’s tough. We’re always overworked. How can I think about training? How ... when ... can I go, when can I send Mario to training?” (The name of the employee was changed to ensure anonymity.)*

The interviews also revealed that employers and employees also lacked information on what training is available for them. They also lacked knowledge about the benefits of training. Owners also reported difficulty in accessing training tailored to their needs in terms of type and quality, scheduling and location. They also argued that local providers, such as the Malta College of Arts, Sciences and Technology (MCAST) and the Institute of Tourism Studies (ITS), were reluctant to develop and offer courses to their businesses. They believed that this was due to the costs needed to organize and customize courses and the often-small numbers of trainees.

The data also revealed that most of the owners were “reticent” (OW8) to pay for the full costs, or part thereof, of the development and provision of training programmes.

The poaching of skilled workers by other enterprises, and training that may lead to higher wage expectations or demands, were also mentioned as “barriers to training” (OW8) by the employers. They argued that “larger firms often pay higher wage rates than we do” (OW4), and feared that formal qualifications obtained by an employee, particularly if s/he was younger would increase his/her opportunity to move on to a bigger, and better paying, enterprise. Training, particularly “formal ... and not done on the job, away from here (the workplace)” (OW4) was perceived by many of the interviewed employers to be of “more benefit to them (the employees) than the firm itself” (OW11). Thus, those few owners who considered training to be important to the success of their business provided only in-house firm-specific training. This training upskilled the employees with “less transferable skills ... in the open market” (OW6).

The only exceptions were the owners of a family-run operation in the tourist industry (OW7) and the two technology-intensive small enterprises (OW9 and OW12). In the former, the owner of a small boutique hotel in Malta’s sister island, Gozo, argued that he sent his son, daughter and husband – his three full-time employees – to various courses, locally and abroad, about hotel management, health and safety, and culinary arts. The other two employers – one the owner of a small printing bureau and a computer services centre – also sent their workers to training courses. They agreed that their workers needed constant upskilling and updating in information and skills related to the business, particularly about new technology and software because “this was essential for the success and/or survival of the business” (OW12). However, except for the family-run business, much of this training was offered to the younger employees.

Indeed, most of the owners argued that training older workers, particularly those who were 50 and over, was “not on the(ir) agenda” (OW6), as one respondent put it. When asked “how can older workers learn new skills that are relevant to their job?” (JV), the majority of owners insisted that it was “up to the employee” (OW9) to learn new skills and knowledge, and preferably by “learning on the job” (OW12).

The problem is compounded further by the older workers’ own reticence to training programmes. This is an exchange with an unskilled female carer employed at a small home for the elderly. The business, the owner confessed, is at the risk of closing down and the carer is well aware of the circumstances:

*EM16: I have a family. I worked hard all my life ... since I was 16. I saved a bit. Why should I start training now?*

*JV: What if you become redundant?*

*EM16: If I lose this job ... I will see what I can do ... but I have no interest in training. I will try finding a job similar to this one. I have the experience ... I know how to work with the elderly. I will find a job.*

*JV: Do you have any certificates that can help you?*

*EM16: No. I have the experience.*

*JV: At 51, you're still young ... relatively young. Have you no interest in training that may improve your chances of finding a good job, perhaps a better job?*

*EM16: No. I was never good at school. But I was good in caring. I know how to work with the elderly. I do not want training.*

Variations of this attitude towards training are scattered in the interviews with most of the employees across the majority of the 12 commercial categories. The exception were those older workers employed in the technology-dependent sectors.

### ***Attitudes towards e-Learning***

All the microenterprises involved in this research project were equipped with the technology required for online learning: a PC, smartphones or tablet, and the Internet. Most of the enterprises also had a good Wi-Fi connection that could be used by all employees. However, only three businesses – one a restaurant and two within the ICT sector – had employees engaged in e-learning. These employees were younger than 50 years and, hence, no employee involved in this research project ever participated in an online course. Moreover, the data also showed that none of the interviewees, participated in an online course – free or otherwise – on their own volition.

Many reasons were gleaned from the data for this negative picture of e-learning in the microenterprises involved in this research. The most quoted include:

- There is a lack of knowledge about online courses and scant awareness of the potential benefits of e-learning to the enterprises and individuals (owners and workers).
- Most owners perceive e-learning courses (that they know about) not to be “well adapted to the very practical and specific needs” (OW7) of their SMEs.
- The learning culture of most of the microenterprises is informal. Owners and employees prefer just-in-time, immediate answers to problems that really matter. Most owners and workers, however perceived online courses to be of the “formal” kind, created by educational providers who do not cater for their specific needs.
- Training through online courses is perceived by both owners and workers to be costly, and beyond the budgets of the SMEs.
- Most owners only have “little experience with technology” (OW1) which they mainly use to communicate via e-mail and Facebook, and to sell their services and products. Most workers also have a limited experience of technology that is “enough to use a mobile phone” or smartphone, “play with the PlayStation” and/or “set up a TV box”. Most owners and older workers perceive this limited experience and knowledge of digital skills as being “insufficient for participating efficiently in an online course”.

- Most older workers, and particularly those with a low level of education and the unskilled, had a lack of digital skills. They also believed that, at their age, it was difficult for them to learn these skills, and thereby participate effectively in online courses (if these were relevant to their needs).
- Older workers also argued that it was difficult to follow a course online while (a) on the job; and (b) after working hours because of family, social (including active participation in sport associations and village feast decoration preparations) and other responsibilities (including a second, part-time job).

Notwithstanding the above, most owners and some employees, agreed that if the e-learning was tailored to their needs they would “probably embrace” (OW9) it more. For example, one employer noted that all the online courses he knew of were in English. He argued that “my two employees hardly know how to read and write” and “their English is very poor”. This, he explained “made it difficult for them to follow any course”. If on the other hand “a course ... for example, a health and safety course ... was in Maltese” and included videos of “people talking” in the native language then his workers “might be convinced to join”.

## **Conclusion**

The data strongly indicates that, in Maltese microenterprises, the owners and older employees’ attitudes towards formal learning, and e-learning in particular, are relatively negative. The results of the current study, therefore, conforms with findings from other investigations about e-learning in SMEs in other European countries (Admiraal & Lockhorst, 2009).

However, the respondents of this study report a relatively more positive attitude towards informal “on-the-job” learning. The findings also suggest that any e-learning programme should be tailor-made to meet the specific needs of the enterprise and older workers, and fit within the informal learning culture that exists in these microenterprises. Available online courses will not be effective in this context. An easier access to e-learning, perhaps by developing a “one-stop-shop for learning and setting up networks and communities” (Sinkovec, 2009) with the specific intention of creating or sponsoring the provision of “needs-specific” (OW2) and “SME-friendly” (OW9) courses, can be beneficial to both the firms and the older workers.

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## A MULTI-SCALE APPROACH TO LEARNING INNOVATION DESIGN

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### Abstract

This paper presents the “Learning Innovation Network”, a learning innovation multi-scale design tool, developed by METID Politecnico di Milano, that provides a synoptic vision of the factors enabling a learning-teaching process. The decision makers at each level are stimulated in reflecting about actors, objectives and constraints, but also supported in designing in a creative and integrated context all the components (physical and digital) of a transformative collaborative experience (channels, activities, contents, relationships with the outside world, etc.), shifting the focus from the “content centred” approach, still deep-rooted in traditional academic institutions.

### Introduction

*Constructive alignment* is the synthetic definition of the main theoretical underpinning of the outcomes-based curriculum provided some years ago by Biggs (2003). This simple but fundamental approach can be described as the learning design process able to assure coherence between assessment, teaching strategies and intended learning outcomes in an educational programme (McMahon & Thakore, 2006). *Teaching strategies* is often considered as a synonym of *pedagogical approach*, but the bridge able to support the fill of the gap between the formulation of learning outcomes and its positive assessment is actually a complex system of methodologies, tools, contents, exchange channels, activities, relationships where each single part have to be carefully designed consistently with the others in order to reach the expected goals. The challenge is even more complex if the objective is to reach specific learning outcomes by *teaching innovation*, seen as the implementation of strategies able to transform traditional transmission-based teaching practices in student-centred processes, stimulating active learning within supportive environments, engaging students in authentic and real-life problem-solving (Brandon, 2004). This vision has been furtherly developed by suggesting that learning innovation involves also creative teaching able to foster students’ creative potential (Ferrari, Cachia, & Punie, 2009). Until this moment we can count on wide debate about pedagogical frameworks to be applied, while a relative lower attention is paid to the systemic design of the learning experience at its different scales: from the regional systems, to the classrooms. This paper proposes a systemic design tool based on the cross-fertilization between the pedagogical culture and a very specific branch of the *design discipline*: the *design for services*.

## Going beyond the traditional approach

The panorama of conceptual and practical tools available for supporting institutions, instructional designers, individual teachers or groups of them in starting and in performing a learning innovation process is wide and diversified (Conole, 2013). Some of them are very well known and largely applied and have been strongly influenced by the ICT culture, mainly because of the frequent identification of learning innovation with the implementation of digital tools or resources. An effective example of this is Agile Learning Design (Boyle, Windle, Leeder, Wharrad, Alton, & Cook, 2006), an approach evolved from the software development industry. Its basic philosophy is to reach rapidity and flexibility in providing “innovative contents and tools” thanks to an interactive and iterative approach to design that typically prioritizes speed in design and in implementation. It has been proposed as an evolution of traditional approaches like ADDIE Model (Analyse, Design, Develop, Implement, Evaluate), first developed for the U.S. Army during the 1970s, that emphasized accuracy and multiple validations (Peterson, 2003) at each step of design and implementation of each part of a learning path, with a particular focus on contents. With a different perspective, mainly focused on the massive re-use of learning contents and tools, other guidelines, as the Pedagogical Patterns Approach (Weisburgh, 2004), helps to focus and to synthesise the essence of the new learning practice or content in a compact form that can be easily communicated, shared and reused. Other approaches are more linked with the teacher training activities needed in order to kick-off the learning innovation process as, for example, the TPACK model, which focuses on the interplay of three primary forms of knowledge (Content, Pedagogy, and Technology) to be considered when training teachers supporting them in the design and implementation particularly of e-learning experiences (Mishra & Koehler, 2006).

Getting furthermore closer to the practical design tools, teachers can use autonomously several software tools useful for designing learning content and activities (e.g. LAMS – <https://www.lamsinternational.com>, CompendiumLd – <http://compendiumld.open.ac.uk>), providing a flexible visual interface to support the mapping of ideas and the design of *learning items*, the related timelines, resources needed and so on (Conole, 2013)

Nevertheless, in recent years, several authors have underlined that something is still missing, particularly in the role of the learning innovation design methodologies in supporting the creation of new consistent ideas in a systemic context. A new vision of design methodologies could still give relevant contributions in educational practices for supporting institutions, teams and individual teachers in creating in implementing new educational processes able to better match learning needs (Goodyear & Retalis, 2010; McKenney & Reeves, 2012) and also to develop a culture of educational quality (Ghislandi & Raffaghelli, 2015).

## The Learning Innovation Network

The Learning Innovation Network, is a learning innovation design tool, developed and tested by METID – Politecnico di Milano (MEtodi e Tecnologie Innovative per la Didattica/Methods and Innovative Technologies for Learning, <http://www.metid.polimi.it>), that stimulates

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decision makers and teachers to a new vision of the learning experience and of their role of “innovation facilitators” in the full respect of their own teaching in a systemic perspective.

The Learning Innovation Network is based on the strong belief that learning innovation is an actual design story where useful innovation rises as a result of a synergic effect, often sprouting in the gap between the different stages of the structured processes and it's a lot more than a sum of steps and activities.

The Learning Innovation Network is an elicitation tool whose application can be applied at different zooming scales in order to design new concepts and ideas for an education system, an institution or a whole course. Furthermore, it can be integrated with the use of specific conceptual and practical design tools, as those described in the state of art, for going deeper in some specific details.

The conceptual and operational pillars that inspire the Learning Innovation Network are:

- *the directed storytelling*, a conversational and new ideas generator tool introduced by Evenson (2006) in the design for experience in order to explore behaviours and their potential as innovation drivers;
- *the empathic conversations*, suggested by Raijmakers et al. (2009) to link the phase of analysis of the context and in creating a context of cooperation;
- *the multi-agent communication graph* (Pacuit & Parikh, 2005) used for shaping and designing the learning experience rising from the physical and virtual exchanges among the key nodes: the *learning actors*.

The Learning Innovation Network is thus at the same time an *empathic conversation catalyser* and a *new ideas elicitation tool* that guides and supports the decision maker or the teachers in order to:

- promote their awareness of all the components of the learning dynamics in where they are already acting recognising their role in it;
- help them in focusing problems and limits perceived or emerged by facts;
- mobilise their interest for playing the role of “designers of useful learning innovation”;
- kick off the process of learning innovation by identifying main actions to be planned and implemented.

The Learning Innovation Network nodes are made up by all the subjects, all the *actors* that interact in the knowledge transformational process.

Teachers and students are categories that should not be perceived as binding. A network of peer learners can occur where everyone is playing the role of a person aiming to achieve a goal of durable transformation of his system of knowledge, skills and styles, and desiring at the same time to facilitate this transformation into other components of the Network.

The key concept is that the experiences able to catalyse learning are raising from the knowledge sharing among *people* (e.g. each single student and his colleagues of the current and the previous

years, teachers and their collaborators or colleagues, external subjects such as the authors of adopted books, or authors of any available digital resource, or also families, cultural external actors, etc.) acting in an environment and connected to each other thanks to *communication channels* that allow them to co-shaping a network where the learning experiences occur: the Learning Innovation Network.

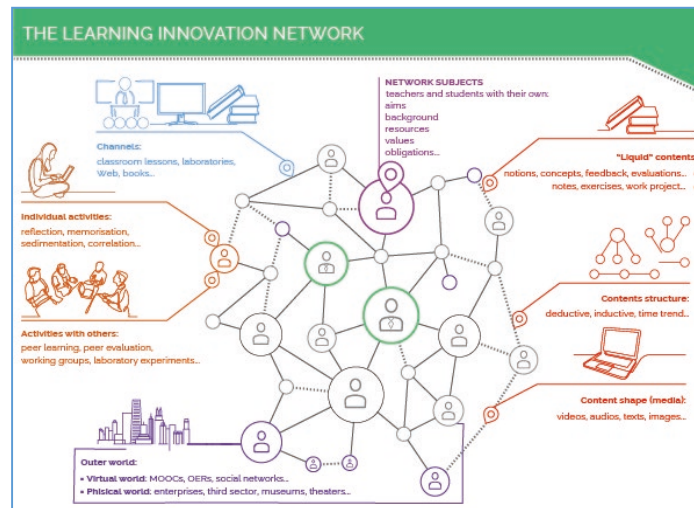


Figure 1. The Learning Innovation Network (source: METID 2017)

The Subjects-nodes are defined by:

- their basic features:
  - objectives: implicit and explicit purposes that occur within the learning experience at all its scales (regional, institutions, course);
  - background: formative, experiential, including relevant *preconceptions* or *misconceptions* about the discipline or the context;
  - resources: resource sets that can be activated in the process (time, economic resources, tools, materials, etc.);
  - role: the role within the network can be static or dynamic (for example, the role of *teacher* can be stably played by one of the subjects or being dynamically filled by many subjects);
- the actions they can accomplish:
  - autonomous actions: reflections, consolidations, exercitation, memorization
  - channel activation: development of mono, bidirectional or multidirectional communications with other subjects

The Arches (the elements that connect the nodes) of the Learning Innovation Network are the channels through which the communication among the subjects' flows and are articulated in:

- physical arches (classroom, laboratories, etc.);
- virtual arches (Learning Management Systems, Social Networks, etc.).

The Contents (concepts, ideas, information, instructions, etc.) flow through the channels among the nodes. There are "liquid" and their flow is allowed by the fact that they have a

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structure (time-based, deductive, inductive, etc.) and a shape defined by the media used (text, video, image, etc.).

A component of the Learning Innovation Network asking a particular attention is the role of the “Outside world” that could be at the same time a relevant part of the learning path but also a key driver of learning Innovation. A deeper and wider interaction with all the actors involved in the production and reproduction of the knowledge in our societies, could help us in designing innovative learning path that have to be not just multi-actor and connected, but also chaotic, dynamic, difficult to contain or, in a world, *rhizomatic*, taking inspiration by Deleuze and Guattari (1980). They used the terms *rhizome* and *rhizomatic* to describe the theory that allows to use multiple, non-hierarchical entry and exit points in knowledge construction and representation. by opposing the rhizomatic approach to a traditional, hierarchic, tree-like, conception of knowledge, which works with dualist categories and binary choices. A rhizome works with planar and trans-species connections, while an arborescent model works with vertical and linear internal connections. In such a vision of the models of production and reproduction of knowledge, the Learning Innovation Network could catalyse the teachers’ engagement in the emersion, formalization and sharing of the knowledge that is asset not just of the Academy but also of the main actors of our society: companies, GLAMs (Galleries, Libraries, Archives, Museums) and institutions, third sector, citizens, paving the way to truly new scenarios for more effective and integrated learning experiences.

Also in its own structure as operational tool the Learning Innovation Network hasn’t any hierarchical organisation: each single components of the Learning Innovation Network can be the starting point for the learning innovation design and several iteration of the model leads to the internal coherence of the results.

## **Conclusions**

In a scenario of learning innovation, a political decision maker, an institution, an individual teacher or a group of teachers can find and use a lot of well-known conceptual and practical tools for helping the learning innovation process. In the large panorama of these tools, there are very effective supports which focuses on the process, on the creation of the conditions for the proper transmission of resources and contents or on the detailed planning of contents and activities seen as modules to be composed. But decision makers and teachers need also conceptual and practical tools to help them in developing the awareness of the actual situation and to imagine its evolution, with a synoptic vision of all the components on which it is possible to act for improving experiences and its results: not just *contents* or media, but also relationships with the *outside world*, physical and digital channels, individual and collaborative activities in a dynamic flux and in collaboration with experts, colleagues, students.

In this perspective, the Learning Innovation Network helps decision makers and teachers in separating learning innovation from the pure problem of a dialectics with technologies and the digital world, and focuses instead on building a multi-actors interaction strategy that mobilizes

a wide range of tools in a synergistic and evolutionary learning experience increasingly integrated with the world *outside the classroom*.

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## **DISTANCE LEARNING AND TEACHING: UNDERSTANDING THE IMPORTANCE OF TUITION OBSERVATIONS**

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### **Introduction**

Quality of distance learning can be considered in different ways: the quality of the teaching and learning materials that students can engage with, the quality of correspondence tuition given to students in response to their assessments and the quality of online or face to face teaching. The quality of online or face to face teaching is considered to be especially important in terms of helping to develop tutor-student relationships and student motivation.

This paper describes a project to capture and understand the practice of tutorial observations from two different perspectives: the perspective of the distance learning tutor, and the perspective of the line manager. The project has a number of linked objectives: it aims to understand what happens during a tutorial or class observation; understand what good observation feedback is; what considerations need to be made regarding the observation of online tutorials; how to observe team teaching and offer feedback that is appropriate and useful for lecturers; how to best influence and develop teaching practice; to understand attitudes of different groups of staff across the university.

This short case study begins with a description of a literature review, followed with a brief summary of a series of focus groups that were designed to elicit opinions and perspectives about tuition observations: two focus groups for associate lecturers, and one focus group for their line manager. The focus groups helped to identify a set of practice recommendations, which are shared. The paper then concludes with a summary and pointers towards further research.

### **Literature Review**

One of the first steps of the project was to carry out a literature review (Chyriwsky, 2017). Before commencing, it was acknowledged that the term *teaching observation* can be connected to a broad field of study; it can relate to observation practice at school level, tertiary education as well as higher education. Exploration of this area can also expose debates relating to educational policy and development. A direction was given to focus attention to research that related primarily to distance education, higher education and the management and development of teaching practice.

Fifty-nine publications were identified. These included journals, books, and professional development conferences. A range of key themes were identified, along with important papers that shared research findings and provided pointers to research practice.

Some of the key themes identified included: peer observation (Cosh, 1998; Jones & Gallen, 2015) and observation design (Gosling, 2001); the philosophy of tutorial observations, i.e. whether they were for lecturer performance monitoring or for personal and professional development (Shortland, 2004); aspects of development related to technology skills, fostering a sense of belonging and developing of competence (Harper & Nicolson, 2013); the exposure to different pedagogic approaches, changes in personal understanding and perspectives (Harper & Nicolson, 2013); the importance of dialogue between the observed and observer (Donnelly, 2007); the recognition of challenges such as workload and observer bias (Martin & Double, 1998; Hatzipanagos & Lygo-Baker, 2006; Courneya et al., 2008).

Following the literature review, it was decided to run two sets of focus groups for university staff: one for associate lecturers, who are generally observed, and another for the academic managers who regularly carry out observations (known as staff tutors). A description of both focus groups can be found in the next sections.

### **Focus Groups: Associate Lecturers**

Open University associate lecturers, who are also known as tutors, are part time members of staff who are the student's first point of contact when they are studying a module. A module is usually up to 30 points of study and runs between 6 and 9 months. Tutors have up to a group of twenty students and can teach on undergraduate and postgraduate modules across a range of different faculties. All the teaching and learning materials are written by a module team and the tutor's role is to help the students understand and work through the module. Tutors respond to student queries, mark assessments and run tutorials. Tutorials can take place face to face, but they increasingly take place online using Adobe Connect.

Two focus groups were run at an associate lecturer development conference in May 2017. During the session, tutors were asked two questions: "How should staff tutors and faculty managers run effective observations?" and "What feedback would help you the most?" During the focus group, tutors were encouraged to write down key thoughts and opinions using a flip chart. After the session, important discussion points summarised in a blog post which was made available to participants (Douce, 2017a).

The discussions that took place can be summarised by a set of keywords. These were: purpose, importance, dimensions, acknowledgment, dialogue, frequency, practicalities, negotiation, feedback, differences, opportunities and connections. Purpose relates to the overall objective of observations; whether they were solely for management or for developmental purpose. This linked to the theme of importance: observations should be done properly; they should not be cursory or brief. The term dimensions related a number of different aspects, i.e. whether the observation was formal or informal, group or individual, or whether line managers were visiting a live or a recorded tutorial. It should be acknowledged that observations can be stressful and

that trust between the observer and the observed is important. Feedback was also discussed; there should be a dialogue and tutors should be given a right to reply, and observer engagement within a tutorial can also be something that can be negotiated.

An important point is that there appears to be differences in observation practice; there were differences in terms of frequency and the ways that feedback is shared to tutors. Reflecting the literature review, the tutorial or teaching observation can be considered to be a rare opportunity for both development and collaboration; there are certainly opportunities, particularly with respect to developing and facilitating peer observations.

### **Focus Groups: Staff Tutors**

The second set of focus groups took place in November 2017 within a regular meeting that is scheduled for tutor line managers. The aim of the faculty staff tutor meeting is to learn about changes within the university and to share academic and management practice. The meeting was attended by staff tutor representatives across the Faculty of Science, Technology, Engineering and Mathematics (STEM).

Tutor line managers were split into 7 groups, roughly representing disciplines and were asked the following questions:

- What is the most important reason to carry out an observation?
- What procedure or procedures do you follow?
- How do you record an observation?
- What do you look for?
- How do you share feedback?
- Is there anything special about online observations?
- Should there be standardised guidelines for STEM?

All groups were asked to discuss the questions, make notes and provide a brief summary of their discussions.

The keywords that related to the themes that were exposed are as follows: philosophy, relationships, dialogue, guidelines, feedback, online, experience, priority and opportunities.

Philosophy reflects the earlier use of the word *purpose*; for example, the staff tutors were exposing the question as to whether an observation was developmental or managerial in the sense of ensuring quality assurance. Relationships relate to the fact that observations can also have multiple purposes; they can help to develop and build relationships, reduce tutor isolation and offer reassurance. This theme is linked to dialogue and feedback, in the sense that observations are an opportunity to have helpful conversations about practice. Two other important points were: online tutorials do not need to be perfect; the challenges accompanying the use of technology are thoroughly appreciated, and the experience of both the observer and the observed are to be taken into account.

Reflecting the tutor focus group, opportunities were also discussed: peer observations have the potential to be facilitated and observation results and feedback have the potential to have a broader impact in the sense that they could feed into discussions regarding module development and design. Finally, there was a conclusion that a standardised set of standardised observation guidelines were not appropriate; tutors, disciplines and modules are all different.

## **Faculty Guidance**

One of the immediate outcomes of these discussions was to uncover a set of practical and adaptable guidelines that have been used for Science tutors. For sake of brevity, the guidelines have been summarised in the following two paragraphs. A more thorough description is available in Douce (2017b):

During the tutor probation period (which lasts for two years), each tutor should be observed once across all different tuition methods. Line managers should liaise with each other to decide which observations would be appropriate and the *lead line manager* will ensure that at least one observation is made before a tutor's appraisal which takes place every two years. A lead manager can ask other colleagues for an observation report (with tutor permission) to prepare for a tutor's appraisal.

Every tuition report should present some useful feedback (using a feedback form) and should be stored on a secure server. Line managers should give at least 2 weeks' notice before an observation and, if appropriate, ask tutors to prepare a lesson or a tutorial plan, and have them send it to you. When a report has been sent to a tutor, ask for reflective feedback from tutor.

## **Summary**

This research has exposed a variety of different practices and attitudes regarding tuition and tutorial observations, and has helped to suggest further research. There are three immediate areas of focus. These are: continue to read and analyse the literature review, continue to explore the subject of online teaching observations, and continue to consider how to appropriate conduct observations when team teaching is carried out. This third point implicitly reflects an important and repeated theme: how to balance the needs of management and quality with the needs of pedagogic and professional development. This is, of course, connected to a theme that has emerged from the literature, the tutor focus group and the line manager focus group: how best to develop and facilitate peer observations. This question points towards an important action: the need for further staff development workshops to share practice.

This research has been carried out within the Faculty of STEM. Looking long term, there are clear areas of further development: there is the possibility of extending this work to other faculties, and also building on the focus group research to develop a more detailed survey to uncover and expose broader attitudes regarding tutorial observations. There are, however, a number of key themes that can be identified. These are of course, the importance of trust and the importance of communication.

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## ACTIVITY THEORY AS DESIGN TOOL FOR EDUCATIONAL PROJECTS AND DIGITAL ARTIFACTS

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### Introduction

The European Community has identified as one of the most important goals of EU 2020, the issue of technological innovation aimed at developing and improving the quality of life of citizens and to enhance the performance of education systems (European Commission, 2012). In particular the Digital Competence Framework 2.0 (DigComp 2.0) states, in the area “Problem Solving”, that a key competence is related to resolve conceptual problems and problem situations in digital environments and to use digital tools to innovate processes and products. Following these recommendations, in 2015 we started a Master’s program entitled “Digital Innovator” at the FISPPA Department of the University of Padova (now at its 4<sup>th</sup> edition). Many of the participants came from various public institutions (schools, municipalities, local health authorities). They enrolled in the Master with the aim to acquire technical and methodological skills useful for designing and implementing specific educational digital projects each one in their specific context. In fact, there is the need to train teachers and experts that are able to deal with these issues and the Master wanted to meet these training needs, focusing especially on the planning stage of educational digital projects.

### The Activity Theory framework to design digital educational project and artifacts

A flexible, modular framework able to effectively represent the many and complex relationships and processes involved in an educational digital project, can be the “Cultural Historical Activity Theory” (CHAT) (Engeström, 1987). The theory focuses on *activity systems* seen as interactions and changes in learners, social communities, objects, and tools. Technologies in our context are seen as mediators tools of the activities of individuals acting in a coordinated way in order to achieve a specific goal (Kaptelinin & Nardi, 2006). According to this interpretation, we can describe the activities of a complex socio-technical system, such as the planning of educational digital projects, analysing the interrelationships of six elements that contribute to the realization of an *expected outcome*:

- subject(s) – actors engaged in the activities;
- object – the objective of the activity system;
- community – social context;
- tools – the technological artifacts (instruments) used by actors in the system;
- division of labour – the division of activities among actors in the system;

## Activity Theory as Design Tool for Educational Projects and Digital Artifacts

Corrado Petrucco, Cinzia Ferranti

- rules-conventions, guidelines and rules regulating activities in the system;

Among the various elements, some critical issues often emerge, that in the Activity Theory are defined as *contradictions* (Engeström, 2001). The concept of contradictions between two elements of the triangle (Figure 1) is the starting point for the recognition of the principal stresses (seen as problems) in a system, but also a possible direction for the evolution of the activity system itself. It's important to note that the contradictions are intended not as occasional problems that may or may not influence the Subject, but they represent a real structural component of the system that affects all the elements. Engeström also defines multiple levels of contradictions, starting from the internal ones (for example, between the subject and the community or between the Community and the Rules) until you reach the outer ones that may occur between different activity systems.

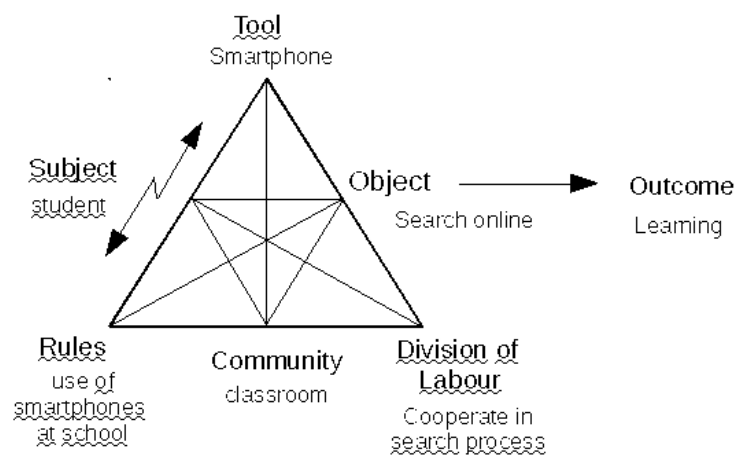


Figure 5. Interrelationships of elements of an educational activity system according to the Cultural Historical Activity Theory (CHAT) (Engeström, 1987). The diagram shows a possible contradiction in the use of smartphones at school.

For example, we can consider the educational use of smartphones in classrooms in order to keep students engaged in an online search for information about a specific learning topic: it can lead to contradictions between Rules and Subject (Students) because smartphones are powerful distractions device and can be an opportunity for cheating, unauthorized socializing, and social isolation (Figure 1). Activity Theory can also offer a methodological perspective where technologies in educational contexts can be analysed in a broader view starting from a micro level (students, teacher, classroom) to a meso level (school networks) and finally to a macro level (Núñez, 2009; Jaworski & Potari, 2009). This approach is useful in order to discover how and if an educational technology project can be influenced by cultural and social interactions outside classroom and formal education. Technology itself is not a neutral tool, it becomes a generative force that shapes and change the learners' knowing processes (Su et al., 2013).

### The Activity Theory and the Project Work

Activity Theory can provide a good framework for project work design (Hung & Wong, 2000), so participants were invited to design their proposals for educational technologies projects

using this framework. It was not too difficult for them to identify concrete elements at play in their specific Activities Systems and recognize the potential *contradictions* emerging in each System. This historical-cultural analysis process of the various organizations has led to many participants in the Masters to develop a deep understanding of how each organizational context in which they belong to can evolve positively, and in this way solving one or more contradictions present, thanks to proposed changes and innovations introduced in the project. Use of the Activity Theory, however, has required us to pay special attention to the items *Outcome* and *Tools*: most of the projects in fact wanted to have as *Outcome*, an App to install on a Smartphone or tablet, to be used by students or citizens, but the analysis has also highlighted the need to consider this App as part of two Activities Systems and in which it takes on two different roles.

In the first role, the App is conceived as the *Outcome* for the Design System and in the second role instead intended as a *Tool* of another Activity System; The broadening of the design perspective that involves two Systems, one of production and one of use, then drove us to elaborate an ad hoc model, useful for the participants in order to improve their understanding and the design of project. We referred to the PAM (Project Activity Model) model, which enabled us to transform the learning experience of the Masters into a real organizational project, which was set out through a project-based learning approach (Krajcik & Blumenfeld, 2006; Bell, 2010). As we have seen, the first step required the reconstruction of the current Activity System from which one could begin the plan design. Subsequently the relationship between two systems in which the key elements are the design and the use of application software that are able to resolve some of the contradictions emerging from the analysis of the Activity System and can help it evolve effectively was outlined. All the projects proposed have had to review the information systems related to their Activity System.

### **Two connected systems: *production* and *use***

Many projects written and realized in the master “Digital Innovator” involved the participants drawing two connected activity systems. The first one refers to the production of an App or a digital instrument and the other one showed its use and therefore the changes occurred in the initial activity system (before the project). Therefore, the design model PAM (see a first formulation called SAM that concerned only Smart Cities projects, in Petrucco and Ferranti, 2017) allows the integration of the Production and the Use systems to innovate the intervention in real educational contexts (Uden, 2006). After the representational rebuilding of the two systems, in order to complete the design, we proposed to follow some steps called PAM DESIGN STEPS (making explicit the information needs for the digital tool or app design), which are shown below:

- the analysis with AT triangle related to the current context, before the project;
- the emergence of the main CONTRADICTIONS - identification of the most important contradictions in order to design an information system that meets the needs of the evolution of the System (van Amstel et al., 2016);



- the creation of KEY QUESTIONS - leading questions that help to identify key information elements used for shared planning (their nature, form, value and timing, ...);
- the draw of connected two systems: production system and use system of digital tool or App);
- the use of a DOCUMENT MODEL for the descriptive part of the project document, namely a format of logical design sequences.

The PAM model has many strengths, but also some limitations. It is suitable to identify the main directions of evolution of the system and it is particularly profitable for the macro-design processes. Nevertheless, it does not appear to be the most appropriate instrument to manage the micro-planning level of the App and the specific information flows. For these processes the project team should make use other design tools. Especially for App development aspects, it should make use specialized and technical knowledge, which also take into account the vision of any participatory planning systems that allow to respond to the needs of students.

### Projects based on designing model

The experiences of project work of the participants are clear examples of how the PAM design model can help one to focus on the fundamental directions for thinking in an evolutionary manner about the project in a specific context (seen from inside a public institution or a school system). During the first three editions, the participants designed several educational projects with our model. It is interesting to report these projects because they are the result of an entire process. The analysis of the context, the activities system and the roles of the involved stakeholders and the contradictions within the system itself have outlined, in a socio-culturally founded way, the specific elements of the educational design actions. Many ideas were presented with the support of PAM, among which here we mention four examples, and at the end we represent only one of them.

The first one is “The alphabet of dots”: the project, with inclusive educational objectives, has realized a path with tactile laboratories and sensory deprivation exercises in order to allow children to better understand the condition of a blind person. In addition, has been created an app, specially designed for sighted children, that allows to learn and practice alphabet Braille in an intuitive and fun way. The second one is “Dante’s Inferno”, a playful-educational application for an interactive game; the project led to the design of *Dante’s Inferno*, an app for tablets and smartphones, that allows to create dynamic activities starting from the creation of a team game structured as the “Game of goose”. The third one is “OpenLab”, a participated project of creative atelier, a sort of fab lab, realized in a secondary school. The analysis of the activity system showed the need to involve the territory (interest groups and associations) in the design and organization of the atelier. The creation of an App made possible to manage the organizational and consultation phase.

The last one is “Augmented Museum”, the project led to the construction of an educational path, through an *ad hoc* Augmented Reality App, modifies the approach of students, but also general visitors, to the Museum of Natural Sciences of Legnago. The outcome of the project was

the creation of a visit experience where students can “touch” the artifacts and interact with 3D digital objects. During the first step of design process, it was fundamental to bring out the contradictions of the current system. They turned out to be: difficulty in the representation of museum artifacts, lack of structured paths designed for visitor categories, weak involvement of the local community. Afterward the “production system” connected to “use system” was outlined, a core step to have a good initial representation and then to develop the entire project and facilitates the descriptive phase of educational project work (Figure 2).

All projects are the result of definition of the interaction between different activity systems where some contradictions connote the existing context and activities. From the reciprocal relationship of elements of old activity system, the participants design a new and prospective system, imagined for the future and reachable through the app’s production system.

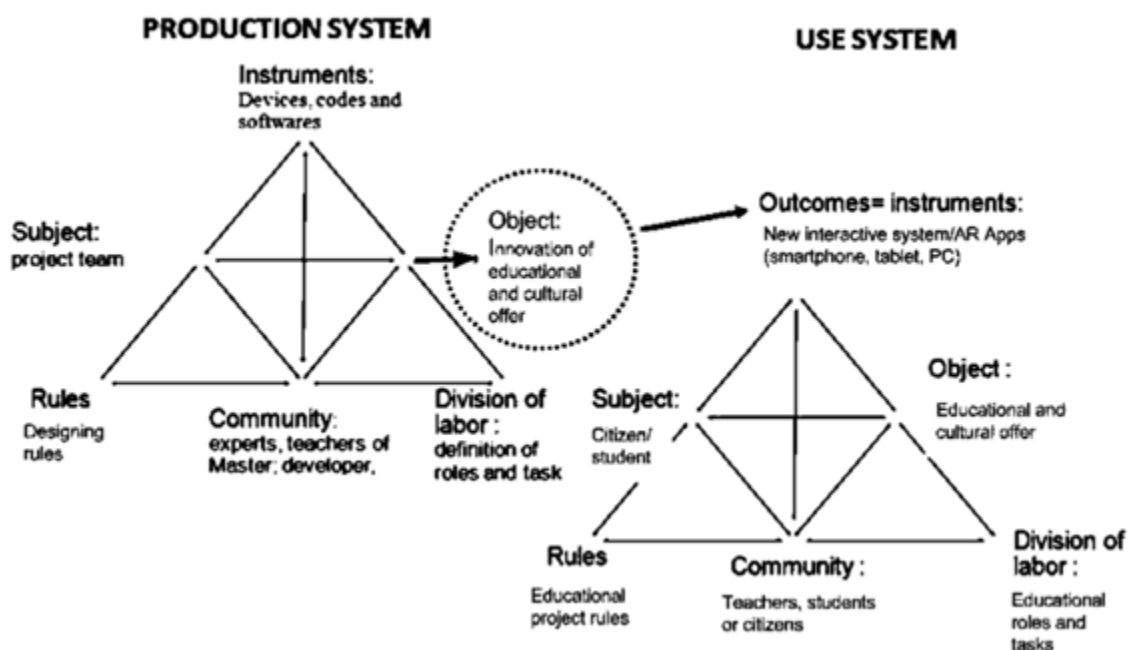


Figure 2. The connection between production and use systems (project “Augmented Museum”)

### Participants perceptions of PAM model

To test the usefulness of the model in the projects design we analysed the perceptions of participants (N = 40) at the end of the Masters activities, through a short questionnaire. In particular, in 2015, there are 20 participants (M = 9, F = 11); in 2016, 11 participants (M = 2, F = 7); and in 2017, 9 participants (M = 2, F = 7). The results were encouraging: more than about 90% of the participants considered it *useful* or *very useful* to use the model in the initial design stage, compared to a conventional design they used in past, confirming a previous result in Petrucco and Ferranti (2017), with data referring only to 2015. Also the distributions reported in Table 1, although different, do not change much the substance of the participants’ perceptions. It’s interesting to analyse the reasons for these findings (Table 1): the majority of participants see the model as a concept tool that is capable of representing effectively and comprehensively all the elements and their interactions (79%), especially between different activity systems (61%) (for example, Public institution and citizens or School and students).

Also to note, but to a lesser extent, is the perception of the model as a tool that facilitates communication of the project to politicians or administrators (28 %). Finally, more than 80% of the participants believe they can use this model in the future into their professional practice.

Table 1: Perceived usefulness of the PAM model (more than one answer)

It has effectively represented all the elements and their interactions.	79 %
It made it possible to understand the interaction between the two different systems involved (e.g.: my institution and the targets of project).	61 %
I have been able to easily explain my project to others or to the administrators and / or politicians.	28 %
I have been able to clearly define the problem that the app had to deal with.	18 %

## Conclusion

All the participants considered the PAM model very useful in particular because it made possible to understand the interaction and solve contradictions between different stakeholders and systems involved. In particular, the PAM model has enabled participants to consider the development of technologies, such as the App, not only as a mere product, but also as part of multiple different systems of activities that can adequately represent the requests and the points of view of all the social stakeholders involved in the production and in their use. From a broader point of view, using the Activity Theory (AT) framework as a project/reflection tool proved to be particularly effective, both as a reference framework for the design of specific educational technologies projects and as a training tool capable of creating a bridge between formal learning conveyed in academia and real world contexts. The participants highly appreciated the characteristic of the AT to foster a systemic vision which clearly represents the various elements involved and identifies technologies as important mediators of the innovation processes.

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## **“THE COBBLER WHO WEARS THE BEST SHOES”: HOW TO EDUCATE THE STAFF OF THE HIGHER EDUCATION INSTITUTIONS USING DIGITAL TECHNOLOGIES. STUDY OF THE PLEKHANOV UNIVERSITY EXPERIENCE**

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### **Introduction**

Among communities of different levels, education of which is to be organized under the special scheme, perhaps the most specific one is the staff of the higher education institutions themselves. Unfortunately, a common saying about “the cobbler who always wears the worst shoes” often becomes very actual in such situations. Meanwhile, these educational programs often have very high relevance, which can be clearly illustrated by the Russian example. The majority of Russian universities are public, and receive the funds from the state budgets in order to conduct their activities. In a sense, this situation is the heritage of the Soviet era, although, of course, with the transition to a market economy, many higher education institutions have switched to making their own funds. This process seems very positive in the light of reducing the burden on the State budgets. However, the share of self-earned funds in the budgets of the Russian universities is still relatively small (no more than 51% in average). The situation is aggravated by the fact that higher educational organizations are conservative, “slow” in changeovers, and most of the managerial staff of universities (especially regional) does not command effective methods and tools of financial management. Moreover, there is a systemic problem – the heads of universities financial services almost never link the financial results of the universities with their development strategy, selected set of educational programs, the main parameters of the educational processes etc.

Therefore, in 2017, the Ministry of education and science of the Russian Federation (MES RF) has given the Plekhanov Russian University of Economics (PRUE) and the Ural Federal University (UrFU) the task of designing the special study programs aimed for the professional development of universities financial managers and specialists of strategic development. According to this task, the PRUE and the UrFU had to train at least three representatives from each higher educational institution of Russia. Since the organization of education of such number of participants, scattered geographically across the vast country, on full-time basis was extremely hard to implement, the program was developed with wide application of digital technologies used by universities in various educational programs.

## **“Tools of planning and implementation of mechanisms for sustainable economic development of universities” study program**

The new educational program called “Tools of planning and implementation of mechanisms for sustainable economic development of universities” included 7 main themes:

1. The balanced system of strategic objectives.
2. Overview of financial strategies for decision-making.
3. Process approach to organizational change.
4. The system of remuneration and incentives.
5. Project management.
6. Rating of the financial management quality.
7. Informatization as the basis of efficiency.

The learning process lasted for 6 months (from late June to the end of December 2017) and was divided into four stages:

- Stage 1 – self-examination for two weeks during which the participants have filled 4 questionnaires developed by the organizers of the training, followed with one-month distance learning, which included two webinars. The distance learning within the program had not required the development of a special electronic system. The university used the LMS on the Moodle platform, which currently serves as the electronic learning platform for the PRUE distance learning students.
- Stage 2 – full-time three-day training in the form of intensive interactive sessions at the PRUE and the UrFU.
- Stage 3 – team work of the students in distance learning format for 6-8 weeks aimed to develop specific projects that can bring economic benefits. This stage also included two webinars.
- Stage 4 – one-day intramural presentation of the developed projects for the Commission consisting of the PRUE professors and representatives of the MES RF.

The structure of the assessment of trainees during the study of the program was as follows:

- 10% – peer assessment of questionnaires completed by listeners;
- 10% – timeliness, completeness of assignments for independent work;
- 30% – work during the session;
- 50% – assessment of public project defence.

Upon completion of the program all teams of the universities who participated in the program as listeners, had to present a set of materials, including:

- balanced system of objectives and indicators of the university, key KPIs for 3-5 years;
- enumeration and assessment of the processes critical for the realization of strategic goals;

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- project summary for changing of one of the university activity processes that are important for economic efficiency;
- organizational and administrative documents of the university, initiating and implementing the project launched;
- adjustments to the plan financially-economic activities of the university.

For the final project the universities teams were able to choose different themes. The structure of the projects prepared by teams of the universities (in the general view) was as follows:

- implementation of additional education and professional retraining at the university – 28%;
- improvement of the management system – 21%;
- creation of centres of project activities – 14%;
- improvement of the system of remuneration and incentives – 12%;
- improvement of the university performance by outsourcing of non-core activity – 8%;
- introduction and development of distance learning – 3%;
- other topics – 15%.

In total more than 500 people from 203 higher education institutions of Russia were trained within the program. 60% of the attendees were employees of financial services, 40% – of not financial. Division into staff categories was as follows:

- the rector or vice-rector – 20%;
- chief accountant – 12%;
- chief financial officer – 30%;
- chiefs and main specialists of the leading services – 38%.

## **Results and feedback**

Upon the end of the program the first group of participants were asked to rate the organization of the event, the curriculum and the skill level of the speakers. The analysis of the responses showed the following results:

1. Almost all participants noted the timeliness and topicality of the program. 80% have rated the topicality at the maximum, 20% noted that the workshop was rather relevant (“The program of the workshop was formed based on current goals, which every University comes across”).
2. The participants of the seminar highly appreciated the quality of the program (55% gave the highest rating, 45% rated it well). It was noted that the structure of the training program is optimal, all range of issues are interlinked, there is a logical sequence of the study material presentation and the duration of the program matches the content. It was noted that the range of issues covered by the program is useful for application in practical activities of the universities, and the answers to many questions in development of university strategy are given.

3. Listeners noted the good combination of theoretical and practical orientation of the program. 72% gave the highest rating, respectively, 28% have rated the issue for good. It was noted that the workshop is not overloaded with theory, practical work was consistent with the theoretical material gained during the day. The theory was supported by practical individual tasks and homework.
4. The audience highly appreciated the methods used for conducting the program, and the skills of the speakers (83% on this indicator was given the maximum *excellent* rate, respectively, 17% have rated the issue for *good*) (“Regarding the high level of professional skills for all speakers there is no doubt. Materials prepared and presented in a very clear, intelligible and substantive manner”). The listeners distinguished especially the two speakers, Sandler and Zipes, who were simultaneously the moderators of the full-time seminars. There was noted a good teamwork of these teachers, the first of which was the representative of business sphere able to command the best practices of corporate management, and the second, being the university ambassador, could circumstantially evaluate these methods in relation to the features and specifics of the university management.
5. All students without exception noted the high quality of the program organization (78% gave it the highest rating, 12% rated for *good*). Complaints to the room equipment, technical and operation support of the study process were not mentioned. The program schedule was strictly maintained, there were no gaps and unnecessary pauses in the work. (“Very good atmosphere, created by the convenience of collaboration and communication. Excellent technical support and convenience for all participants”).

Comments and suggestions expressed by the participants were following:

1. The need to continue holding such workshops was strictly noted. (“Regular organization of such seminars helps to build teams within universities, it is extremely important to exchange views and problems with colleagues from other universities”; “It is desirable to hold similar events more than once a year”).
2. It was suggested that there should be more clearly formulated requirements on the formation of the study groups. The lack of stringent requirements on the number of students has resulted in a situation when in a number of universities the groups of participants were formed quite arbitrarily.
3. Many participants noted that the program should involve university rectors as listeners (“A huge problem when applying the knowledge is a resistance from senior management. Thus the knowledge acquired through the program may not be implemented in a timely manner”; “We kindly request you to invite university rectors to such workshops”).
4. A lot of wishes has been expressed concerning the order of formation of groups for independent work. Suggestions were given that the groups should consist of representatives of universities with similar specific of activities, or may otherwise be formed based on the rating of universities financial management efficiency.



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5. Regarding the content of the program some suggestions were made for enabling legal issues, examination of the practices of restructuring in the financial services. It was proposed to consider in more detail the issues related to the work of the Automated management system for plans of financial and economic activities (AMS PFEA) developed by the Ministry of Education and Science of the Russian Federation (MES RF), and pay more attention to financial planning. The listeners would like to see a representative of MES RF within the course of the program in order to obtain the necessary advice. Suggestions were also made that within the bounds of this program MES FR may organize business meetings related to the questions provided in the curriculum.
6. The general wish was expressed to provide the program with more practical examples, showing both successful and unsuccessful experiences of universities in the implementation of certain projects.

Thus, thanks to digital technologies the professional training program for TOP-management of a large number of universities was implemented for relatively short time. As a result of the training program implementation, the result wished by the MES RF was achieved – heads of the higher educational institutions financial services had looked differently at their functionality. They established systematic and structural link between the universities development goals and objectives and their financial stability. The results and efficiency of the program may also be radically enhanced by its continuation, when each university acts in turn as the customer. The management of each university is supposed to form a *team of changes* (15-20 promising young employees), which is trained on the program described above, and then together with experts from the PRUE develops real projects and bring them to reality.

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## **EDUCAMPS IN DISTANCE EDUCATION: PROFESSIONAL DEVELOPMENT AND PEER LEARNING FOR STUDENT TEACHERS IN ICT**

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### **Introduction**

Some distance education programs offer campus sessions in their courses. That has been the case at the University of Iceland – School of Education (UISE) for the past decades. The question is how such sessions are best organised. Lectures and seminars have been the hallmark of university teaching for centuries but can now easily be available online in various formats including more interactive styles for example with (recorded) synchronous webinars. Already in 2008 there were indications that distance learners at the UISE who had been exposed to online recordings of lectures were less likely to want to spend face-to-face meetings on lectures (Jakobsdóttir, 2008) than those who were not used to watching lecture recordings online. This was not true regarding online asynchronous discussions. Students tended to appreciate f2f discussions during campus sessions regardless of their exposure to online asynchronous discussions (Jakobsdóttir, 2008; Jakobsdóttir, Jónsdóttir, Valsdóttir, Frímannsdóttir, & Jóhannsdóttir, 2008).

Of course there are many other teaching methods that can be applied when people meet f2f. One method that we have found to be promising among teacher students learning about ICT is a type of workshop that has for example been called educamp or edcamp (Carpenter, 2016; Leal Fonseca, 2011). Similar methods have also been called *unconference* or *over-the-shoulder* learning, playdates, or teachmeets. An educamp as described by Leal Fonseca (2011) is an “unstructured collective learning experience” making tangible “possibilities of social software tools in learning and interaction processes while demonstrating face-to-face organizational forms that reflect social networked learning ideas.” Such events have probably mostly been organised for the purpose of professional development and a chance to make connections and learn from peers in an informal way. Due to the fast technological developments it is important to instil in teacher students a mind-set that nobody can be an expert in everything and that it is important to explore together and learn from each other. Teacher students in their second semester of several years of study can expect that the technological landscape will have shifted and changed and new pedagogical emphasis and sets of tools arrived or be on the horizon. The educamp method has been used in Iceland under the translated label (Icelandic) *menntabudir* since fall 2012 with various groups: teachers of ICT, special education, natural science and mathematics, and teachers with groups of pupils in schools for example recently on makerspaces projects at the primary level (Jakobsdóttir, 2015; Jakobsdóttir, Jónsdóttir,

Gudmundsdóttir, & Pétursdóttir, 2014; Jakobsdóttir & Thayer, 2014). In addition, these types of events have been offered in campus sessions with graduate since 2012 and undergraduate students in ICT courses at the UISE since 2014. The method has been adapted with different groups and for different occasions but when it is used as part of the teacher education curriculum it may have a more formal aspect in the way that all participants are required to participate with contributions in dual role as teacher and learner and that such a project is evaluated as part of their grade.

In this paper, educamps organised with undergraduate teacher education students are described as well as the reactions of students from three cohorts in 2014, 2015 and 2016 (additional data may be added in the final version of the paper from a 2018 cohort which is completing a similar project in spring semester 2018).

## **Method**

The study is descriptive involving survey data (numerical and text in open-ended questions) concerning reactions to the teaching method involved.

### ***The Educamp project and data collection***

The educamp project was integrated in a 5 ECTS introduction course on ICT in education. Most of the course participants were then in their second semester (spring) in a B.Ed. teacher education program. It counted as 10% of the final grade (involving ca. 12-15 hours of work). The goals were the following:

- Students will understand the value of sharing experience, knowledge and ideas about ICT use in learning and teaching.
- Students will understand the importance of professional development in ICT and opportunities and possibilities to keep up with changes and innovation.
- Students will widen their network among fellow students and teachers regarding the use of technology and pedagogy.
- Students will increase their knowledge about use of ICT and development of teaching methods.

The course was taught online (Moodle-based) but included two campus sessions. The educamp event was scheduled for the second session but students prepared by reading materials and watching recordings about educamps, teacher professional development, social learning and communities of practice. Then they put their name in a course wiki in a time slot to make their introduction by themselves or could also make an introduction with one or two other students. Due to the fairly high number of students in the class (around or more than 100) more than one educamp session was available during the campus session week. Each session had ca. 10-15 min. preparation time in the beginning, four ca. half an hour time slots for introductions, and then some time in the end for whole group discussions and/or follow-up work. Students were expected to be in a teacher role at their station in one of the time slots but could roam around and decide what they wanted to learn from other students during the other time slots. By having

## **Educamps in Distance Education: Professional Development and Peer Learning for Student Teachers in ICT**

*Sólveig Jakobsdóttir*

four time slots on average there should have been about 3 students in a learner role at each station/presentation. Figure 1 shows photos from how the project looked in practice.



Figure 1. Pictures from educamps organised in a course on ICT in education in spring 2016.

Photos: Sólveig Jakobsdóttir

After the campus session students were expected to send in: (a) An introduction (online form) about the software, tool, digital learning materials they were presenting, outlining how it worked, whether there were problems in relation to its use and provide ideas and reflections on the potential use in teaching or learning; In addition, students were required to send: (b) information with a different online form about their visits to five other students during the educamp. In the second contribution they were required to reflect on their learning from each visit and provide ideas on how those tools/software/materials presented and discussed with others could be useful in their own teaching and learning. Also, at the end they were invited to evaluate the educamp experience and indicate how much/little they enjoyed it and how much/little they learned from it. It was made clear in that section that students were not required to complete the evaluation questions and whether they did would not have any effect on their grade for the project.

Those who could not attend the campus session due to illness or other reasons, were required to send in two presentations online instead of one (or during one year could make arrangements with the teacher to attend and present at a special table via synchronous online meeting). Early presentations/contributions sent in online were made available in the Moodle course web (wiki) and students could choose five contributions from there to read about and reflect upon if they were unable to attend the campus session in person. Finally, when all introductions had been sent in they were all made available in Moodle. Students indicated whether they permitted that their contributions were made available in an open web after the course and then anonymously or with their name displayed as author. After the project had been graded the course participants received an announcement with reference to the resources produced by the students with all of the presentations, an overview about how the educamp experience had been evaluated by the participants and a request to let the teacher know if they did not want their evaluation of the project to be presented outside the course (e.g. at conferences or in reports or articles about the project). No such notifications came forward in any of the years.

### ***Participants***

The participants were in three cohorts taking the course described above, most of them during their second semester in spring 2014, 2015, and 2016. For the first two cohorts taking the course in 2014 or 2015 the course was mandatory but for the 2016 cohort students were able to select

four courses out of six so an estimate of ca 2/3rds of the cohort signed up for the course. The completion rates in the course was 80, 78, and 77% respectively and most of those completed the educamp assignment along with the evaluation questions in the second part of the online contributions. Table 1 provides an overview of the participants in the course and the evaluation survey. As can be seen, majority of the course and survey participants were female all years. The course completion rate was 78%. Most of the those completing the course participated in the survey evaluating the project. The mean ages of the student cohorts were 27 to 30 but the age range was quite broad from 20 to 58. About 10-11% of the students answering the evaluation questions each year had not attended the educamp event in person but just accessed the information about the presentations online.

Table 1: Information about the student cohorts and survey participants (number of participants, gender ratio, mean age, course and survey completion) by year

Participants	Information	Year		
		2014	2015	2016
Course	Number of students	113	109	96
	Female: Male (F:M) ratio	80:20	78:22	77:23
	Mean age (age range)	27 (20-58)	30 (20-57)	27 (20-52)
	Course completion rate	85%	79%	83%
Survey	N (females, males)	88 (77F, 11M)	72 (60F, 10M, 2 unidentified gender)	70 (55F, 15M)
	Survey completion rates total (females, males)	78% (86%, 48%)	66% (42%, 71%)	73% (74%, 68%)

## Results

### *Contributions*

The number of contributions during the educamp events ranged from 62 to 73 and covered from 49 to 52 tools/software etc. About half of the group chose to make their contribution individually but others arranged themselves in pairs or small groups (see Table 2).

Table 2: Number of contributions online and in educamp sessions and number of tools, methods or materials sent in by year

Year	2014	2015	2016
Number of contributions sent in online	73 (from 80 students)	72 (from 76 students)	62 (from 57 students)
Number of tools/software etc. covered	52	51	49
Number of tables/workstations in the educamp/campus sessions	45 (24 individuals, 16 pairs, 5 trios)	53 (25 individuals, 26 pairs, 1 trio, and one group of 4)	36 (15 individuals, 13 pairs, 8 trios)

The presentations were about a diverse range of tools, software and/or e-learning materials. Examples from 2015 included digital portals or resources in Icelandic, for example educational games or drill and practice in language learning (storytelling, sound, grammar), mathematics, digital maps in geography, and first aid. Other examples included social media (e.g. various

possibilities in Google, Facebook, Snapchat, Twitter, Pinterest), maps, question games (e.g. Kahoot! Or Quiz Up, flashcards (e.g. Bitsboard), language learning tools (e.g. Duolingo), music (e.g. Guitarbots). In addition, there were introductions about tools for multimedia production or publication (iMovie, Movie Maker, Moovly, Youtube), online communications and learning.

### **Student reactions**

The students tended to rate the experience as very interesting/fun. A large majority all of the years agreed with that statement, 73% 2014, 81% 2015 and 84% 2016, whereas 27% 2014, 18% 2015 and 16% 2016 thought it was considerably interesting/fun and none answered not interesting/fun. See Figure 2.

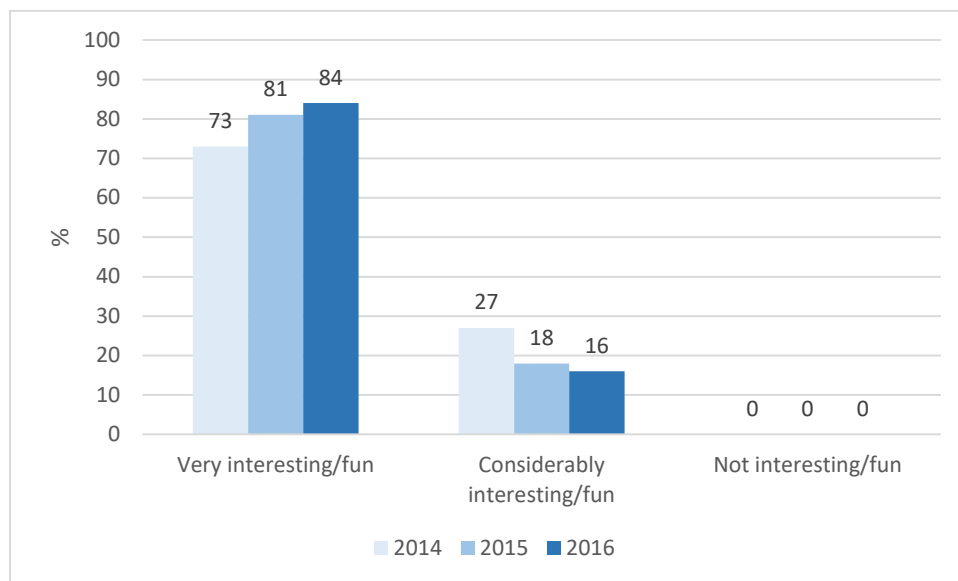


Figure 2. Students' interest

Answers to the question: "What did you think about participating in the educamp? How much/little interesting/fun?"

In spite of the short time devoted to the educamp event and the project, a large majority though they had learned very much (29%, 36%, 43% 2014 to 2016) or much (50% 46%, 46% the years involved) from the project while some answered considerable amount (21%, 14%, 10%) and hardly any students said little or very little/nothing. See Figure 3.

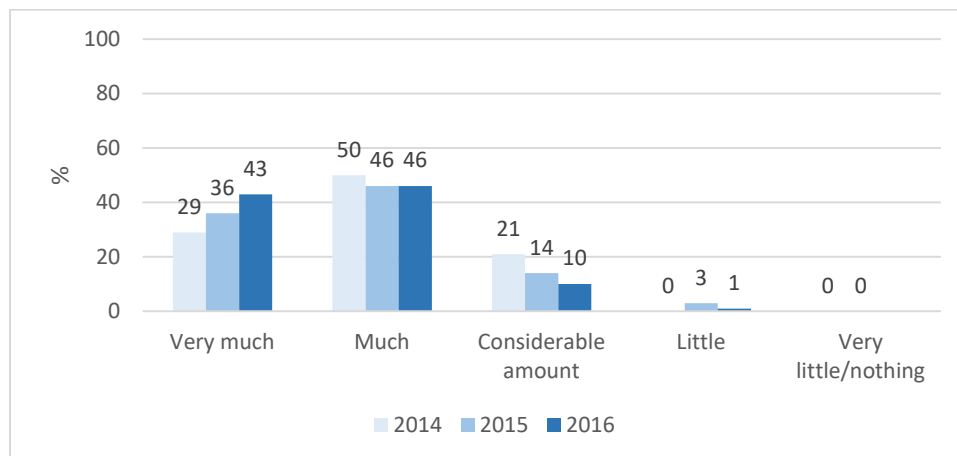


Figure 3. Students' learning.

Answers to the question: "What did you think about participating in the educamp? How much/little did you learn?"

There was a tendency for students to rate the experience higher (learning and interest) with year which might have been an indication that the project was better introduced and/or organised in the latter years by the teachers (learning:  $R = .180$ ,  $n = 222$ ,  $p = .007$ ; interest:  $r = .165$ ,  $n = 221$ ,  $p = .014$ ). However, in 2016 students more interested in ICT in education may have selected to take the course than those less interested which could be a factor in higher rating that year whereas in 2014 and 2015 the course was mandatory for everyone. However, interestingly correlation between attending the event on campus or not with amount learned or interest was not significant (in the final version of the paper data from open-ended questions will also be presented).

## Conclusions

Teacher students appear to enjoy and learn from the educamp method to reflect and think about using ICT in education. There is a need to work with ICT competences in teacher education perhaps with a focus on self-efficacy (Gudmundsdottir & Hatlevik, 2018). In a world that can be quite intimidating, regarding its huge flora of tools and methods that are being promoted in teaching and learning, new ways need to be tried and tested where learning and professional communities can explore technologies and discuss with peers and experts why and how they could be of use in praxis.

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## **A STUDY ON DESIGNING ONLINE LEARNING ACTIVITY**

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### **Abstract**

How to enhance the quality of online learning? The curriculum design is the most important part among all and the learning activity is the key to high quality delivery. In the meanwhile, the design of content and learning activities have to meet the needs of different target groups. The study is based on interviews of 105 e-Learning courses in consideration of online learning activity and current situation, etc. The purpose of the study is to design an online program with higher quality and it will be able to motivate the target groups' willingness to learning, for instance, what are their interests, how are they learning and ways they prefer to, etc. The study provides five kinds of online learning activities which fit for the learners and provide the methods and tools of designing.

Online learning achieves its objective by e-Learning courses. Online learning activities are the basic elements of e-Learning (Chao, 2012). The advantages and disadvantages of online learning are the key factors affecting the quality of the e-Learning.

The Distance-Teaching Academic (DTC) has been running for 20 years, but the quality of education has been questioned and its efficiency has not been proved as planned. The reasons for this are as follows:

- Online learning needs much more motivation and determination than that of normal learning (Illeris, 2007). Online learning also requires the individual learner for much more motivation to self-learning.
- Learners of the DTC have been unable to maintain high level of motivation and they have very poor self-learning skills.
- The majority of the courses rely on the resources of the DTC and usually provide learners with a variety of tools including literal texts, photographs, animation, videos, and etc. The learners are required to complete the study tasks but it is difficult to ensure that the study has been undertaken as expected.

How to design online learning activities to motivate the learners? This is the key point affecting the outcome of e-Learning. This essay will analyse the current situation in e-Learning in China and learners' motivation to undertake modern distance higher education in China.

It will attempt to design online learning activities, which could motivate the learners; outline the design concepts for online activities, and provide a framework for increasing the quality and efficiency of online learning.

## **The study of online learning activity**

### ***The concept of online learning activity***

Online learning activity is designed by instructors on learning target which provide for learners (Wenge, 2016). Learning activity has its purpose that solves the question which can inspire the learners' curiosity (Tanner, 2007). In general, learning activity is the same as the other production activity which is belong to social practice activity. We need define it in a special meaning. Many scholars define it in narrow meaning in environment of learning activity and the target of learning activity. We can classify them on the characters of learning activity which include in-class learning activity, extracurricular learning activity, blended learning activity and online learning activity. Learning activities of different characters have difference in implement environment, event organization, interactivity, completion and restrictions.

Different scholars have different concept for learning activity. Above mentioned concepts emphasized the importance of online learning environment as well as the internet literacy to finish the target task.

“Online Learning Activity” is all the activities which are finished in the online environment. The characters as follows:

- clear learning targets;
- distinct learning task;
- assisted learning resources and routes for finished learning tasks;
- quality criterion of checking learning tasks finished;
- clear learning outcomes.

### ***The present study of online learning activity***

There are many studies of online learning activity at home and abroad. The articles of online learning activity mostly emerge after 2005. The studies of basic theory include Effective Teaching Theory, Cognitive Load Theory, Performance Technology and Model of Cognitive. Different theory studies lead to different kinds of learning activities.

Different scholars classified online learning activities, for instance, instruction interactivity (McDonald & Gibson,1998), stream of learning activity (Watkins, 2006), inscape of online learning (Kolas & Staupe, 2010), constructivism (Wang, Zhu, Chen, & Yan, 2009), motivation and inspiration (Bonk & Khoo, 2014).

The study of online learning activity shows that there are 4 key elements including learning task, procedure, rules of monitor and rules of evaluation (Kaicheng Yang, 2002). Ronghuai Huang (2007) raised seven inscapes which include learning needs, learning environment, mini learning activity, technology environment, learning support, restrictions and learning evaluation. Meril (2006) raised that sophisticated learning activity includes question centred, task sequence, instruction units analysed, instruction tragedy and instruction interactive. Nan Wang raised that learning activity includes tasks of specified outcomes, scene of learning activity happened, tutor supported for learning activity and evaluation of learning activity (Nan,

2009). Ting Li raised that learning activity includes targets of activity, object of activity, contents of activity, tragedy of activity, procedure of activity, learning evaluation and reflective of activity (Ting, 2012).

The study of activity also includes learner support service, evaluation, collaboration, etc. The study at abroad pays more attention to the satisfaction of learners and emphasize the importance of learning society and learning community. Scholars at abroad pay more attention to the effect of practice instead of theory. But whether home or abroad the study on online learning activity is far from sufficient. At present, what is the effect of online learning activity of modern distance higher education targeting at adults in service with continuing degree education in China? Whether the activities fit for learners? How to design the online learning activity which triggers learning?

## **Design of study**

There are 68 DTCs in China. This article selects 16 DTCs from them which distribute in Northeast China, North China, Central China, East China, West south China, Northwest China, South China. Under consideration for the subjects and types of courses we select 37 majors which include 8 subjects (Economic, Law, Education, Literature, Technology, Medical, Management) and 105 courses. We also selected 184 learners which were interviewed and filled in the questionnaires in order to study and analyse that include the types of online learning activity, task style, interesting and concerning, motivation, etc. Online learning activity consists of tasks procedure. Motivation influences the tasks finished and attended, furthermore, influence the quality and effect of learning.

## **Findings of research**

### ***Learning strategy and learning activity analysis***

In terms of online learning, the learning strategy is the method for learners' knowledge and capacity building. It matters the learners how to interact with learning resources, build their own knowledge system, so as to realize cognitive structure change. Learning strategy also affects learners' decision making in learning activities, leading to the autonomous and cooperative learning, promoting learners' active completion in meaning construction. The type of learning activity is highly correlated with learning strategies. The research is in the angle of the learners' learning strategy to study the classification of online learning activities. The current online course learning strategy mainly consists five elements, including self-study, listening, experience, inquiry, problem solving, and then there comes five basic types of online learning activities. Online learning activity is composed of a series of learning tasks. In the perspective of learning method of learners, the research has been done to focus on classification of online learning activities, 105 online courses have been analysed and summarized one by one.

Those online learning activities consist of different learning tasks, there are 11 kinds of learning tasks.

## **A Study on Designing Online Learning Activity**

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All of the 105 courses include self-learning activity and lecture activity. Only 5 of them include experience online learning activity and 4 of them include exploration online learning activity, 11 of them include problem solving online learning activity.

Research combined several existing scales of activity type preferences, the learning motivation, self-learning ability, etc. which include seven dimensions of measurement.

Measurement reliability: Cronbach alpha coefficient is relatively general evaluation index of the reliability test, the measurement data calculation of Cronbach alpha coefficient as the chart shows, the scale coefficient is 0.9241, with a relatively high reliability, the reliability coefficient is above 0.6.

Each online learning activity includes different kinds of task which learners have different preference. Problem solving is the most favourite online learning activity which mean is 4.81. Secondly, the favourite one is experiencing and lecturing online learning activity which mean are 4.67 and 4.23.

### ***Learning motivation analysing***

We usually take practice for certainly targets. Learning means change, in some ways is persistent change. Adults characters changed from dependent style to independence, which learning and living experiences and the needs of personal development influence what they would learn and when to learn. Their learning interests and motivation also influence what they would learn, when to learn and how to learn.

Adults learning possesses heterogeneity. Learning habits and learning style vary from one to another. Adults conduct independent learning. Adults learn for what they need. Adults life experiences influence learning. Adults' social status adaptation triggers learning preparation. Adults learn for practice and problem-solving. When learner realize the learning content is useful and then he or she will pay more attention.

97.83% of learners talked about attending test in order to gain credits. 88.04% of learners talked about that learning activity should integrate with real life and work, they don't like learning too many theories, and the reason is not to know how to use. 95.33% of learners thought that internet connection speed and smooth of video would influence learners' interests. Low speed of connection would reduce learning motivation. Furthermore, 82.61% of learners don't like downloading plug-in during learning. 89.13% of learners thought that online learning activity should provide a clear learning path, they like finishing learning tasks under the instruction path.

The adults who attend distance higher education that needs academic certificate, in the same time, they also need good learning contents.

When being asked when they will learn with initiative. They talked about gaining credit and learning motivation on different perspectives.

- 61.96% of learners talked about changes in external environment.
- 89.13% of learners talked about the challenge of new position.
- 53.26% of learners talked about self-developing bottlenecks.
- 82.61% of learners talked about the needs of sustainable career development.
- 44.46% of learners talked about the needs of personal fulfilment.

The study found that the learners like problem-centre learning which is based on task and the target is solving problem and promote self-development. To emphasizing real work solving and real problem in real time and gain real outcomes so that he can enhance comprehensive quality and promote personal career-development.

### **Online learning activity design**

Online learning activity design should systematically think about the learners of distance higher education. Either we should meet the needs of talent training, or we should meet for the real needs of the learners. We should guarantee the education quality from stimulating learners' motivation and holding the target of learning really happened. Moreover, how much content should one activity include? What about the relationship between activity and one course? These are all the problem which should be thought about when we design one course. The study promotes the rules of designing one course, design plan and methods.

### ***The rules of design***

Following the researching outcomes, we proposed the basic rules of designing online learning activity:

1. Online learning activity should have finer granularity in order to run in mobile terminals like cell phone, so that learner can learn anywhere and anyplace. Each activity should have a learning outcome so that learner may know what he gained after learning.
2. Learning path should be clear. We should provide specific requirement of learning and learning procedure.
3. Interactive design should be enhanced. We should create interactive environment which for learners who have same major and similar career to communicate and strengthen interactive.
4. To enhance the correlation between online learning activity and vocational working tasks. To break through the previous subjects and design the learning activity which is related with career and vocational technique. We should pay particular attention to the key problem and difficulty.
5. The content to learners should be combined with real work and life in order to stimulate the learners' motivation and give rise to an in-depth learning.

During the designing learning activity, we will study on the specific design plan and method according to the above rules.

### ***Learning activity composition***

One course usually is composed of a set of units. One learning unit is the unit of the learning activity.

In fact, online learning activity which the study promoted is the independent learning unit from one divided one course. One course is composed of several activities. One unit is equal to one learning activity. One learning activity is composed of several learning tasks. The task is the theme or specific affairs which learner should finished in the learning activity. Online learning activity is the procedure of tasks.

### ***Online learning activity present elements***

By the way of presenting to learners of course, online learning activity would include the task, learning style and evaluation.

In each learning activity learners should utilize the content following the tasks and finish the learning activity according to the procedure of tasks. Learners should finish the tasks according to the procedure of tasks. Learning tasks correspond to simulation operating procedure, the online learning system would record the learning procedure and learning outcomes automatically. Furthermore, online learning activity design is restricted to the function of learning platform.

### ***Online learning activity design***

We should pay much more attention to the problem-solving learning activity in order that online learning activity should be the perfect combination of structured knowledge and unstructured knowledge.

There are many scholars studied on the process of problem solving. Dewey proposed five stages which include problem recognizing, clarifying problem, proposing assumption, deducing the meaning of assumption, verifying assumption. Ausubel and Robinson proposed four stages which include presenting the problem environment, clarifying the target and known conditions, finish targets, verifying. Sternberg proposed circle of problem solving. He thought when we facing a problem that we need go through seven stages.

Domestic scholars proposed procedure of problem solving which include a series of stages that correlate with each other. The stages are finding problem, analysing problem, proposing assumption and verifying assumption.

We found the tasks of problem solving include clarifying problem, analysing problem, proposing problem solving plan, solving problem according to plan and verifying problem solving.

Some problems in online learning are proposed clarifying. So they would not be recognized and assessing problem solving is finished in evaluation of learning activity. Thus the main tasks of

problem solving include identifying y problem(elective), analysing problem, proposing solution, solving problem.

Some instructors thought the analysed tasks are the core tasks. The problem of the learning activity is clarified which is for learners finishing. The first task for learners to finish is analysing. And then learners solve the problem by themselves or group. If they meet difficulty that instructors or mates would support him. At last, learners submit assignments, reflect and exchange. So the procedure of finishing activity is identifying problem, analysing problem, propose solution plan and solving problem.

Evaluation should include participation of online discussion, points proposed in discussion and performance of assignments according to the requirements of finishing tasks. We formulated the designing plan for problem solving activity (Table 1).

Table 1: The design plan of problem solving

Types	Targets	Organizing	Rules of evaluation
Problem solving	Application	1. Clarifying problem;	Participation of online discussion
	Analysing	2. Analysing problem;	
	Evaluation	3. Propose plan for problem solving;	Points of discussion
		4. Solving problem.	Performance of assignment

The learning platform should have the following functions so that learners can finish the learning activity in convenience.

## Conclusion

People-oriented designing thoughts are effective methods. The study proposed designing plan and tools for 5 kinds of online learning activities in modern higher education. The paper focus on the designing processes and methods of two kinds of online learning activities (experiencing and problem-solving online learning activities) which are largely needed by learners without a rich description in current courses. Furthermore, the methods of study proposed fit not only modern distance higher education but also other kinds of education for reference, which will be able to enrich the forms of online activities, be more suitable for learners' needs as well as ensure the quality of all kinds of online learning. Online learning activity depends on the function of learning platform. The structure and the function of the platform would pose a great impact on the online learning activity design.

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## **THE OPEN UNIVERSITY OF CHINA AND CHINESE APPROACH TO A SUSTAINABLE AND LEARNING SOCIETY**

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### **Abstract**

As the most populous and second largest economy of the world, China has seen huge changes and emerging needs in social and economic aspects over last few decades. In 2012, the Chinese government decided to establish the Open University of China (OUC) on the basis of Chinese Radio and TV University System for promoting lifelong learning and a learning society. The purpose of this study is intended to provide a case analysis of results of and challenges for OUC. After five years of development, OUC has increased its capacity for promoting lifelong learning including a national wide university network, massive online teaching and learning model, digital learning environment and resources, customized services for special groups and credit bank system. Meanwhile, there are problems and challenges to its current and future development, such as inexperience of quality teachers, the difficulties in quality assurance and credit transfer, insufficient policy support and regulation from government and the growing competitiveness in online education market. It is expected that this study will contribute to understand the way of OUC meeting the emerging needs of a lifelong learning society in China and share its experience.

### **Introduction**

#### ***The changing context in China: towards a sustainable learning society***

With the rapid development of ICT and the rise of knowledge economy, to build lifelong education system and a learning society has become a common trend and inevitable choice of human society. The Chinese government has begun to promote lifelong learning and a learning society since the beginning of the 21<sup>st</sup> century. It was considered as one of the key tasks in the Report of the 16<sup>th</sup>, 17<sup>th</sup> and 18<sup>th</sup> CPC National Congress. As a result, State Council (2010) made a strategic plan of education development from 2010 to 2020 and put lifelong learning as a main goal. Under this clear policy guidance, varieties of lifelong learning practices such as the building of learning city, learning community, learning enterprises, learning family, and the launch of the “Lifelong Learning for All” Week have been spread all over the China Mainland.

#### ***The establishment of Open University***

In 2012, the Chinese government established the Open University of China (OUC) on the basis of Central Radio and TV University (CRTVU), expecting it to meet the diversified and personalized learning demands of the public and contribute to the construction of open and

flexible lifelong education system. (Ministry of Education, 2012). Shortly after that, the OUC put forward its 10-year strategy aimed at being one pillar of Chinese learning society and one of the world's top open universities with Chinese characteristics (OUC, 2012). From 2012 to 2017, OUC has made reforms in many aspects, such as organisation structure, education delivery mode, OERs and MOOCs, recognition and transformation of learning outcomes.

## **The development of OUC from 2012-2017: promoting lifelong learning in China**

### ***A national wide university network: the OUC community***

The OUC has a different university network from other open universities in the world and conventional universities in China. It is nationwide and within the society. Firstly, it has a vertical section based on different administrative divisions inheriting from CRTVU system which is called headquarter (national level)—branch (provincial level)—college (city level)—study centre (county level) system (Yang, 2014). Secondly, it develops a new parallel section with social partners such as enterprises, industries, cities, and universities (Qi, Ma, & Yuan, 2012). Therefore, a lot of joint colleges are established and the network is getting more and more powerful. According to the annual report of OUC (2017a), by the end of 2016, OUC had set up 1 headquarter, 44 branches, nearly 1000 colleges and more than 3000 study centres, as well as 11 joint colleges with social partners. As a new type of cross-industry and cross-regional university with a service network covering both urban and rural areas in China, up to now, the OUC (2017a) has 3.5 million registered students, of which more than 70% students are from the grassroot level, 55% located in the central and western ethnic minority border regions.

### ***Online teaching and learning model: Six-Network Integration***

After the research on promoting online learning behaviour and outcome, the OUC (2015) created a Six-Network Integration teaching and learning mode to ensure and enhance the quality of education delivery. The six key factors to quality online education are online learning space, learning courses, teaching team, learner support, learning assessment and management, which called Six Networks. Among them, the network learning space is the basic element, the online learning course is the core element, and the other four are the supporting elements. The Six Network is both relatively independent and mutually supportive, and it is a specific structure. They together formed an ODL model. From 2012 to 2017, OUC has made great progress on developing of every network and the Six-Network Integration Model gained the first prize of teaching achievement of Beijing city in 2018 and is selected to compete for national level prizes.

### ***Digital learning environment and resources***

The OUC is promoting in-depth integration of technology and education. As president Yang Zhijian (2013) said, the OUC is taking a cloud-road-terminal model for utilizing the new information technology. It works with Alibaba Group to set up a cloud platform for teaching and management, works with the network operation enterprises to build different roads for delivering the services, and works with communication terminal product enterprises to produce

OUC learning terminals for receiving the services. All of these support millions of simultaneous visitors and billions of personal accounts for online learning, forming a nationwide digital learning environment that satisfies learners' autonomous learning needs. In order to make learning more convenient and solve the problem of the uneven distribution of quality educational resources, the OUC cooperated with other colleges and universities, vocational schools and social education institutions established the National Digital Learning Resources Centre to share tens of thousands of courses, free-to-use lectures, a digital library and special learning websites that are open to the public.

### ***Customized services for specialized groups in growing need***

The OUC is providing customized services for migrant workers, college students as village officials, employees of large-scale enterprises (such as McDonalds), the disabled, military personnel and others. It has also worked with relevant industries and established 11 industry and corporate colleges, including the School of Coal Mining, the School of Social Work, and the School of Logistics. In order to serve specific sections of the population, OUC (2017a) has established 10 special colleges, including the Bayi School (aimed at military personnel) and the School for the Disabled. According to the OUC (2017b), of all the 3.5 million registered students, 200,000 are rural students, 120,000 military personnel, 270,000 are ethnic minority students, and 6,000 are disabled students.

### ***Credit Bank System for bridging formal, nonformal and informal learning***

The OUC is providing formal and non-formal higher education programs. Since 2012, it has started to research and design a model called "Credit Bank" for the accreditation, accumulation and transfer of formal, nonformal and informal learning outcomes. Under the guidance of the MOE, the OUC (2016) has completed a general framework for a national credit bank system with "framework + standard" technical path and carried out pilot work. Up to now, it has organized 55 units, including relevant ministries and commissions, colleges and universities, vocational schools, open universities, training institutions and communities, to be engaged. An alliance for the mutual recognition of learning outcomes has been initiated and established. 1 Learning Outcome Accreditation Centre and 67 Sub-Centres have been established across China. In 2017, the OUC launched an online platform called Online Credit Bank Platform (ICDE, 2017b).

## **Problems and challenges**

### ***Inexperience of quality teachers***

Quality teachers is one of the biggest problems that OUC facing. The education level of teachers is low. Research (Yang, 2012) shows that of all the 57,000 full-time teachers, only 12% are postgraduates. The on-the-job training for teachers is insufficient. A majority of teachers are not familiar with distance education and have little corresponding theoretical or practical experience before joining in the OUC, and they do not have adequate and systematic on-the-job training afterwards (Li, 2014a). The social status of teachers is not satisfying. They do not enjoy high social status and influence comparing with research university teachers. This

becomes severer in the hierarchy structure, the lower the worse, which affects the working passion and job attractiveness.

### ***The difficulties in quality assurance and credit transfer***

The organizational structure of the OUC is much larger than that of CRTVU. It involves more stakeholders, and education services provided to the society are more diversified and personalized. How to ensure high quality in every aspect of the training of different types of groups is difficult. Credit transfer is another complicated issue. At present, China has not formed national qualification framework and credit transfer framework. As a pilot, the OUC is promoting credit transfer mainly by agreements with some colleges and universities. However, it is still difficult to transfer credits in a wider range, such as with industries, enterprises, universities, primary and secondary schools, and social institutions.

### ***Insufficient policy support and regulation***

Regarding of financing, currently, the OUC mainly relies on tuition fees and supplements by grant. Compared with conventional universities, OUC doesn't have national student tuition allocation. And compared with the other Open Universities in the world, the government funding is quite low, which is only 30 million yuan per year (OUC, 2013). Therefore, the infrastructure and teaching conditions of OUC branches, colleges and counties are unsatisfied. Besides that, there are no standards and indicators for the performance of OU in China, and the review and evaluate on the quality improvement is insufficient.

### ***Growing competitiveness in online education market***

The OLD institutions in China are now experiencing an unprecedented prosperous period while the market is increasingly competitive, and it covers all education levels, attracts public and private sectors and provides various scopes of services (Gaba & Li, 2015). The iResearch Company (2016) said that from 2013 to 2018 the market scale of online education in China will increase from 83.97 billion Yuan to 204.61 billion Yuan, with an average annual growth rate of approximately 20%. The most powerful private ODL institutions have existed for no more than 15 years, many of which have successful Internet use experience, abundant capital, good industrial chain and powerful technology research background. Following the wave of MOOCs, the conventional universities in China have strived to develop ODL in recent years. For example, in 2013, Tsinghua University, Peking University joined the Edx, while Fudan University and Jiaotong University joined Coursera. Top nine Chinese universities (C9) formed an alliance for Chinese MOOCs. It shows that the online education market, even in higher education level, is getting more competitive. Prompted by the MOOCs boom, MOE (2015) promulgated the Opinions and Suggestions for Promoting the Construction, Application and Management of MOOCs, which created favourable policy conditions for the orderly development of MOOCs.

## Conclusion

The establishment of OUC was considered to be a response to meeting the diverse needs of China's political, economic, social, technological and educational development (Li, 2014b). As an important approach to a sustainable and Lifelong learning society in China made by MOE (2016), OUC has made tremendous difference in last five years after its establishment. For open to people, it is getting more accessible and providing customized education provision to the different group, such as on-job workers, farmers, migrant workers, elders, soldiers, disabled people. For open to places, it is producing more and more online learning resources to the students and more and more OERs to the public. And the resources and learning support can be reached at the workplace, learning centres and home through Pad, laptop, TV and many other ways. For open to method, it is the in-depth of ICT with teaching and learning. The propose of six key factors of online teaching and learning and its practice improving the learning behaviour and outcomes. For open to ideas, the OUC has a bigger and wider university system than before, and its ideas of co-share and win-win of stakeholders shows great potential and adaptive to the holistic promoting of lifelong learning society in China. As a result, ICDE (2017a) gave OUC the Institutional Prize of Excellence for its good performance. But on the other hand, the problems and challenges are still there and needed to be solved. It is related with many aspects like policy support and regulations, capacity building, quality assurance and improving of using ICT.

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## MOOCS COPYRIGHT PROTECTION IN CHINA

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### **Abstract**

The development of digital learning not only brings great convenience to the human life, but also promotes the reform of education. Education mode has been changed from face to face education activities to relying on the internet technology to carry out education. But the MOOCs has caused some problems in China, the most urgent need to solve is the copyright protection issue. This article is mainly discussing MOOCs copyright protection in China: the ownership of copyright, the rational use of copyright online, and the statutory license system of copyright in China.

### **The ownership of the MOOCs copyright**

According to the Copyright Law of China, the work must be an intellectual achievement that can be replicated in some form of tangible form in the field of literature, art and science. That is to say, to become the Work recognized by Chinese law, there must be two characteristics: one is originality, and the other is reproducible. From the characteristics of MOOCs, we can know that MOOCs education is in accord with the definition of Work in Chinese law, and is protected by Chinese Copyright Law. Teachers' classroom teaching is protected by copyright, whether in the context of international Convent or in Chinese laws. In China, the third article of the Copyright Law (2010 Amendment) stipulates that *oral works* are protected by the Copyright Law. The Enforcement regulation of the Copyright Law promulgated by the State Council further expounded the oral works. Oral works refers to impromptu speech, lectures, court debates and other oral works.

As the object protected by law, if the creative process of the MOOCs is relatively simple and the creative subject is clearer, the ownership of the copyrights is simple and clear. The copyright should belong to its creator. If two or more individuals or units coproduce the works, these works are called *cooperative works* and the copyright should be shared with all partners.

However, in the actual process of creation, colleges or educational institutions are often provided with resources and facilities, such as facilities, equipments and other resources. Moreover, they hire professors or teachers with doctorates to teach, the copyright ownership of such works is more complex. For the hired professors or teachers, they think that the class is mainly the activity of the lecturer's speech, and the talents of the instructor are very high. They are the master of the course, so the copyright of the class should be the individual who teaches. Another point of view, institutions of higher learning or educational institutions feel injustice, because the curriculum is not only the narration of the instructors, but also the use of media,



Internet technology for recording, phonetic transcoding, subtitle and file uploading. The creation process of the class is more than a typical multi process team. As a result, we should not regard MOOCs as a single individual, but a common cooperative work.

In view of this phenomenon, the sixteenth article of Chinese Copyright Law stipulates the concept of *service work* and the ownership of copyright. In accordance with the provisions of Chinese law, a work created by a citizen when fulfilling the tasks assigned to him by a legal entity or organization shall be deemed to be a service work. The copyright of service work is different according to different situations. If there is no special provision or agreement, the copyright of the service work belongs to the author, and the unit has the priority to use it. However, if the law, the administrative regulations or the contract stipulates, the copyright must be attributed to the works of the legal person, or the works such as the engineering drawings, the product design drawings, the maps, the computer soft pieces and so on, which are responsible for the legal person's material and technical conditions. Copyright is owned by a legal person and the author has the right to authorship. Therefore, from the above legal provisions, MOOCs in China, its copyright ownership is also different under different circumstances, in some cases the copyright of the class is owned by the teachers, and in some cases the copyright of the class goes to the educational institutions directly.

### **The fair use of copyright in internet**

In order to ensure the authority and interest of the course teaching, the course makers will inevitably use other people's works. Regardless of the maker or learners of MOOCs, the infringement may occur during the use. This is an important problem to be solved in the legal protection of MOOCs education in China. Therefore, in order to obtain the balance between the copyright owners and the public interests to acquire knowledge, the Chinese Copyright Law stipulates the "fair use" system and has also been further carried out in the communication of information network

The twenty-second article of Copyright Law of China stipulates that: "the use of a work under the following circumstances cannot be paid without the permission of the copyright owner, but the name of the author and the name of the work shall be specified, and the copyright owner shall not infringe on the other rights under this Law: (1)... (7) for school classroom teaching or scientific research, translation or a small amount of reproduction of published works for use by teaching or scientific researchers, but may not be published and issued." Although this system has given other people certain rights, the scope of restrictions is very harsh. First of all, it limits the purpose of use and can only be used for classroom teaching or scientific research in school. Secondly, the method and quantity are limited. It can only be translated or "small" copy. Again, it can only be used by teaching or scientific researchers, and cannot be published. Finally, we should specify the rights of the copyright owner, such as the author's name and work title. The sixth regulations of the State Council's administrative regulations on the protection of the right to the dissemination of information network also protect the spread of "fair use" on the Internet. The regulations stipulate that "for school classroom teaching or scientific research, a small

number of published works are provided to a small number of teaching and scientific researchers and cannot be paid without the permission of the copyright owner.”

The establishment of the fair use system in China’s Copyright Law has laid a good legal foundation and system guarantee for the rapid development of MOOCs in China. After all, the principle of free, sharing, and opening to the class education is free, and proper fair use can help to create more and better curriculum resources, which is more conducive to the opening and development of education.

### **Statutory license of copyright in China**

China’s statutory license system is an important restriction system of copyright. It allows people to use other’s works in a specific way without the consent of the copyright owner, but should pay the necessary fee to the copyright owner. The twenty-third article of the Copyright Law of China stipulates that, “or the implementation of the nine-year compulsory education and the national education plan, the publication textbooks can be compiled without the permission of the author, without the permission of the copyright owner to assemble the published pieces of work or short text, musical works or single pieces in the textbook.” The works of fine arts and photographic works shall be paid in accordance with the provisions, and the names of the authors and the names of the works shall be specified, and the copyright owners shall not infringe on the other rights enjoyed by the copyright owner in accordance with this law. The eighth article of the regulations on the protection of the right to communication of information network also provides a clearer provision for the statutory licensing system “for the implementation of nine-year compulsory education or national education planning through the information network, without the permission of the copyright owner to use the fragments of their published works or short written works, musical works or single pieces.” The courseware for the production of art works and photographs is provided by the remote education institutions making the courseware or using the courseware according to law to the registered students through the information network, but the remuneration shall be paid to the copyright owner.

From the above two legal provisions, we can see that although China has formulated the statutory licensing system for copyright, it has imposed strict restrictions. First of all, only nine-years compulsory education or national education planning and education resources can be used in the two resources of MOC resources. Secondly, the scope of the work is strictly limited, it must be the fragments of the works or short written works, music works, or a single piece of art and photography. Thirdly, the subject and object of communication are also limited. It can only be spread through the production of courseware or distance education institutions in accordance with the law. The target audience can only be registered students. Finally, the cost is clarified. The *legal licensing system* in China is different from the *rational use system*. Although it is clear that a specific work can be used by others, the legal licensing system must pay remuneration to the copyright owner.

## **Conclusion**

As the continuous development of the information network technology, the development of MOE teachers in China is also very fast. However, as the works are being disseminated online, the speed of dissemination is uncontrollable. Because the legal provisions of Chinese law, such as Copyright Law and the right to communication of information network, are clear about the ownership of copyrights under different circumstances, and through the *rational use system* and *permissions licensing system* in Chinese law, the law on the rights and interests of MOEs and its copyright of owners can be guaranteed. This not only helps to protect the legitimate rights and interests of the creator of the class, but also promotes the development of the course in China, and has realized the balance between the protection of the copyright owners and the social development.

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## **THE THEORY – AND ESPECIALLY THE PRACTICAL IMPLEMENTATION – OF SPACED REPETITION IN REAL LIFE STUDY CIRCUMSTANCES**

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Learning to learn needs to be based on reputable scientific theories in order to be effective, and at the same time they need to be tried and tested in real life teaching and learning situations. A challenge is to develop programs where strategies and habits are built into a broad, coherent approach where aspects are mutually supportive.

A program has been developed at the University of South Africa, as part of a pilot project rolled out in 37 South African Schools. This program addresses aspects of Identity (characteristics of the learner), Mastery (habits and strategies for effective learning) and Legacy (ways to show what they know, as well as using data, information and knowledge to address real life issues).

Two important learning strategies included in this program are *spaced repetition* and *interleaving*. The reality of learners' busy schedules, however, makes it difficult to implement. This leads many learners to revert to *cramming*, often with very little long-term memory retention. The challenge is to translate the proven strategies into workable habits. For this reason, the *Doppler* strategy was suggested and taught to learners in the 37 schools. It entails a strategy to schedule several subjects in times leading to tests and exams, in a way to study the content several times in shorter time-frames.

Feedback from focus groups pointed to positive results in terms of the following:

- Feasibility: it did work in real life situations if students applied and used it;
- Identity: it showed a positive effect on the learner's mindset (Carol Dweck), and grit (Angela Duckworth);
- Mastery: positive effect on long-term memory retention, but more important, on self-efficacy and confidence; and
- Legacy: when followed, it had a positive effect on test and exam marks, but also on deep learning.

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## **DOES A RAPID PROTOTYPING METHOD STIMULATE OUR TIME-PRESSURED TEACHERS TO DESIGN RICH AND BLENDED LEARNING ENVIRONMENTS?**

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### **Introduction**

VIVES university of applied sciences aims at creating connected curricula that forge a link between thinking and learning in such a way that what is learned is presented in a meaningful, authentic manner (Perkins, 1993). VIVES wants to prepare its students for tomorrow's professions by developing student-centred learning environments in which students become active, self-managing and cooperative learners. The European Commission's Education and Training 2020 Strategy (ET2020) (European Commission, 2013) recognises the need to improve the quality and relevance of teaching and learning in higher education, to modernise and digitise educational systems. There is the need to design future-looking, digitally rich, flexible courses, mobile-ready and attuned to students' expectations for engaging, professionally related learning experiences. In VIVES, we therefore stimulate a blended learning approach, which we define as the integration of on and off-campus learning activities and a learning goal-oriented use of educational technology. Our primary focus is on the enhancement of teaching and learning with a didactical focus on student centred learning. Technology supports the enhancement of this goal. Upgrading conventional face-to-face approaches towards more blended, online and distance learning formats is recognized as a dauntingly challenging task for lecturers, educational advisors and learning technologists (Ellis & Goodyear, 2009).

### **Designing blended learning environments**

It can be argued that designing a blended learning environment is not as simple as combining an online environment with a F2F course (Gedik, Kiraz, & Ozden, 2013). "Re-creating learning online and determining the right blend isn't easy or to be taken lightly" (Hofmann, 2002; p.519). Blended learning demands new instructional design that requires harmonization of the environments not only in terms of the media and technology used, but also regarding design approaches. Hence, many aspects should be taken into account instead of simply combining online and face-to-face practices if a blended learning experience needs to be successful (Gedik et al., 2013).

A question that arises is how do we best help our time-pressured teachers in this process in order to develop rich blended and online courses (Petrovic & Young, 2016)? Teachers often

don't feel the urge to use new technologies and some are reluctant towards implementing technology in the learning activities. Additionally, a great work load makes it difficult for teachers to make enough time for redesigning their course.

So there is an urgent need for teacher professional development in this field. This need is recognized by the European Commission (2014) in the report "New modes of learning and teaching in higher education". It is not simply about individual training. Modern teaching should be team-based and courses should embody and demonstrate personal, subject-specific and institutional values.

### **Focus of the study**

We recognize Beetham's (2014) general critique of curriculum design in higher education in that "practice and process had often been local, ad hoc, unexamined, and unresponsive to changing demands". The design process of blended courses requires to be structured, dialogic and iterative. At VIVES, we sought for a concrete and effective methodology for getting started with design teams. Several methods were compared and many of the current methods of learning design consultancy and workshops (supported by internal and external experts) seemed to be support-intensive, time consuming and therefore poorly scalable.

However, one method was retained. This method – an approach called "ABC curriculum design method" based on research from University College London (UCL) (Young & Perovic, 2016) – meets with our concerns. The key of the approach is pace, engagement and collaboration. The building blocks of the methodology – the learning activities – were examined and described by Laurillard (2012).

The ABC-method is a workshop developed for a teacher design team in order to help them create a powerful blend of learning activities. In just 90 minutes using a *rapid prototyping* format, teaching teams work together to create a visual *storyboard* outlining the type and sequence of learning activities (both online and offline) required to meet the teachers' course learning outcomes. Assessment methods, cross-program themes and institutional policies can also be integrated into the process. The method can be applied on new courses or courses that change to an online or a more blended format.

The method has already been implemented in UCL in more than 90 sessions, reaching 400 teachers, re-designing around 120 courses. On invitation, the ABC-method has been presented at 17 other (inter)national universities and colleges throughout Europe and around, in which 500 academics and teachers participated representing a range of disciplines (from medical sciences through engineering, education and social sciences). Also in VIVES the method has been implemented.

## **Does a Rapid Prototyping Method Stimulate our Time-Pressured Teachers to Design Rich and Blended Learning Environments?**

*Sylke Vandercruyse et al.*

### **Research questions**

After implementing the workshop in our institution, we want to have an insight in the effect and the long-term results of teachers who followed the workshop. The following questions will be investigated:

- Do teachers change their ideas about blended learning after joining an ABC-workshop?
- Is the ABC-method useful for stimulating the reflection about the use learning activities and tools?
- Do teachers have the intention to redesign their courses after joining an ABC-workshop?
- Do teachers actually change their instructional design after joining an ABC-workshop?
- How do teachers experience the ABC-workshop?
- Would teachers like to change aspects of the ABC-workshop?

### **Methodology**

Focus group methodology will be used as qualitative research tool. This method is especially recommended in social sciences in order to gain insight into how people think and provide a deeper understanding of the phenomena being studied. Due to the group interaction, the participants may encourage each other to make connections to various concepts through the discussions that may not occur during individual interviews. One of the major purposes of focus group methodology is evaluation. The method is useful in providing context and depth in order to acquire relevant background information (e.g., motivation) and lends itself for interpretation of the experiences and thought of the participants. Hence, we can collect in-depth data on the specific evaluation questions to determine the effect or success of the ABC-workshop.

The composition of the focus groups will be based on the teachers joining the ABC-workshops, which are organised on voluntary base. The structure of the focus group will be as follow: introductory round (moderator will present himself and give a description of the main goal of the focus group), individual task (each participant will be asked to reflect for five minutes on what they considered the most prominent experience during the ABC-workshop and secondly on what they want (or have) (to) change(d) after following the workshop), group discussion (the crucial part of the focus group in which the participants can freely talk and interact with each other; based on the above mentioned questions) and a group task (at the end of the group discussion, participants are asked to summarize their findings).

The focus group interviews will be recorded and transcribed. Based on this information, the ABC-method can be optimized, for instance by adding a follow-up to the workshop which is currently lacking, in order to enhance the long-term effects of the workshop.

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## **ALEBRIJE MODEL FOR THE DEVELOPMENT AND SUPPLY OF EDUCATIONAL CONTENT**

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### **Introduction**

In Mexico, 88% of Mexicans have a smartphone and 81% of them stay connected to the internet throughout the day (IAB México, 2017). In addition to the above, the creation of decontextualized learning contents that can be reused by different educational events is fundamental. Taking into account the two aspects mentioned above, the Alebrije Model was developed.

The word *alebrije* refers to the construction of a fantastic creature with characteristics of different animals to achieve a unique entity, in this same way, it seeks to achieve a unique educational act for each person, group or organization. To do this, small capsules of thematic content are built and integrated. These capsules can be studied alone, or be integrated into the didactic sequence of one or several courses or modules, achieving the construction of different types of educational events.

This model is organized in three levels: the micro level that represents the thematic unit as a minimum to study; the meso level, which considers its inclusion within the didactic sequence of an educational event; and the macro level, which considers its cataloguing for inclusion in resource repositories accessible to all university students and the general public.

### **The Micro level**

In order to meet the needs of people at any place and time, the Learning Support Units (UAPA for its acronym in Spanish) were designed, which are online educational resources for self-study that present the content, activities and evaluation of the specific topics in an organized way, to meet the learning objectives proposed by the same UAPA (CUAED, 2015).

The topics addressed by the UAPA are part of the academic programs taught in the schools and faculties at the National Autonomous University of Mexico (UNAM for its acronym in Spanish). The teacher can use the UAPA as support material for the study of the subjects or for the delivery of their course. The student will use the UAPAS as a self-learning material or as a review element, since as the UAPA organize knowledge and experiences, they allow the structuring and achievement of learning objectives, promoting significant learning experiences, through the conceptual growth coming from of the negotiation of meanings, of sharing multiple perspectives and of the modification of the students' own representations.

The UAPA alone constitutes a whole (thematic unit) that due to its conception and structure can be used, reused or serve as a reference during different moments of the teaching-learning process. Therefore, the narrative of each UAPA must be taken care of, so that the discourse in it is sufficient for the achievement of the proposed learning, and, in addition, does not depend on other UAPA.

The base structure of UAPA includes: objective, content, activities, evaluation and information sources.

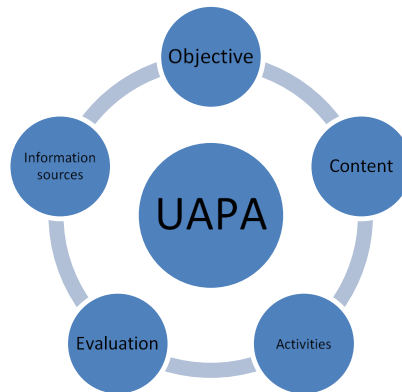


Figure 1. UAPA base structure

## The Meso level

At the Meso level, the construction of educational events (course, subject, module) with UAPA is considered. Each thematic unit or group of themes of the unit addresses didactic sequences with the components defined according to the pedagogical approach. Each event may consider in its design the inclusion of own and external resources obtained from various electronic sites or institutional repositories (CUAED, 2016).

These events and the UAPA that derive from it must be constructed according to the following characteristics for pedagogical aspects and style correction:

- Instructional design focused on the construction of self-contained thematic units (Support Units for Learning – UAPA) with the possibility of interoperability between courses and platforms.
- Design of activities and content management based on: native LMS resources; template multimedia resources; and downloadable resources (PDFs, etc.)
- Creation of a style sheet that gives uniformity to the criteria: verbal person, bibliographical references, learning objectives, etc.
- Spelling, writing and style revision, emphasizing aspects such as uniformity and proper use of language.

For graphic and integration aspects the UAPA must consider:

- Visual design and integration of activities and contents based on multimedia resources of template, native of the LMS and downloadable (PDFs, DOCs, etc.)

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- Visual design and integration of custom graphic interface in HTML5 with a structure that allows the independence of the contents with respect to the platform (it allows the migration of courses to other platforms or media without the alteration of the design or content)
- Design of institutional identity iconography applied in contents.
- Inclusion of a template multimedia resource by topic.
- Content development in HTML5 oriented to the SCORM standard.

## **The Macro level**

This is where the repositories of resources are located, which serve to disseminate and disseminate knowledge that supports learning. Information technologies perform a fundamental support function as a support for the processes of exchange of ideas through the repository, but reality shows that the key for the repository to achieve its objectives are the people (Cabrera & Rincón, 2001). Hence, it is necessary for resources to have a metadata schema that gives UAPA visibility and makes them searchable for potential users, inside and outside of the UNAM. With this, the reasons for developing and maintaining open repositories of resources exposed by Matking (2010):

- to offer a public service adhered to the universities tradition of universality in education;
- to allow the display of institutional programs; to draw the interest of possible applicants;
- to share and reuse educational resources; to publish research conducted within the institution;
- to attract new sources of financing;
- to support current students' learning; to train and develop the institution's staff;
- to promote the use of educational resources from other institutions; to actively participate in the global community.

The main repository that organizes and catalogues UAPA and other open resources is UNAM-RETo (Educational Resources for All). UNAM-RETo is a platform whose objective is to organize, archive, preserve and disseminate all the digital content developed by the Coordination of Open University and Distance Education, CUAED, together with entities and dependencies of the UNAM. UNAM-RETo catalogues and organizes UAPA and other educational resources from different sources such as the Virtual Environment of Languages (AVI for its acronym in Spanish); English Media; Math Media; Spanish Media; Reposital; and Media Campus; among others. It is intended that UNAM-RETo be a repository that has visibility in other institutional repositories of the UNAM and that at the same time be the reference of the search of online didactic material for the Open University System and Distance Education (SUAYED for its initials in Spanish) of the UNAM.

## **Conclusion**

The UAPA are an alternative for the efforts in the creation of open content (accessible from any device) by educational institutions, be valuable inside and outside your organization.

The cultural wealth of the University must be open to society and must also support the individual in their individual and group learning events.

The layout of the UAPA as individual study elements, as part of a course, and as items of institutional repositories visible thanks to the metadata, makes the UAPA a very useful development and allows us to visualize new ways of approaching learning to more people.

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## **INTERNATIONAL COLLABORATIONS IN BLENDED LEARNING: A DOUBLE DEGREE MODEL**

*Charles Krusekopf, Royal Roads University, Victoria, BC, Canada*

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### **Abstract**

This poster presents a unique Double (Dual) Degree agreement that was established in 2016 between Royal Roads University (RRU) in Canada and the Management Centre Innsbruck (MCI) in Austria. The Double Degree includes the Master of Global Management (MGM) at RRU and the MBA in International Business at MCI. Both programs are offered in a cohort based, blended learning format that includes short residencies and online courses. The Double Degree was created to allow mid-career, blended learning students to build international competencies and networks, while continuing to work full-time. Mid-career students have traditionally had limited opportunities to participate in an international Double Degree program due to work and family constraints. The pairing of the two blended programs created an opportunity for cross-cultural and international learning among a traditionally overlooked population. The poster will highlight the program's academic and business models, lessons learned during program development and implementation, and key issues for consideration by other institutions considering the development of online or blended Double Degree programs.

### **RRU-MCI Blended Format Double Degree Development**

In the field of online education, blended learning has been recognized as a preferred format for both teaching and learning. Blended learning allows students to build networks and bonds that substantially enhance the overall learning experience. Many students in blended programs are working while they study, allowing them to apply their learning immediately and to bring real world experiences directly to classroom discussions and exercises. Companies and organizations have highlighted the important skills students can gain through blended learning with an international element. Both multinational enterprises and small firms often operate in a cross-national or global context, and require collaboration and teamwork across multiple countries in both online and face to face formats. Employees and leaders within these organizations need the skills to navigate cross-cultural and global management competencies in both the online world and on site engagements. Few university academic programs, however, incorporate this range of interactions within courses and activities.

Double Degree programs represent collaborations between two universities to allow students to complete two separate degree programs with some coordination or mutual recognition of courses between the two institutions. International Double Degree collaborations allow students to study at institutions located in different countries, creating opportunities for cross-

cultural exchanges and new learning approaches. Royal Roads University (RRU) and Management Centre Innsbruck (MCI) began actively working together on the development of a Double Degree program in spring 2015. The Double Degree program received final university approval from both schools in spring 2016, and the first student exchanges occurred in September 2016 when three RRU MGM students travelled to MCI and one MCI MBA student attended RRU. In fall 2017 five RRU students attended the MCI MBA program. In the future, it is expected that 3-5 students from each institution will take advantage of the Double Degree opportunity each year.

RRU and MCI have many similarities, with both being founded in 1995 with a mandate to focus on applied education. While RRU focused on blended learning from its founding in 1995, MCI primarily offered on campus learning and began developing its first blended learning program, an MBA in International Business, in 2014 through its Department of Executive Education. The process of program development was guided by both the experience of the program proponents and university guidelines. MCI had several Double Degree agreements in place for face to face programs, including master's level programs in business with the University of Omaha, USA and bachelor's arrangements in engineering with the Centria University of Applied Science in Finland. RRU previously had a Double Degree for its MGM program with the Munich University of Applied Science (MUAS). University guidelines stipulate that students need to complete at least two-thirds of the credit requirements for each program. This requirement ensures that students complete all the core program courses and requirements, using the courses taken with the other program to cover program elective course requirements. It also ensures that the Double Degree is not a 50% plus 50% arrangement, an important consideration to maintain program quality and integrity.

The program design holds true to the cohort model of each institution. Students complete all or almost all the courses at their home institution before starting classes at the partner institution. Both programs begin in fall with an on-campus program residency where students and faculty build close bonds through participation in active learning and team building exercises. The students then move into online courses taken with their cohort members, creating a learning commons that builds on their shared residency experience. MCI holds two, one-week long residencies plus online courses during the first year of the program, while RRU has one, two-week residency followed by 10 months of online courses. Students at both institutions then decide whether they will complete their home university program and graduate, or transfer to the partner university to start the Double Degree program.

Students who opt to complete the Double Degree transfer to the partner university after 12 months at their home school and participate in the first residency and the regular series of online courses at the partner school. Students are not required to take all program courses, in particular those with similar content, such as accounting and finance, which they take only with their home university. All Double Degree students complete a Major Research Project (MRP) overseen by an MCI faculty member. The full Double Degree program can be completed in 24 months, although some students may take longer depending mostly on the completion timing of their MRP.

## **Double Degree Benefits**

Several benefits for students, faculty and RRU and MCI as institutions have been identified through the development and implementation of the Double Degree program. First, the program offers an internationalization opportunity for blended degree students who are working full time. Given traditionally low participation rates in international education, especially among students in North America (Helms, 2014), a blended Double Degree opportunity expands the opportunity for a traditionally underserved group of students to gain international experience. Many traditional internationalization programs, such as a semester abroad at a partner university, are difficult for mid-career working professionals who cannot leave their jobs and families for extended periods of time. Working students might participate in a short study tour abroad, but such tours often involve only students from their home institution. The internationalization benefits extend beyond the individual participating in the Double Degree to all the students in the program because the students from the international partner school become regular members of the program cohort.

Second, the MGM-MBA Double Degree program exposes students to a new set of students and faculty from the partner university in both a face to face and online environment. Students build bonds working together in the residency, and carry over interactions online. Third, studies have shown that students gain both cross-cultural and other personal skills such as self-reliance through participation in a Double Degree program (Culver et al., 2012; Corno, Lal, & Hassouna, 2016). These skills are developed through cross-cultural interactions with students, faculty and staff at the partner university. Alumni of Double Degree programs report that they learn that people in other cultures approach problems in different ways, and understanding that multiple approaches and perspectives exist help students in both their academic and work environments (Culver et al., 2012). Double Degree students learn to navigate the systems and requirements of a new university in a foreign country. This experience forces students to encounter and navigate new systems and requirements, and experience that studies have shown enhances self-reliance and confidence among participants. This new confidence has been found to be the most important benefit that students gain through participation in a Double Degree program (Culver et al., 2012).

Fourth, students in Double Degree programs gain additional credentials and skills that support career development (Henard, Diamond, & Roseveare, 2012). The Double Degree opportunity expands course offerings and allows students to take courses not available at their home institutions. For example, MGM students are able to take advantage of MCI's strength and courses in entrepreneurship, while MCI students take advantage of RRU's focus and courses in the area of sustainability. These options allow students to gain new strengths and fields of focus.

Through its blended format, the RRU-MCI Double Degree Program is designed to meet a critical need for managers with cross-cultural and management skills that can be employed in both face to face and online settings. Firms operating in a global environment often rely on teams of people located in different parts of the world who may have met but interact primarily online. Studies have shown that issues related to *social distance*, such as the processes followed

and language and technology used to facilitate team interactions, often prevent online, international teams from operating effectively (Neeley, 2015). The MGM-MBA Double Degree program requires students to develop skills that support both online and face to face teams with a diverse range of participants from different countries and different industry sectors. The design of the program forces students to confront and manage issues related to social distance and effective inter-cultural interactions. These skills support long-term career and personal development.

In addition to the benefits that accrue to students, university faculty and programs benefit from the Double Degree program as well. For faculty, the Double Degree program creates new learning opportunities by helping to internationalize the student body, and offers the opportunity to teach at the partner university and explore new pedagogical approaches. The students who participated in the first exchanges under the Double Degree partnership in fall 2016 brought new perspectives on both course material and pedagogy to both RRU and MCI. Numerous discussions occurred between the international students and the faculty and students at the home universities about how teaching and program approaches differed between the two schools.

The Double Degree partnership also opened new teaching and exchange opportunities for faculty and staff. These teaching and exchange opportunities offer faculty and the opportunity to explore new online learning systems and methodologies. For example, RRU uses the Moodle platform, while MCI uses Sakai. Learning technologists from both institutions have the opportunity to explore technical and organizational aspects of course delivery. The pedagogical approaches also offer opportunities for mutual learning. MCI utilizes course Studypacks from GlobalNxt University, while RRU relies more on faculty developed content and course designs. The different technologies and learning approaches allow faculty and staff from both institutions to learn from one another and apply new knowledge and lessons to home institution approaches and courses.

From an institutional standpoint, the Double Degree partnership offers several advantages, including a benefit from recruiting new students, a potential wider pool of faculty and courses, and the potential to expand cooperation to new fields. Student recruitment is an important advantage of a Double Degree partnership, and includes the potential for new students from both the domestic market and the transfer students from the partner institution. The Double Degree opportunity can serve as a market differentiator for the programs involved, creating competitive advantage for the schools in a crowded marketplace. Both institutions prominently highlight the Double Degree partnership on their program websites, and the Double Degree is a key topic raised by prospective students at recruitment presentations.

The recruitment, collaboration and professional development aspects of the Double Degree support a strong business case for both institutions. While Double Degree students from the partner institution do not pay the same full tuition as a regular program student, recruitment and admissions are greatly simplified and no new courses to be created or taught. While the institutions bear the cost of program administration and oversight, in return they receive direct



benefits related to increased recruitment and tuition, and indirect benefits received by faculty, staff and students in terms of new learning and professional development opportunities.

### Double Degree Challenges

While the Double Degree arrangement offers many benefits, challenges exist. Substantial effort was required on the part of program faculty leads and staff in a variety of university departments to develop and implement the Double Degree program. The program has required continuing attention to advertise and explain it to both prospective and current students, and to deal with questions that have come up with regard to registration, payment and curriculum. One student from MCI who wanted to participate in the program was unable to obtain the required Canadian student visa in time to start the program and had to defer a year. In part these challenges occurred due to the fact that the program was new and had not been run before. Once the program is established and more experience is gained, better, more timely information and processes will help avoid such problems.

Questions have been raised about whether Double Degrees are worth the institutional time required given the small numbers of students who often participate in such programs (Hall, 2012). However, such programs can be an important incentive to attract the best students who are looking for international opportunities and challenges, and can serve as a way to energize faculty members who realize new opportunities for collaboration with the partner school. Individuals and institutions should not enter into the Double Degree process without a clear understanding of the time commitment involved, but if the potential partnership offers clear benefits for students, faculty, staff and the institution, the investment in time and resources can bring important benefits.

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## **STUDENT ACTIVE LEARNING IN NET BASED EDUCATION – EDUCATIONAL DEVELOPMENT IN TEACHING OF INFORMATION LITERACY**

*Anna Gahnberg, Sonja Fagerholm, Swedish National Defence University, Anna Lindh Library,  
Sweden*

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### **Introduction**

Developing information literacy is a matter of quality in higher education. Anna Lindh Library is a research library specializing in the fields of defence, international relations and security policy. The library is situated at the Swedish Defence University (SEDU) in Stockholm, Sweden.

During 2018 the library offers all information literacy education online via a web conferencing software. This poster describes what is behind the change and the pedagogical and technological advantages and challenges we have identified so far.

### **Background**

SEDU is a young university, established as a national university in 2008, although its roots can be traced back to the establishment of the Artillery College at Marieberg in Stockholm in the 19<sup>th</sup> century. SEDU is also a small school with in total 825 civilian and military students (full-time equivalents) in 2017.

Information literacy training is provided by the library to both civilian and military educational programmes at SEDU. Teaching at the library is run by a group of four librarians and two educational technologists. The library has a pedagogical view based on student-active learning and has for several years conducted teaching in the form of lectures and search exercises in classrooms. The transformation to online teaching has a number of reasons and here are some:

- The number of students is expected to grow with 30% within the next two years. Classes will be larger and there is a scarcity of physical classrooms on the horizon.
- Military contract education students, who are adults and often have families, have expressed wishes for more flexible learning (in terms of time and space).
- The Swedish University Computer Network (SUNET) provides infrastructure and software services such as the web conferencing software Adobe Connect, hence SEDU has adequate technological environment.

There is a reluctance among some teachers to use technological tools similar to what Capogna (2012) describes in Italian universities, although at SEDU they represent a much smaller group.

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Therefore, we believe it suitable for the library, where the educational technologists are situated, to take a lead to address the digital transformation

This will require other teaching methods, and the library now sees the need for educational development and to raise skills to use tools that support flexible learning.



Figure 1. Photography of the library by Rickard Kilström

### Technological tools

According to Hrastinski (2013) technology, if properly used, can increase learning opportunities. We also believe that online education can be a solution when the student groups grow. It enables remote teaching and it is in close proximity to the platforms and databases used in today's information search.

As a first step in the transition to net based education, we have used the web conferencing software Adobe Connect to carry out the teaching.

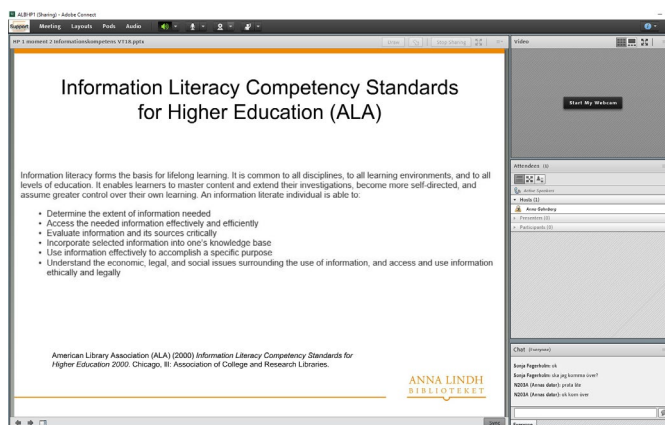


Figure 2. Screen shot from an Adobe Connect meeting room.

The teaching has been scheduled, it is synchronous, and we have designed it with search exercises, conducted individually or in groups to stimulate student active learning. In Adobe Connect, the class at times has been divided into breakout rooms and the librarian has been able to follow the students' work by moving between these groups. "Synchronous use like this,

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may have social advantages when the students may interact with the teacher and each other, they may also discuss and comment assignments and questions before presenting them” (Biggs & Tang, 2011; p.71).

As a complement to the teaching, we have also used learning objects in the form of video clips that we created with the video editing software Camtasia.

In addition to Adobe Connect, the school’s LMS (learning management system) has been used as a communication platform with the students. All school courses have their own area in LMS and this is where we have distributed our teaching materials. The LMS also has a function with discussion forums that have been used. “Asynchronous use has been said to be particularly valuable in off-campus teaching and brings flexibility to attend for the participants” (Biggs & Tang, 2011; p.71).

### **Evaluations**

The transition to a net based approach is followed up and evaluated by the librarians and the educational technologists through reflections posted in a WordPress blog. Students participating in the teaching also submit an evaluation after each occasion, by answering a questionnaire in LMS.

On occasions when the military or civilian course teacher has attended the library web conference, we have noticed a positive effect on student participation. We consider the collaboration between the library and the course teacher to be crucial for the information literacy training, weather it is conducted in a physical classroom or online.

### **Conclusions**

One of the challenges of applying net based learning to information literacy instruction is that the students are not familiar to the technique yet. Another challenge is that librarians do not meet the same students over a longer period of time, or not even when they need the instruction the most. Therefore, the combination of scheduled synchronous instruction and asynchronous communication through chat will possibly turn out to be the most successful.

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## **ONLINE INDUCTION TO SUPPORT TRANSITION TO TAUGHT POSTGRADUATE STUDY**

*Megan Kime, University of Leeds, United Kingdom*

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### **Summary**

This poster presentation will explore how online resources can be used to support students through the transition to taught postgraduate study. It will showcase an online induction course – Pathways to Success – developed to prepare students for study on online distance learning (ODL) Masters degree programmes at the University of Leeds; and discuss work currently ongoing to develop the course so that it can support a wider cohort of PGT students at the University.

### **Introduction and Overview**

The transition to taught postgraduate study can be a challenging one for students from all backgrounds. It involves stepping up to a higher level of academic practice, and for many students, operating within an unfamiliar academic culture, whether because they are returning to formal education after a break, or are new to study at a UK higher education institution (HEI). Added to this, the study period for taught postgraduates is accelerated, with less time to acclimatise and settle in that in a traditional 3-year undergraduate degree. This presentation will introduce an ongoing project at the University of Leeds to develop online resources to support students through their induction and transition to taught postgraduate study.

The first phase of the project was to develop an induction course – Pathways to Success (P2S) – for taught postgraduate students beginning ODL degree programmes at the University of Leeds. P2S has been built and will be piloted with a small cohort of student in April 2018. Following evaluation of this pilot, the course will be made available for students on a number of ODL programmes at the University of Leeds for the September 2018 intake. The second phase will be to pilot a version of P2S for a wider cohort of PGT students coming onto campus-based programmes.

This poster presentation will explore the challenges, both technical and content-related, associated with developing resources that are sufficiently targeted to particular cohorts to be relevant, whilst at the same time sufficiently generic to enable re-use across a range of contexts. Evaluation of Phase 1 is ongoing, and initial student feedback will be presented here, along with plans for future evaluation and the development of Phase 2.

## **Phase 1: Pathways to Success for ODL students**

Starting in December 2016, the project leader has worked with relevant stakeholders within the University to design and develop an online induction course to support students through the transition to online study at Masters level. The induction course has initially been designed with an international, professional student audience in mind. Students on the ODL programmes at the University of Leeds included in this project will be studying part-time whilst working as part of their continuing professional development (CPD), and are likely to be returning to study after some time out of formal education. This group of students often have particular support needs stemming from the fact that they tend to be time-poor, since they are juggling study with their career and often with extensive personal commitments (King & Alperstein, 2015). As these students tend to be over 30, they are also more likely to have families and caring responsibilities (University of Leeds, 2015; Dabbagh, 2007).

Research indicates that an effective induction is crucial for ODL programmes (Forrester & Motteram, 2005; King & Alperstein, 2015; Simpson, 2002; Tait, 2000; Lehman & Conceicao, 2014; 2010). Simpson identifies four kinds of barriers to participation on ODL programmes: informational, institutional, situational and psycho-social. A successful induction will identify and overcome these barriers (Simpson, 2002). The induction should provide the student with motivation to study; an introduction to the online learning environment, and to the learning community; assess their readiness and provide solutions to potential barriers to participation; set expectations; and provide information on policies and procedures and how to access student support services (Forrester & Motteram, 2005; King & Alperstein, 2015; Tait, 2000; Lehman & Conceicao, 2014; 2010). Given the multiple important aims of an effective induction, there is a danger that an individual course tries to do too much and ends up not doing anything particularly effectively. P2S has therefore been designed as the first step in a longer process of transition and support for students. It focuses on the key information that needs to be transferred to the students before they start studying, and aims to begin the process of developing their study skills and preparedness for study.

P2S has been designed to help students begin to develop a sense of community in their cohort and feel part of the university. It includes information on programme administration and how to use the online library, and also includes dedicated activities to develop skills to become a successful Masters student, including critical thinking, academic integrity and intercultural learning. The course promotes principles of active and experiential learning. The content is led by student stories and interactive exercises with immediate feedback. The course is delivered in the University of Leeds Minerva VLE (Blackboard Learn). The course materials include a number of interactive online lessons developed using the Evolve authoring tool. Through engaging with the induction, the students will be introduced to the VLE, become familiarised with how content will be organised, and have a chance to practice with the various kinds of content and activity (King & Alperstein, 2015). Forrester and Motteram found that if students have trouble in their early encounters with the technology then they become frustrated which is a barrier to enthusiasm (Forrester & Motteram, 2005). The course provides low stakes opportunities for the students to practice using the learning tools (including asynchronous

discussion forum and synchronous web conferencing using Blackboard Collaborate) before they need to use them in their programme, and to predict common issues and provide troubleshooting advice.

As this is the first interaction with the VLE that students will have, it sets the tone and expectation for the rest of the programme (Lehman & Conceicao, 2010). It is important, therefore, that the induction course is experienced as welcoming and encouraging. Distance learners often struggle to feel a sense of community or connection with the institution, since they do not come to campus and therefore miss many of the usual community-building interactions such as welcome week activities. The course includes several video clips from university staff and students welcoming them to the University. It can be difficult to fully replicate informal social activities online, but throughout the course students are encouraged to take part in ice-breaker activities and discussions with their cohort. This is particularly important because students will be expected to work collaboratively with their cohort during the programme. The course includes guidance on the ground rules for interaction and expected social norms, as well as emphasis of the benefits of engagement and the purpose of interaction and collaboration, to try and overcome any sense that the students may have of the interactions being unimportant or a burden (Forrester & Motteram, 2005).

As outlined above, one potential barrier to participation in ODL programmes is informational. All students, whether ODL or on campus, need to understand the key administrative details of how their programme works, and know how to get help if they need it. But for distance learners the informational barrier can be higher, since it is harder for them to seek ad hoc help by going physically to an advice centre or student support office. It is therefore important that online students know who to contact if they need support, whether that be technical, academic or pastoral (Forrester & Motteram, 2005). Furthermore, online learners may need guidance as to when it is appropriate to seek support, since they may not know what level of support to expect (Moisey & Hughes, 2008). The course therefore includes introductions from key support staff and services and video case studies from students talking about the kind of support that they have accessed during their studies. Where possible support services have been represented by an individual to provide a human face to the service.

The pilot of P2S for the first phase will be evaluated via the analysis of student feedback collected via a course evaluation questionnaire at the end of the induction, followed up by a focus group with a small group of students. The questionnaire will consist of MCQ and survey questions, and responses will be anonymous. Focus groups will provide rich qualitative data which will be used to inform further evaluation of the course, and revision as appropriate. The questions for the focus group have been designed in accordance with the principles for good questions set out by Krueger and Casey and follow their suggested questioning route (Krueger & Casey, 2009).



## **Phase 2: Pathways to Success for language pre-sessional students**

From the outset an aim of this project has been to develop online resources which can be deployed to support a wider range of postgraduate students than those studying on an ODL programme. The second phase of the project is to extend P2S to a wider cohort of postgraduate students at the University of Leeds. This phase of the project will develop a pre-arrival induction course for students joining one of the University's pre-sessional language courses in June 2018. These students are coming to study campus-based programmes, and take pre-sessional language courses to improve their language skills before beginning their Masters programmes.

The immediate challenge presented by moving into this phase of the project is the need to meet the different needs of this cohort of students (Forrester & Motteram, 2005). Because the audience for the pre-sessional language programmes is different to the original target audience for P2S, consideration needs to be given to how to tailor the content to their particular needs. The original version of P2S encourages students to undertake a study skills audit at the start of the course, and then to spend some time on any skills that they feel they need support with before commencing their programme. We have designed the study skills aspect of the induction as self-directed (prompted by reflection on the skills audit) to enable students to focus their time on the areas most relevant to them. The aim is to begin from the outset encouraging the students to take responsibility for their own learning strategy, recognising that different learning styles are suited to different approaches (Lehman & Conceicao, 2014). By building in self-assessment and self-reflection we aim to encourage independence in the learner, backed up by support where needed (Moisey & Hughes, 2008).

However, it also important to provide clear expectations of what it is like to study at postgraduate level (King & Alperstein, 2015). Following advice from colleagues in the University's Language Centre and the International Student Office particular attention has been paid to inducting international students into the academic culture of UK higher education. This is backed up by research: "For some international students, the initial engagement in the UK higher education system can be challenging as they are grasping new concepts in a sometimes unfamiliar culture, and often studying with English as an additional language. Academic practices, such as academic writing, assessment and grading practices vary between different national education systems. In a diverse student group, some international students may have little or no prior experience of: academic writing and referencing; or critiquing work; or challenging received wisdom; or non-traditional assessment methods (e.g. reflective logs, group projects, portfolios)." (Juwah, 2010). Whilst the academic skills content already in P2S will be helpful here, the pre-sessional students may be a need additional guidance as to which particular areas they need more support in. Where students do not have prior experience of reflection and self-assessment, the approach in this course may prove problematic without additional support from a tutor. One important element in acculturation to UK higher education is setting clear expectations around academic integrity, to avoid problems with plagiarism later (King & Alperstein, 2015). P2S requires students to take the University's standard academic tutorial and test, and also includes a deeper treatment of the reasons for academic standards and referencing. The aim here is to make students feel part of an academic community and understand the

central important of academic integrity as a norm of that community, and understand the purpose of referencing in the collective research endeavour. However, research suggests that effective intervention to acculturate international students to UK standards of academic integrity requires a tailored interaction (such as submission of practice essay, feedback then one-on-one or small group discussion of that feedback, focusing on academic practice) (Higher Education Academy, 2014; Morris, 2010). For pre-sessional students, this will be delivered by tutors once they arrive on campus.

This second version of P2S will also be evaluated through a student feedback survey and student focus groups, as well as via focus groups with the Language Centre tutors delivering the campus-based sessions following the induction course.

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**Online Induction to Support Transition to Taught Postgraduate Study**

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## **AN INNOVATIVE TOOL TO ASSIST THE CREATION OF HIGH QUALITY OPEN, AND DISTANCE LEARNING COURSES – THE VIRTUAL TEACHERS TOOLBOX (VTT-BOX.EU)**

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### **Introduction**

Virtual Teachers' Toolbox (VTT-BOX.EU) aims to create a special virtual toolbox for teachers as a sophisticated tool for developing open, online, flexible and technology enhanced education, and learning (OOFAT). The project is a two-year project, during 2017-2019. The project aims to innovate OOFAT and to make learners more successful, and to take the responsibilities for their own learning (Gutierrez, 2014; Liang, Wang, & Hung, 2008). This will be achieved by an innovative, motivating self-evaluation method, and with an innovative and learner-centred pedagogical approach based on a pedagogical framework on self-directed learning (heutagogy) (Hase & Kenyon, 2000), and an all-encompassing quality enhancement framework (Kear et al., 2016), in line with the 21<sup>st</sup> century demand, and the UNESCO goals on education (SDG 4) (UNESCO, 2015a; 2015b). To achieve this, teachers will be supported in course creation by an innovative web-based toolbox (VTT-Box). This project uses a strategic cooperation between formal and non-formal/informal educational providers using Information and Communication Technology (ICT) based teaching and the enhancement of digital integration in learning. Accordingly, this will enhance teachers' professional development and support learners' acquisition of values, skills and competences. Additional, pilot courses as samples of proven praxis will be produced and be published as Open Educational Resources (OERs). The toolbox, will hence assists teachers/trainers in the course creation by offering a pedagogical framework with a special learner's view, a quality enhancement framework and a new self-evaluation technic, the so-called mandala evaluation. The project bundles the experience, competences, and knowledge of five institutions from different educational backgrounds and it consists strategic cooperation between formal and non-formal/informal educational providers.

The project objectives are:

- Practical implementation of pilot courses in OOFAT using an innovative learner-centred pedagogical approach (including a quality enhancement framework) and an innovative, motivating self-evaluation tool for learners (Mandala self-evaluation) to increase learners' learning success. Mandala self-evaluation is an innovative element in teaching.

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- Creation of a ready-to-use in-service and OOFAT training-course for teachers, to be developed as a Massive Open Online Course (MOOC). This course offers work methods and resources for all kinds of educators and offers a way for digitization of quality learning content and promotes the use of ICT as a driver for systemic change to increase the quality and relevance of education.
- The project supports teachers with a web-based service, which includes a tool to assist the course creation and the pedagogical framework; both of them are based on an innovative learner-centred approach (Hase & Kenyon, 2000). Moreover, it includes a quality enhancement framework (as described later). Implementation of learner-centred, problem-based, active and authentic learning through a multidisciplinary and an interdisciplinary approach are a crucial issue in this development. This is the main intellectual output, and it will be provided as an OER.
- A transferability and evaluation guide enable the transfer of the developed products to other educational sectors (Early Childhood Education, Primary Education, Adult Education, Higher Education).

### **Method**

The used methods for this project followed a classical way with systematic a literature reviews on current international research and trends within the areas of the scope of the project. In addition to that, learners' needs, according to the target groups will be identified, and analysed. Based on that, innovative pedagogical and quality frameworks will be developed.

### **Target groups**

The project's target groups are:

- teachers (School Education) teaching learners in the age of 13-19 years and
- learners, special focus on the age group of 15-19 years old;
- project results can even be used in Early Childhood Education (ECE), Primary Education (PrE), Adult Education (AE) and Higher Education (HE) as well, therefore trainers and educators in ECE, PrE, AE or HE are a secondary target group also. A transferability guide will provide the project's results for these groups.

### **Innovation implemented in the project**

The project is recently just started, October 2017, and in February the 2018, the first gathering for a teacher training course took place, hosted by the project coordinator. It was agreed to follow what was set up in the application, and at the first kick off in 2017, and to base the coming teacher training events, the courses, as well as the set up Massive Open Online Course (MOOC) on the following well recognized frameworks as for example:

- The UNESCO Sustainability goals (SDG 4) (UNESCO, 2015a; 2015b);
- Current trends related to the 21<sup>st</sup> century for teaching and learning (EC, 2017);

- Innovative pedagogical frameworks (Carrington, 2017; Inamourato dos Santos et al., 2016; Laurillard, 2012; Salmon, 2012);
- Quality enhancement framework (Kear et al., 2016; Ossiannilsson et al., 2015);
- Frameworks for open education (Inamourato dos Santos et al., 2016);
- Framework for DigCompEdu 2.0 (Redecker & Punie, 2017);
- The Mandala self-evaluation model (Mazohl, 2016, Mazohl et al., 2018).

The above-mentioned frameworks are well recognized and used in educational contexts. As they are well known and because the project is just recently started, they will not be elaborated further for this poster-submission to EDEN 2018. Instead just the Mandala self-evaluation will be explained somewhat more below as it has not yet been frequently published.

### **Mandala self-evaluation**

Mandala self-evaluation is a graphical-based method to prove the learners increasing competences and learning progress (Figure 1). This method of self-evaluation was developed by Peter Mazohl in 2016 (Mazohl et al., 2018) will be used and evaluated for the first time in this project. The method is a complete innovation, and it has not been published yet, but it is mentioned once one research paper by Rauchlechner (2016). However, it is further even developed by Mazohl et al. (2018).

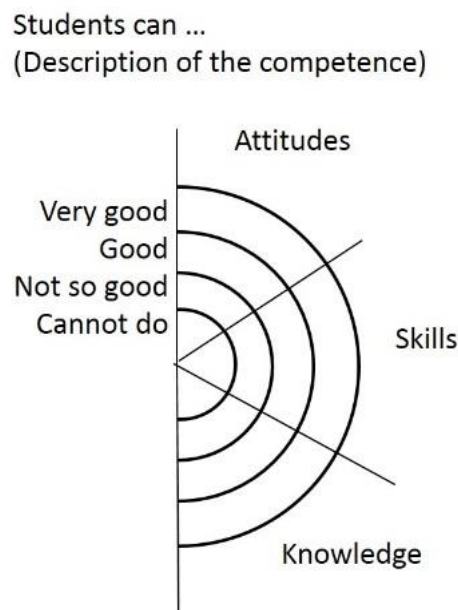


Figure 1. Patterns of a self-evaluation Mandala

The Mandala self-evaluation:

- gives learners the possibility to control and measure their learning results easily;
- proves the increase of competences (as foreseen in the European Community);
- motivates the learners;
- enables a visible and simple documentation for the learners (and teachers) of the competences increased by their learning.

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Strict definition of the competence-based learning (SchoolEducationHighway, 2014) outcomes created by the teachers are transformed in the Mandala self-evaluation in a graphical pattern where the learners can indicate graphically their current status of competences. After the learning process, the achievements are marked in the Mandala again. The difference before-after shows the success of the learning process at one glimpse. It also has a motivating impact on the learners because it's a success-based evaluation of their learning success.

### **Results**

The project has just started (October 2017), accordingly results are not obvious so far, (on the date of the submission for EDEN2018, however when the conference is in June 2018 we are about to have some more results to present).

The first signs already are however encouraging, and promising. In a first pilot environment, the developed Mandala self-evaluation was performed and evaluated (in a small case study). The sample group covered a high school class (24 learners at an age level of 16 years. The evaluation was done by a guided interview and focused on the feedback from the learners describing the acceptance and the usability of the Mandala self-evaluation. The feedback was positive, and the learners appreciated the quick visibility of learning success by comparing the two mandalas. This small case study will have an impact at the teaching training event for the VTT-Box Project held in February 2018. Teachers from 3 different European high schools (Italy, Spain, Austria), together with representative from the Swedish partner, the Association for Distance Education, who have member throughout the entire educational sector was trained at the teacher training event to use the method and to have the possibility to implement several pilot courses within their areas.

The development of the pedagogical framework is developed, (based on Poulakakis, Vassilakis, Kalogiannakis, & Panagiotakis, 2017), and will shortly be updated, after the partners' responses (teacher training event, week 6, 2018). The results have an emphasis on active, and personal learning methods, engagement of learners in group work, and the use of interactive multimedia materials. Moodle 3.4 (<https://moodle.org>) is foreseen as the learning platform for the development of the online distance learning course.

### **Discussion**

The use of the self-evaluation Mandalas is a promising step to better teaching, and to understand where learners are at. It forces the teacher to intensively consider and think strictly about the competences and includes even fun elements for learners in the teaching process. Young learners find it *playful* (feedback from the case study). With a well-fitting pattern (some kind of grid) the method is also applicable to Primary Education, Higher Education (Universities) and Adult Education. This must be topic of further studies.

There are no doubts that the use of multimedia is a promising way of teaching (Puentedura, 2006). Following the ideas of Bergmann et al. (2017) with the flipped classroom (Ossiannilsson, 2017), the concept of activating learners is integrated into the project. The idea is that learner

do not only watch a video or perform some interactive tasks, but they also learn something during the interaction. The open concept in teaching and learning is a promising strategy for the future (Inamourato dos Santos et al., 2016). Using open educational resources enables learners to select from a wide scope of educational offers and to decide on their own what they will use. This self-decision motivates learners in self-directed learning.

Most learners were motivated by the self-evaluation Mandalas and enjoyed seeing that they have increased their competences in each of the fields (knowledge, understanding, and skills, or in their behaviour). The problem in the project's context is to have motivated learners. Nevertheless, learners that are not motivated and cannot be motivated by their teachers will pass all the course offers without any advantage.

## **Conclusion**

Prensky (2001) argued that Digital Natives are using rapidly evolving technologies and display decreased tolerance for teacher-centred style. Learners like to use their technical devices in their learning (Mazohl, 2016). Teachers, instructors, and researchers are continually seeking for new methods and strategies to engage and motivate their learners (Jacobs & Alcock, 2017).

The current state of the project brings up the first positive results and offers a promising preview to the final products. The selection of the used elements in the pedagogical framework is currently finished and discussed; it showed up a practicable method for the teaching and the use in OOFAT courses.

Although the project targets distance learning the project shifts partly into blended learning with a specific focus on the distance learning part. Through this overlapping area it offers a high potential of transfer to blended learning. Traditional blended learning is considered to be learner-centred, offering flexibility, and ownership throughout the learning process. In short, the concept simply means the blend of virtual online digital media, training with traditional classroom methods, and face-to-face, instructor-led sessions (Ossiannilsson, 2017). In School Education (SE) learners are taking part in onsite teaching and can receive assignments which can be done in the frame of distance learning. This links partly to the ideas of Bergmann et al. (2017) and carries some characteristics of flipped learning. As all learners attend onsite teaching daily (in the classical brick-and-mortar environment), the typical parameters for blended learning are fulfilled. The project results, therefore, are also relevant to all kinds of blended learning. This will be a specific item in the foreseen transferability guide.

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## UNIVERSITY STUDENTS AS DIGITAL CONTENT CREATORS

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### **Introduction: Higher Education Repositories, Students and Digital Content**

The aim of this poster is to discuss the role of learner-produced digital content within higher education courses and the ability of higher education institution to scaffold such learner-generated outcomes in ways that enhance both learners' engagement and learners' education. To this purpose the poster offers a review of selected relevant literature as well as of relevant data from the University of Padova in order to discuss the core elements of a viable pilot project. The poster includes four sections:

- introduction, an overview of challenges and opportunities concerning learner-generated outcomes and related repositories;
- students as content creators at the University of Padova, a case-study;
- collaboration among creators, focusing on the opportunities offered by a cooperative learning approach;
- towards a pilot project, highlighting key issues for an action-research project design.

Connecting formal and informal learning enhances students' motivation and opportunities for collaboration. Specifically, it can be observed that informal learning that occurs in the context of participatory media offers opportunities for increasing student engagement in formal learning settings (Bull et al., 2008). Digital media provide a wide range of turning higher education content and competences into concrete outcomes with enhanced opportunities for shared reflective and transformative learning process. The Thoughtful Learning site lists 38 ways in which students can create digital content. They range from recording a podcast to contribute to a blog to Design an info-graphic. The way such digital outcomes are produced, shared and reflected upon within higher education is strictly connected with the ability of higher education institutions to offer and manage accessible educational repositories. According to Lynch (2003): "a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. While operational responsibility for these services may reasonably be situated in different organizational units at different universities, an effective institutional repository of necessity represents a collaboration among librarians, information technologists, archives and records managers, faculty, and university administrators and policymakers". In addressing why Open

Educational Resources Repositories Fail, Clements (2016) stresses that most repositories measure success with contents' and users' growth, which alone do not address the interactions that take place in these repositories. She recommends to use qualitative analyse to complement quantitative measuring of repositories' quality and specifically to focus on monitoring stakeholders' expectations. Santos-Hermosa, Ferran-Ferrer, and Abadal (2017) support the claim for Repositories of Open Educational Resources (ROER). They observe that OER-exclusive repositories lead to better reuse and educational outcomes than hybrids and that most of the Creative Commons licenses used in ROER allowed reuse.

## **Students as Digital Content Creators at the University of Padova**

In January 2017 the University of Padova began to use the Kaltura platform as a repository for digital contents. It was introduced to teachers through a workshop involving Moodle experts and by making available an online tutorial. A total of 55 teachers were involved in 5 workshops implemented between February and July 2017. Further information was spread through e-mail and Moodle platforms to the whole of faculty members. Using the Kaltura open source multimedia platform students and teachers had the possibility to share, to produce and to collaborate around multimedia digital content. During the 2017-2018 academic year, different outcomes were uploaded in the Kaltura platform. They include six main categories:

- video presentations;
- interviews;
- small documentaries and photo-reportages;
- video demonstrations;
- podcasts;
- motion graphics videos.

According to the students this led to cooperative work, engagement, research of creative solutions. Usually these outcomes were of low quality. We can identify some reasons as that we can encounter:

- Both, teachers and students have, in average, a low level of digital skills.
- Not knowing the amount of technical and practical work, it was difficult to plan the outcome efficiently.
- Both teachers and students lack technical instruments.

## **Collaboration among Creators**

In addressing ways to turn cognitive surplus into social capital, Shirky (2010; pp.171-175) identifies four categories (or spheres) that can draw additional value from digital online activities: personal, communal, public, and civic forms of human collaboration. Cooperative learning offers specific instructional opportunities to enhance such collaborative efforts. In order to improve both the quality of the students' outcomes in relation to digital content creation and their ability for peer-to-peer cooperation at the University of Padova, it is envisaged that during the 2017-2018 a pilot project should be implemented. Within this pilot project, instructors provide guidelines for group formation and open a space in the virtual

## **University Students as Digital Content Creators**

*Marco Toffanin, Alessio Surian*

classroom for this purpose. The choice of topic and type of content design should be the decision of each group. Groups are encouraged to discuss and to implement significant research before consensus is reached, in order to increase their sense of ownership of the project.

Based on previous studies Brindley, Walti, and Blaschke (2009) suggest seven main instructional strategies that seems relevant within the above mentioned pilot project framework in order to improve the quality of group collaboration and to support and enhance student participation. They include: (a) Facilitate learner readiness for group work and provide scaffolding to build skills especially by sequencing activities within the course that build on previously learned skills; (b) Establish a healthy balance between structure (clarity of task) and learner autonomy (flexibility of task) by encouraging learners to form their own groups and select their own topics in order to facilitate socializing within groups and positive group dynamics. This is based on the idea that when students have personal control over the task, this has a positive impact upon their engagement as well as on the sense of relevance that the task acquires for them. (c) Nurture the establishment of learner relationships and sense of community by facilitating students' work in small group through scaffolding the way students develop relationships with their peers early. (d) Monitor group activities actively and closely by being available for feedback, general information, and private counsel. (e) Ensuring that the group task is relevant for the learner by letting them define the topic and process design in accordance with Curtis and Lawson's (2001) finding that the more interested a student is in a group topic, the more motivated the student is in participating in the collaborative effort. (f) Favour tasks that are best performed by a group as engaging in tasks that benefit from teamwork is actually increasing the sense of purposefulness and motivation to participate. (g) Provide sufficient time, including time for re-scheduling, planning, and organizing as well as for the discussion and exchange of ideas that are instrumental to deeper learning. Throughout the process, adaptivity is of great importance to maintain the attention of both underachievers and overachievers (Shute & Zapata-Rivera, 2011)

### **Towards the 2018-2019 pilot project**

Kearney (2011) argues that a current challenge facing higher education teachers concerns how to formalize pedagogical frameworks to leverage worthwhile outcomes across complex online digital environment and open-ended collaborative learning tasks. As mentioned, presently, both teachers and students at the University of Padova report a lack in terms of digital soft skills. During the academic year 2018-2019 we intend to offer them a joint training and action-research framework. This is intended to enable both students and teachers to attend technical workshops based on a cooperative learning approach before and/or during their courses. The workshops aim at developing the digital soft skills needed to produce a valuable outcome that can be spread and shared through institutional repositories. For example, a workshop based on guidelines on how to record a video interview could lead to the production of different interviews based on a topic chosen by the students themselves. A further example: a workshop on how to produce info-graphics as survey outcome or research outcome, based on type of studies that have been introduced during the course. This could lead to have visual results that are useful in summarizing data and in identifying relevant information. This kind of workshops

would encourage engagement and cooperative work and should provide students with core skills that can be useful for future academic and professional tasks as well. The University of Padova staff involved in the project intends to design an action-research framework that should allow a relevant analysis of the workshops' process and outcomes based on the combination of three main types of data: students' and teachers' opinions and ideas as outlined through focus group, students' and teachers' surveys, and the analysis of the quality of the contents developed by students through their groupwork.

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## **EFFICIENCY OF THE COMPUTER AIDED EDUCATION IN BASIC STATISTICS COURSE**

*Anita Csesznák, Réka Szobonya, Budapest Business School, Hungary*

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### **Introduction**

At the Budapest Business School – now a university, formerly a college – from the academic year of 2013/14 we gradually started to teach the subjects Statistics I. on computers. First we introduced this method for Master’s degree courses, then we gradually changed the education of Bachelor’s degree classes as well.

To facilitate the theoretical knowledge of the students and to create the technical background, the teachers of the university published a new textbook and a series of examples for Statistics I. in 2013; for Statistics I.-II., an electronic curriculum was prepared in 2014, which includes audio material, exercises and test questions.

Although the curriculum and the methods have changed, the number of practical lessons remained unchanged. During the semester, the change in computer capacities made it possible in the seminars to solve more and more examples using Microsoft Office Excel instead of the traditional paper and calculator.

Today’s students basically “grew up with electronic devices in their hands” and learn statistics after completing Computer Science, so we can assume that using the computer does not cause any problems for them. Our study reveals how the acceptance and effectiveness of computer usage was developed at various faculties.

The technical change in the curriculum and education led to the transformation of the conduct of the examination. Students enrolled in computer education give an account of their theoretical knowledge through an electronic system, where teachers have compiled a questionnaire of approximately 1,000 questions. To implement the example solutions, we created paper based tutorials and prepared Excel files. The computing technicians of the university prepare the security coding for the tests.

We introduce you how on our B.Sc. course with the largest number of students the efficiency changed as the time progressed, and how much it influenced the drop-out-rate.

### **Full time training**

The majority of students in the undergraduate classes attend a full time course, where they must complete several basic classes, including Statistics I. During the period under review (between



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the first semester of 2011/12 and the second semester of 2016/17), we investigated the students' performance in the subject Statistics I. in the autumn semesters.

Nearly 80-90% of the students wrote both mid-year closed exams, which are opportunities to get a practical mark for a semester, but only three quarters of them, or even fewer, completed this task in the second semesters of 2014/15 and 2015/16.

In the first three academic years, other data were available for full-time students (e.g. sex, age, type of secondary school, maturity subjects, levels and their results, whether they took intermediate or advanced exams, language skills (number of languages, language exams degree)), but in many cases the three databases cannot be compared as the criteria of the students are not the same for each period. Taking into consideration not only the information of the students' performance of the subjects, but also other factors, we divided them into clusters in our previous studies (1) as follows (Figure 1):

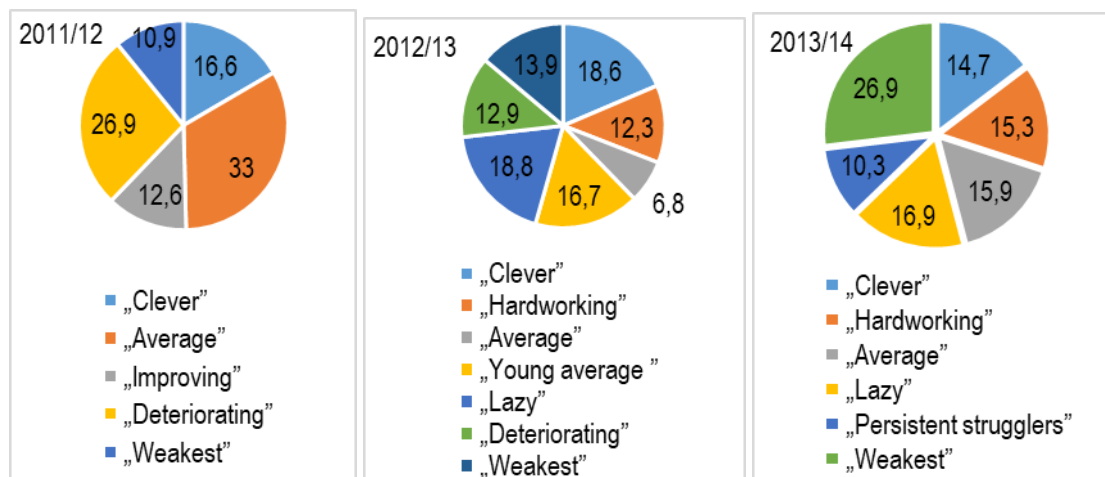


Figure 1. Distribution of full-time students of the subject Statistics I. at the closed exams in 2011/12, 2012/13 and 2013/14  
II. terms, percentage (%);

Own editing, source: (Ország & Szobonya, 2012; Ország & Szobonya, 2013; Szobonya & Ország, 2014)

Seeing the data on the first two graphs, the students were still studying the subject on paper. In the 2013/14 academic year, they studied every two weeks in computer rooms and in the tests the interpretations of Excel outputs appeared. However, there are relatively slight differences in the results.

The group called *Clever* – in all cases below 20% – are those students who have done well in high school and have the best marks at the Statistics I. course. One, and perhaps the most important feature of these students is the advanced maturity exam in Mathematics and its effect, which seems to improve their performance in Statistics I. The least performing, the weakest or worsening, is about 30 percent.

From the last full semester without using computers (2012/13 II.) to the last exam period, when students are fully trained in the computer environment and give their knowledge of the subject not on paper sheets, we have seen the following results.

In B.Sc. education, only a few over half of the students completed the subject Statistics I. successfully. The introduction of the computer educational system was a progressively method, so those students who have not succeeded in Statistics I. formed a special course and they continued to study in the original way, on paper and with a calculator, with exams in a large classroom. Probably this also contributed to the fact that their effectiveness was lagging behind their mates'. The *separation* of the non-accomplished ones was later abolished, and the regular courses included those who were already repeating the subject. As a consequence, repeaters can *distract* the performance of students arriving as first graders of the sample curriculum. The non-successful performance of the second semester of 2014/15. is also due to the fact that the new computer-based environment *paralyzed* the students, according to a number of students, and the Excel program was frustrating.

The Statistics I. course ends with a practical mark that students can complete by passing two exams at the end of the study period. Continuous learning and practice are essential to successfully finish the subject.

In the *weak* semester mentioned above, students did not only have a low accomplishment, but the results were lagging behind the other examined semesters: there were fewer of better and more of worse grades.

If someone has failed during the study period, there is a possibility of correction in the exam period. Since Statistics II is based on Statistics I., at the beginning of the next semester students have a final opportunity to pass the subject in the exam course. Figure 2 shows how this has been achieved in the examined semesters.

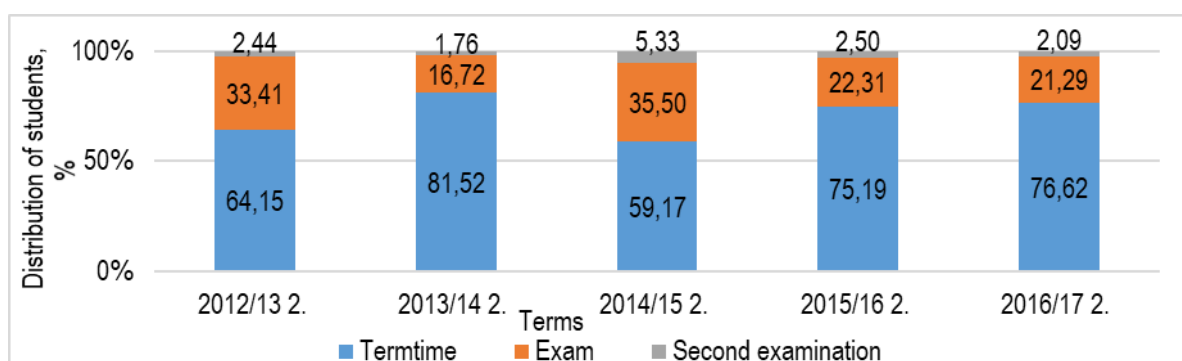


Figure 2. Distribution of full-time students by the period of accomplishing Statistics I. in 2012/13 – 2016/17

II. terms, percentage (%);  
Own editing, source: BGE Neptun system

In the spring semester of 2014/15, the smallest part of the students completed the subject during the study period. This can be traced back to the above-mentioned reasons – many subject repeaters and high recruitment rates. Problem-solving on a computer is faster, and even in large

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computer rooms (30-40 people) there is more chance to help a student, and it is more likely for the members of the course to ask the teacher when problems occur. In the last two examined semesters of the study, a mark from the closed exams during the study period was accomplished for more than three quarters of the students. Permanent practice and preparation provide more thorough learning and understanding, than preparing fast for only the tests. This is also reflected by the fact that the results achieved during the exam period and the exam course are significantly weaker than the marks obtained during the study period.

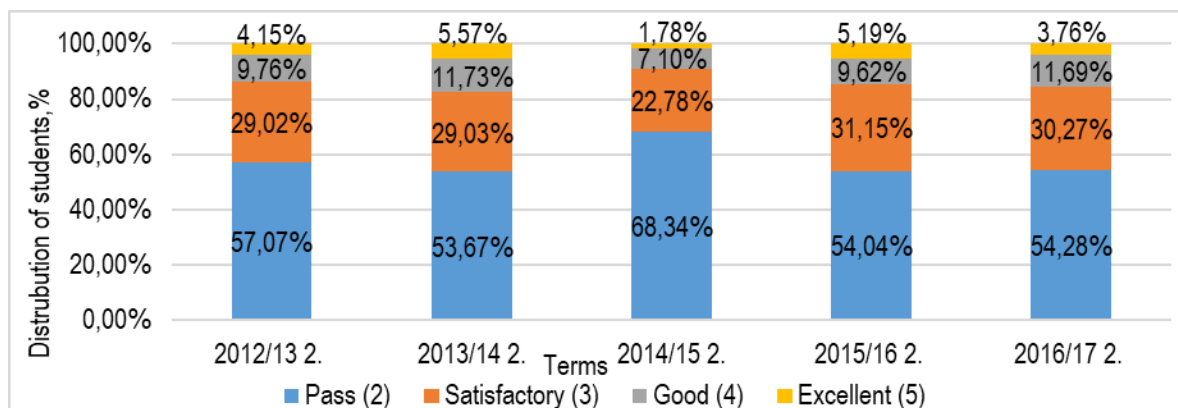


Figure 3. Rate of students performing the Statistics I. course by final result, full-time course, in 2012/13 – 2016/17

II. terms, percentage (%);

Own editing, source: BGE Neptun system

Students are most likely to close the subject with a sufficient grade (Pass). With a teacher's eye is only for *letting go* of the subject and picking up the next, which is based on it. On average, more than 95% of the applicants appear in the second exam course, not many retreat; but not a very large proportion of students succeed. This probably supports the fact that attending classes, continuous studying, teachers' answers at classes will further deepen the knowledge and provide better preparation for the challenge.

## Distance learning course

Many people want to get a university degree while working, so it is necessary to set up correspondence courses and distance learning.

Changes were also made in the distance learning training in Statistics I. and II. courses. "The credit value of the subject rose from three to four as a result of introducing education with Excel. The number of contact hours remained 16 (4x4), the distribution of which consisted of 12 seminars in classrooms and 4 hours in computer rooms in the 2013/14 academic year. From the school year of 2014/15. we have also introduced computer-aided education for distance learning. All 16 contact hours are in the computer rooms, and we solve the exercises with Excel."

Distance learning consultations provide students the opportunity to help home learning through explanations given in the institution, but attending the classes is not obligatory. Distance education is basically designed for working adults. We have assumed that many people are working with computers, and therefore Excel-supported task solution will cause few

problems. However, compared to full-time students, we have experienced even greater differences in these skills and abilities. Figure 4 shows the efficiency of Statistics I. in the period under review.

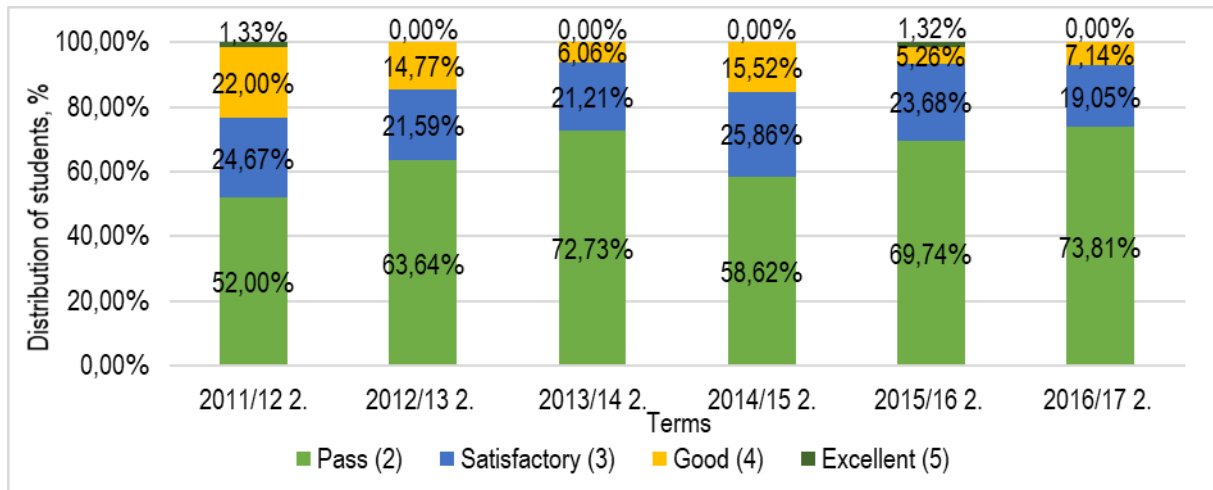


Figure 4. Distribution of students performing the Statistics I. course by final result, distant learning course in 2012/13 – 2016/17. II. terms; Own editing, source: BGE Neptun system

In 2013/14 – the first semester using Excel – the proportion of students completing the subject dropped dramatically, and the frequency of fails increased compared to the previous semesters. The proportion of those who succeeded in distance learning courses on paper-based exams was higher than in daytime training; computer education and examination turned this situation back. This might be due to the fact that it is easier to learn the curriculum on paper on the basis of the given sample tasks, even if the student has no way of participating in the contact lessons.

## Conclusion

Failures and drop-outs could be avoided if only those students would get admission to the university who really have interest in the subjects, and have some related experience. During the university admission, the scores of the best maturity exams – with most points – are taken into account but in many cases, mathematics is not included in this selection. There is no strict required mathematical knowledge. As a result, many students do not have the basic knowledge for Mathematics I before Statistics I, and the later subjects based on them, and without the adequate bases failure only accumulates.

There are also major shortcomings in the field of computer science, which, if they arise, distract students from solving real statistical problems. It would be important to strengthen digital competences in public education with greater emphasis.

In the labour market, there is an increasing demand for employees who are strong at analysing the data independently. One of our aims is to help students, but as long as the knowledge and competence needed to master the tertiary level of learning is lacking in the majority of students, this is a very difficult task.

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## **THE FIGURE OF THE TUTOR IN THE BA SDE ON LINE: AN EXPLORATIVE SURVEY ON THE VISION AND PERCEPTION OF STUDENTS**

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### **Introduction**

In the academic year 2015/16 the Department of Educational Sciences of the University of Roma Tre, started a Distance Learning channel for the Bachelor Degree in Educational Sciences.

According to the e-learning formula already tested in the Department through the FaD experience, we provide text and multimedia didactic materials but also spaces for practice, interaction and verification. This solution also allows those who, for various reasons, have objective difficulties in attending the activities in presence and to join the class.

The teaching activities are offered, organized and managed through a Moodle platform while the exams are held in Rome. All final tests are written and are carried out on enabled PCs at the Piazza Telematic, which contains a total of 75 devices.

As the first students will be ready to discuss their theses at the end of this semester, we have decided to evaluate their satisfaction and opinions, with particular reference to the e-tutor.

The tutor is a supplementary figure when compared to the conventional degree courses, which aims, in this specific experience, is not only to help the teacher but also and especially to students, with the aim of building communication networks between the structure that organizes the course, the teachers who propose study materials and educational activities and the students who benefit from all the possibilities of study and interaction offered by an online learning environment (Domenici, 2017).

The e-tutor's competences can be many. It is not always clear, both to students and teachers, whether the tutor should have teaching and disciplinary functions or whether one should only be concerned about the organisational and management aspect of the activities. The two roles, depending on the contexts, could converge into a single figure who takes care of the entire training path: from the provision of content to technical, didactic and disciplinary support, to the supervision and management of group communication activities.

## **The Figure of the Tutor in the BA SDE on Line: An Explorative Survey on the Vision and Perception of Students**

*Beatrice Partouche, Sebastina Sabrina Trasolini*

### **Study context**

In the first year of activity, there were 10 tutors involved in the SDE on-line project, whose main task was to follow and support only the first year' teachings, which amounted to 8 teachings distributed in this way:

- 3 in the first half (General Pedagogy, General Didactics and Informatics);
- 5 in the second semester (English, French, Contemporary History, General Psychology, History of Pedagogy).

In this first stage of experimentation of the distance teaching mode, the tutors were selected among the students of the Master's degree courses of the Department of Educational Sciences who answered for a call for candidates. They had the opportunity to work in couple, under a six-month contract, a total of 150 hours of work and a remuneration of EUR 1,000 each. The following year the same number of tutors with the same type of contract were in charge of managing the first year of the course, which was replicated for new enrolled students, and the second year of the course. In this second phase, the selected tutors had to work individually on the assigned courses. For many, the assignment was both a challenge and a great opportunity for vocational training on the field. In fact, no one had specific training nor significant experience in similar activities.

The first year of the Bachelor's degree course saw 48 students enrolled, of whom 32 attended and took exams regularly throughout the academic year. At the time of re-registration the following year:

- 4 students have given up their studies,
- 8 students did not renew their enrolment,
- 4 people have changed University or degree course.

In total, therefore, we lost 16 students, representing 33% of the total, which is not very different from that of the traditional BA, where the same year the lack of re-registration was 31%. The second year of activity was, in terms of the features of students and tutors, very similar to the first, while the third year of activity, which is still ongoing, is representing a new challenge.

The enrolled students number in the school year 2017/18 almost tripled, and students who requested a career abbreviation were admitted, i.e. students were admitted directly in both the second and third year.

### **Tutor selection and activities**

This year for the first time, the selection of tutors was limited to candidates who already hold a master's degree and had significant previous work experience. This allowed the participation of people from outside the Department and the professional profile of the tutors involved has changed, ensuring a greater ability to manage critical issues and less awe in the relationship with teachers, no longer being involved, themselves, in a teacher / student relationship.

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The first semester of the academic year 2017/18 the tutors were in total 5 with 12 teachings to follow and more than 130 students; the work was very demanding and it was considered necessary to activate 4 scholarships to support the activities of the second semester.

Undoubtedly, in the management of the forums, with so many more participants than in the past and with the need to work on several issues at the same time, much of the quality of the services offered to students has been lost both in terms of presence and quality of interaction. It should be noted that the new type of contract provides for a total of 100 to 250 working hours per year, depending on the tutor, for a gross wage of 20 euros per hour, which does not allow full-time engagement to this activity alone. At least three permanent full-time employees, each responsible for a course year, would be required, with part-time support in the scholarship formula used up to now.

The activities that the tutors have covered so far are:

- take care of the teaching homepages: deal with the general visual aspect, upload the programs, the covers of the scheduled books, hide and make visible the teaching materials according to the needs of the teachers;
- encourage and moderate discussions in educational forums;
- provide organisational information to both students and teachers;
- ensure physical presence during the examination days.

Obviously the tutor follows the teacher's indications and needs and acts according to the initial agreements and those made on each occasion.

Sometimes the tutor has the perception that the forum is too inactive and asks for the teacher's intervention. Sometimes the teacher relies on the tutor and delegates part or all of the management of the educational forums.

The percentage of active students in educational forums is not particularly high, often the participatory students are always the same. They usually respond to stimuli presented by the teacher or tutor, more rarely they take the initiative to ask questions or express uncertainties about the educational content, it is more frequent rather than ask questions of an organizational nature:

- confirmations on texts in schedule;
- exam management;
- news about the final evaluation.

When participation is made compulsory by the teacher through the proposal of activities evaluated or necessary for access to the exam booking, obviously the students respond to the requests.

We have noticed that students in difficulty often avoid asking questions in the forum and so far we have not entirely clear the reasons. We have made some hypotheses and we are waiting for



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the results of the questionnaire to have a more precise picture of the students' perception of the forums and their opinion on the function and usefulness of this tool.

We have noticed when in doubt students prefer to write private messages. This modality, even though it is provided in the Moodle functions, has always been discouraged. Generally, we address students to the teaching forum and/or the technical and secretarial forum, explaining that their question may be of collective interest and therefore we ask them to ask the question where everyone can read so that others can also benefit from the answers.

We have however noticed that participation is more active among students enrolled in the first year while in the second and third year of enrolment, it becomes rarer. Again, we do not know whether it is due to emotional/affective issues, opportunities and time or lack of incentives.

We have noticed that the active presence of the teacher encourages students to participate much more than the mere or prevailing presence of the tutor.

### **Methods of investigation**

We chose to invite students to answer a survey that would allow us to have a clearer view of the experience they are living and at the same time give us useful information to improve the service. The LimeSurvey program through the University of Roma Tre account was used to construct the questionnaire. The survey was sent to each student at the institutional e-mail address and published in the forum news of the technical assistance area, to which everyone has the compulsory subscription.

The answers are anonymous and it takes 5 to 10 minutes to answer the questions. Initially it was thought to encourage participation as a valid activity for the internal internship but we soon abandoned this idea because we would lose the participation of all students in the third year, and many of the second, who certainly have already completed the course of internal internship.

In addition, it would have been complicated to correctly attribute the activities to the students, since the participation is anonymous. The questionnaire consists of 26 items, some with multi-answer and some with free answers. We have created a section dedicated to the profiling of students, because we want to understand some of their features:

- place of residence;
- their age;
- if they have children;
- for what reason they have chosen distance learning.

We were interested in knowing if they live far from the University, if they are workers, if they have family duties, if they have interrupted their studies in the past and want to resume them or if they start a course of tertiary studies for the first time and what are the motivational factors that made them opt for a distance BA.

Let's assume that online SDE students are on average older than conventional BA students and that they are predominantly workers. We know that this didactic mode upsets the classic ways of living space, time and interpersonal relationships and that the student can have a feeling of *absence* as if he were entering an empty classroom. For this reason, one of the main objectives of the questionnaire was to allow us to know the students' perception of the two characteristics that are missing in frontal teaching: the figure of the tutor and the presence of exchange forums.

The next set of questions investigates the perception of the tutor's figure:

- whether it helps in the intermediation of the relationship between student and teacher,
- whether it encourages participation in the forums,
- whether it is a point of reference in the difficulties of access to the University services.

Also, we asked what they believe the role of the tutor should be and in what they found useful. The latter two questions required a spontaneous answer and not multiple choice. Finally, we ask whether they find it useful to have a teaching forum, whether and how often they access it, what the benefits are and whether they would be more motivated to participate in discussions if they knew that it has a bearing on the final evaluation. Our expectation, we will see from the results of the survey whether it is denied or not, is that the students enrolled in 2015/16 will be the most satisfied with the tutors and that they will give more positive feedback on their usefulness and the benefits they have enjoyed. While these perceptions will be opposite in the students enrolled in 2017/18. Instead, we expect newcomers to give positive feedback on the usefulness of forums as opposed to third year subscribers.

## **Analysis and findings**

The student sample covered by the analysis was composed as follows: 250 students, regardless of the year of enrolment. From the 48 questionnaires collected, the student's modal profile turned out to be: female (44 respondents), aged between 30 and 39 years (14 respondents); who resides in the same province as the University (Rome) (40); married (24); without children (30); from the socio-psycho-pedagogical High School (16); with the highest degree obtained only the High School diploma (33); registered in 2017/2018 (33).

Once the modal profile of the respondent had been created, the other questions focused on the motivation for students to enrol in a distance course rather than an in-presence course.

More than 60% of respondents (30 out of 48) indicated as the main motivation for enrolling in a distance course the desire to obtain a degree for both cultural and professional reasons; none of the respondents indicated the choice of the distance course as a stopgap for the lack of enrolment in one in attendance. 5 out of 48 students are convinced that they have chosen the distance course to complete a course of study they have undertaken previously.

Subsequently, 5 indicators were called up regarding the degree of importance for which the student has chosen distance mode:

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1. 50% of respondents (24 out of 47) indicated the distance between the place of study and residence as a reason discreetly/enough/very important for enrolling in a distance course, vice versa, the remaining respondents (23 out of 47) do not consider it a reason or do not consider it a reason at all important;
2. A predominant reason, with more than 85% of respondents (40 out of 47), was to have work commitments that do not allow the student to attend courses in attendance;
3. For 37 out of 47 respondents, family commitments are a discrete/enough/very important reason to enrol in a distance course while the remaining 11 do not consider it a reason or do not consider it a reason at all important;
4. The accessibility of the course at a distance compared to the one in presence is raised a reason discreetly / quite / very important for 25 respondents out of 47, vicesa 22 students do not consider it a reason or consider it a reason not important at all;
5. Most respondents (35 out of 47 respondents) consider access to educational resources and services much more direct than an in-presence course, while about 25% do not consider it a reason to enrol.

The following questions focused on the role of the tutor.

To the question “How relevant is the tutor in the relationship between teacher and student?” more than 70% of respondents (34 out of 47) indicated *very much* (10) and *enough* (24) as their response option; 13 respondents indicated *little* (9) and *not at all* (4) as their options. Respondents therefore clearly indicated the figure of the tutor as an influential figure in the relationship between student and teacher.

When accessing the University services, 34 respondents indicated that the tutor was a very important role for the services such as guidance, internship, lotus questions. On the contrary, only 13 out of 47 respondents consider this a figure that is not or not at all important.

To the question “Does the presence of a tutor encourage you to participate actively in forums?” 29 out of 47 respondents therefore about 60% think that Yes, the tutor figure encourages them to interact on the forum, whereas a percentage of more than 35% do NOT think it is an encouragement.

Subsequently, the survey, again in relation to the role of the tutor, tried to investigate what should really be the function of a tutor within a distance course and what was most useful to him in his learning process.

*Help, encouragement, guidance, student support* are among the functions that respondents believe are most important for this figure to have. Some also argue that it should be a support not only in the problems related to the platform or of technical origin, but that it should provide feedback and clarification on the individual issues in the teachings, in the explanation of texts and in the verification of material useful for the preparation of the exam.

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The usefulness of the tutor was found above all as a moderator in the communication with the teacher when there were communication problems, also with the secretariats. Many respondents also indicated that they had not yet had the need to seek the support and help of the tutor, and others confirmed that the role and function of the tutor is what they expected.

The usefulness of the forum, a container in which the tutor works, as a means of information exchange and a place of discussion, was also investigated.

The question “How often do you access the educational forum?” 35 out of 47 respondents consider the forum very/enough useful. 23 of the 47 respondents considered it useful for the presence of supplementary teaching materials and for the immediate clearing-up use. Only 3 out of 47 use it to interact with other students and about 30% think it useful for the possibility to consult whenever you want the exchanges that took place within it. 5 students out of 47 instead believe that the forum is a challenging activity that cannot actively access for work and study commitments, therefore considered an aggravation in the burden of commitment in which the course already commits them.

Therefore, to the question “Would you be more motivated to participate in the learning forum if you know that it has a positive influence on your final evaluation?” 28 out of 47 respondents replied that yes, they would participate more actively in the Forum if it had a positive influence on the final assessment of their learning pathway.

The last section of the questionnaire gives us an overview of the SDE online experience, with a set of questions on the appreciation of the training offer provided by the Department of Educational Sciences.

More than 75% of the responding students consider the SDE online educational offer to be positive. The reasons for this satisfaction lie in the clarity of the teaching materials, which are always available and interesting, in the freedom of study not bound by the classical academic structure, allowing even those who work or have a family to attend a study and learning path. The ease with which it is possible to interact with teachers, tutors and secretariats, without going physically to them, also allows for smoother and easier communication. The possibility of downloading the materials and always having them available is another positive element that the students tell us.

The degree of dissatisfaction is underlined by the lack of clarity in the way the internship is carried out, and on the information related to the writing of the thesis. Some people identify the lack of a sufficient number of dates to take all the exams, and the computerized mode (i.e. written on the computer) in which the exams are taken.

There are also complaints about the lack of organisation and clarity in the organisation of some courses, and the delay of some teachers in providing the requested answers. The *recycling* of the study materials proposed year after year is also a source of dissatisfaction.

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Nevertheless, the usability of materials, the distance mode, the tranquility of less restrictive, but more time diluted and suited to their personal commitments are among the expectations of those who have chosen this mode of study, unconventional.

For many students it was a positive experience, also because 29 out of 47 respondents consider the amount of workload appropriate for the duration of the course of study and almost 80% would enrol again in the same course at the same University against 13% who would choose another course but always at the University of Roma Tre. Distance learning is a choice that 34 out of 47 respondents would choose again. 6 out of 47 would have chosen it but with more activities in presence. 9% would opt for a conventional course, entirely in presence.

### **Conclusion**

In conclusion, in this first phase of the survey, which still lacks many answers, it is possible to draw up a satisfactory picture in which 36 out of 47 of the respondents to the questionnaire would be rewritten again to our course in Education Sciences with a mainly remote mode.

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## **BRIDGING THE GAP BETWEEN EDUCATION, TRAINING AND THE WORLD OF WORK THROUGH THE DC4JOBS PROJECT'S E- PLATFORM**

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### **Abstract**

The article focuses on the DC4JOBS project (Programme: Erasmus+, ref.no: 2017-1-DE04-KA205-01527), developed by partners from Cyprus, Germany, Latvia, the Netherlands, Spain and Romania. The DC4JOBS project targets young European students with ages ranging from 15 to 17 and creates materials promoting digital literacy among young people and fighting skills mismatches and young unemployment. The article gives insights into the project's research, which identified young people's digital needs and enabled project partners to create the e-learning materials which will facilitate students' integration into the world of work. The article also presents the project main outcomes meant to support young people to up-grade, up-skill or re-skill their digital competences in order to meet the needs of the labour market and bridge the gap between education, training and the world of work.

### **European context**

In all European countries, youth are a "key asset" (OECD, 2013). However, significant challenges have to be met in order to facilitate young people's transition from school to work as well as their successful integration into the world of work. All European countries have joined their efforts to reduce unemployment and raise young people's chances to access jobs by introducing a number of programmes meant to develop and improve young people's skills required on the market as the lower skills youth have, the higher risk of unemployment they face (OECD, 2015). Equipping young people with these skills enhances their opportunities to obtain a job in accordance with their qualifications and avoid any mismatching in this respect, thus contributing not only to their well-being but also to their country's economy (OECD, 2014). As repeatedly stated, young people's unemployment has dramatic effects on their life. Young people who are not involved in any systems (the so-called NEETs): education, employment or training, are at particularly higher risks (EC, 2016a). In its new Skills Agenda for Europe the European Commission asked all its member states to elaborate and implement national digital skills strategies and found national coalitions to support their implementation. Thus, at the European level the Digital Skills and Jobs Coalition mobilises its member states,

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companies, non-governmental organisations and education institutions to manage the existing digital skills gap in Europe and create a single digital market in Europe, which is based on a digitally skilled labour force and population.

### **The DC4JOBS project: objectives, partnership, target groups and main activities**

The year 2016 brought about an increase in the number of young people looking for a job due to the global economic crisis and the increasing number of young migrants arriving in the European Union. The DC4JOBS project draws on these new challenges and proposes several solutions. The DC4JOBS project encourages all European countries to join their efforts so as to promote digital literacy among young people and fight skills mismatches and young people's unemployment. The DC4JOBS project promotes the introduction of a programme based on the development of an interactive and dynamic platform enabling young people with fewer opportunities to upgrade, upskill or reskill their digital competences; this will undoubtedly be instrumental in meeting the needs of the existing labour market and addressing skills mismatches between education, training and the world of work.

The direct target group is young people aged 16-24 years, especially young people with fewer opportunities such as NEETs (young people who are not included in education, employment or training), young people from a migrant background, newly arrived immigrants, young refugees, early school leavers etc.). The indirect target group is the labour market: employers and organisations.

The project partnership is made up of partners from six EU countries displaying a wide range of expertise and a special interest in their professional development and the European initiatives in the field of youth.

The two-year project will meet its ambitious objectives through diverse activities, outputs and results, including a desktop survey, an interactive training platform as well as an online and offline training course on digital skills acquisition.

### **Research findings**

#### ***The questionnaire***

The achievement of the objectives relies on solid research carried out on young people from the project's countries (Cyprus, Germany, Latvia, the Netherlands, Spain and Romania). The research first examined whether there is any connection between digital skills acquisition and youth employment. Having a decent job requires digital skills nowadays, which have to be upgraded as they are constantly under the pressure of time and change. It goes without saying that young people need to adapt and adjust to new technologies continuously. It is difficult to envisage which of the digital skills that young people need at the moment may be necessary in the future. What is important is that young people develop the digital skills necessary for the

current context and that they then be given the opportunity to develop these skills if needed otherwise there will be no carrier prospects for them.

To this end a survey was carried out on young people with ages ranging between 16 and 24 from disadvantaged groups from Cyprus, Germany, Latvia, the Netherlands, Spain and Romania. The survey consisted of 13 questions aiming at establishing to what extent young people have the digital skills stated as vital in The Digital Competence Framework for Citizens (Carretero, Vuorikari, & Punie, 2017). The European Digital Competence Framework for Citizens also known as DigComp, is a tool meant to improve citizens' digital competence and enable their access to lifelong learning, employment, personal development and social inclusion. DigComp has become a reference for the development and strategic planning of digital competence initiatives both at European and member state level. DigCom identifies the key components of digital competence in five areas: information and data literacy, communication and collaboration, digital content creation, safety and problem solving (EC, 2017). Today, being digitally competent means that people need to have competences in each of the above-mentioned five areas.

The partnership first discussed which digital skill levels the young people should have in order to enter the job market; the foundation level digital competences (DigComp 2.1 – levels 1 & 2) were commonly agreed to be the minimum skills required for young people to be employed. As a result, the survey identified the young people's current digital competence level in accordance with the criteria set in the DigComp 2.1 framework; the findings will be used to design and deliver the appropriate training programmes for young people with a view to upgrading their digital competence.

Of the 13 questions, the first two questions were demographic questions which helped determine what factors may influence a respondent's answers; two items were selected out of several demographic issues: age and location; they were considered more relevant to the project whereas ethnicity, status and religion were omitted for discriminatory reasons. The next ten questions focused on identifying the young people's digital competence level within the standards of DigComp 2.1's foundation levels.

The final question was designed to identify and define the young person's overall digital competence. All the questions were simple, concise and closed.

### ***Description of target group***

The survey conducted in Romania addressed the young people aged between 16 and 24 years old, identified as a specific group with fewer opportunities (including: social opportunities, disadvantaged environments: rural areas or disadvantaged social background for the young people and their families; students from vocational schools, with lower levels of education; students dealing with school drop-out and with a high level of unemployment; students from areas with fewer opportunities to benefit from media and digital environments; young people and students with at least a member of the family working abroad).



## **Background**

According to the document “Opening up Education”, open education, including digital technologies and open educational resources, provides a key opportunity to reshape European education to deliver education of higher quality and efficiency, thus contributing to Europe 2020 goals through better skilled workforce and more employment (EC, 2016b). Digital competences are key competences in our world and one of the key objectives of the education should be the development of these competences in students, which can only be achieved by integrating digital technologies into teaching and learning activities. Also, digital technologies and open educational resources provide an opportunity for innovative approaches to teaching and learning, increasing efficiency and equity in education.

Currently, the use of ICT in teaching and learning activities in the European Union is low, only about 50% of students are taught by teachers, who use ICT in at least 25% of their lessons; this is due to teachers' low confidence in and negative attitude towards ICT, as well as limited access and other obstacles (insufficient ICT equipment considered as the major obstacle). According to the ‘Survey of Schools – ICT in education’, only around 15% of students in Romania are taught by teachers with high confidence in, good attitude towards and good access to ICT, compared to the equally low EU average of 25% (20% in Italy and 25% in Bulgaria and Spain) (EC, 2013). Another problem is that teachers do not use ICT to its full potential: most of them only use it in preparation for their classes, without taking this opportunity to develop their students' digital skills or to use ICT to improve teaching and learning through open and innovative practices.

According to the documents “Improving and modernizing education” and “Opening up education”, quality of teaching is crucial in improving the quality, social outcomes and efficiency of education. Digital skills and competences need to be included in initial teacher education, as well as continuous professional development, to keep teachers updated. Training of teachers in the use of ICT in education can provide teachers with skills and knowledge, which will motivate and empower them for more frequent, efficient and innovative use of ICT in teaching and learning (EC, 2016c).

According to the “Education and Training 2020” (ET 2020) benchmarks, Romania is among the worst performers in the EU on basic skills (EC, 2015). There is also a significant mismatch between what the educational institutions offer and what the labour market needs which is visible in the unemployment rates which are particularly high among young people. In Romania, between 50% and 80% of students never use digital textbooks, exercise software or learning games. The unemployment rate reached the highest level (16.9%) among young people aged 15-24, in the year 2017.

## **Location of the target group**

EuroEd Foundation, the Romanian partner in the project, conducted the survey in three locations: (a) vocational schools from the industrial area of Iasi city; (b) schools located in rural

areas, with few educational, social and financial opportunities; (c) ProRuralis, an association targeting students from rural areas, studying in city schools.

### ***Delivery of the survey***

EuroEd used various forms to conduct the survey, depending on the type of the target groups. In order to identify the students from rural areas, EuroEd Foundation contacted teachers and school principals from two schools: Vladeni Secondary School and the Sipote Secondary School, both located in disadvantaged rural areas in Iasi county. The delivery of the questionnaire differed in each school context. Thus, in the Vladeni Secondary School the group of the ten students selected for the questionnaire filled it in in the school IT laboratory as they had limited resources to access the online version of the questionnaire: the lab was the only place in school connected to the internet and students did not have individual internet access at home either. The students from the Sipote Secondary School did the questionnaire on paper supervised by two teachers as there was no access to the internet in the village.

In order to address the students from the vocational school from the industrial area of Iasi, EuroEd got in contact with the school councillor and emailed him/her the invitation with the presentation of the project and the link to the online questionnaire. The school councillor delivered the questionnaire to students aged between 16 and 24, which also included students attending evening classes programmes – programmes typically used for the purpose of continuing education with evening classes to accommodate students with work schedules. The school media channels were used. As for the young people from ProRuralis – the association focused on students from rural areas studying in the city, the contact was established through the list of students who are under EuroEd's administration; the foundation is as a collaborator in supporting this programme meant to ensure a better access for students with fewer opportunities to a higher level of education. The link to the online questionnaire was distributed by email to the group coordinator, who passed it on to the rest of the students.

EuroEd ensured a permanent support for the target group to fill in the questionnaires. As the questionnaires were delivered by various means – emails, direct contacts with the target groups or teachers, school principals, school councillors, visits to schools, posts on Facebook or use of media channels in schools, EuroEd collected the answers through the online questionnaire or in hard copies directly (all data were introduced in the same online questionnaire format produced by the partnership).

The number to quantify the target group was not exactly identifiable, as the channels were varied but the questionnaires were distributed to over 100 target group members.

### ***Discussions***

Discussing digital competences and use of ICT for the group of young adults aged between 16 and 24, with fewer opportunities, was a challenge because a lot of factors had to be taken into consideration (teachers' use of ICT, teachers' confidence in the use of ICT, type of school, area, availability of ICT tools, whether ICT is among the school subjects in the school curriculum or

not etc.). Given the high number of young people attending schools in rural areas it is no wonder that in Romania between 50% and 80% of students never use digital textbooks, exercise software or learning games. In our case, most of the students involved in the survey came from vocational schools where ICT is not a school subject and the existing infrastructure in the areas where they live could not support them to have free and easy access to a computer or the internet. So it was agreed that all the digital competences or skills identified in the respondents were acquired thanks to respondents' individual interest and self-learning. As a result, the students' competence level was not high. In terms of internet navigation/searching for information and chat/online interaction, young adults responded that they found it easy and accessible; they seemed to be very confident in either finding a piece of information they needed or interacting with friends online. Also, they stated that they were confident in accessing documents and their online content and sharing and downloading files, but, on the other hand, programming or data creation was given a low score. However, on the whole, the Romanian respondents considered that they could use digital devices on their own and could deal with straightforward digital issues they faced daily.

### **The project's main outputs**

Based on the research which investigated young people's current digital skills acquisition for employment as well as their digital employability needs, the partnership designed the Digital and Employability Competence Charter and the Open Badges system. The Digital and Employability Competence Charter and the Open Badges system aim to introduce quality standards to the provision of digital programmes meant to consolidate young peoples' profiles.

The DC4JOBS Digital/Employability Competence Charter defines the criteria against which young people's digital skills required on the market are self, peer and professionally evaluated and enables them to devise an intervention action-plan to monitor, record and validate their digital achievement progress.

The following components of the digital competence charter have been established to meet the young people's digital needs as identified by the research:

1. Information: identifying, locating, retrieving, storing, organising and analysing digital information.
2. Communication: communication, sharing resources through online tools, linking with other online users, collaborating through digital tools, interacting with and participating in communities and networks etc.
3. Content-creation: creating and editing new content (from word processing to images and video); producing creative expressions, media outputs and programming; dealing with and applying intellectual property rights etc.
4. Safety: personal and data protection, security measures, safe and sustainable use.
5. Problem-solving: identifying digital means etc.

The open badges eco-system created by the partnership is based on the DC4JOBS Competence Charter and provides young people with indicators of their digital accomplishments and skills.

In addition, the partnership has implemented an e-platform which provides young people with opportunities for online assessment and online training. Based on the results of the survey and the Digital/Employability Competence Charter the DC4JOBS partnership designed an e-tool meant to help young people to assess their level of digital and employability skills as established by the indicators used in the Digital and Employability Competence Charter. The e-tool enables participants to validate their learning process by issuing badges corresponding to their level of digital skills acquisition.

The DC4JOBS tool kit is also part of the e-platform; the kit promotes the up-skilling programme and sets up the on-line one-stop-support centre, which comprises the learning modules. The learning modules use various techniques offered in open learning environment such as Moodle courses, webinars, on-line asynchronous or synchronous courses, which are uploaded on the e-platform. Another component of the platform, the employment data bank, gives useful reports, data, services, tools, templates, or other materials related to digital/employability skills and employment opportunities. The DC4JOBS network supports young people's search for employment and forges links among young people, employers or services with a view to providing information and creating links with various public services, counsellors or consultants in each partner country. The platform is completed by the e-Academy which invites experts, youth workers, stakeholders to register as well as by an e-Manual with instructions and guidelines for the implementation of the platform.

## **Conclusions**

The DC4JOBS project (<http://dc4jobs.eu/home>) fights digital illiteracy, skills mismatches and young unemployment. It proposes to introduce a transparent, multi-regulated and multi-assessed process, based on an interactive and dynamic platform to be developed for young people with fewer opportunities in order to up-grade, up-skill or re-skill their digital skills. This will meet the needs of the labour market and bridge the gap related to skills mismatches between education, training and the world of work.

It also aims to support young people in their search for employment by building bridges with the labour market through the creation of the on-line "DC4JOBS – One-Stop-Support-Centre". The centres to be set and pilot-tested in partner organisations will offer all the services developed by the project: i.e. DC4JOBS skills, professional ICT training for re-skilling and up-skilling of digital skills and career guidance. In this way the equipment, infrastructure and personnel of each organization will be fully utilized. The DC4JOBSnetwork developed between various organisations, stakeholders, agencies, public services etc. will offer guidance and support.

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## **THE PEDAGOGICAL EXPLOITATION OF LAND ART WITH ICT FOR THE CULTIVATION OF CREATIVITY: THE CASE OF ACTIONBOUND (AUGMENTED REALITY APPLICATION)**

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### **Abstract**

The present study derives from the experiential lab of Land Art, during the 3<sup>rd</sup> E-Learning's Lab Summer School of the faculty of Primary Education of the University of Crete. The participants were educators working in Primary and Secondary Education. The study aimed to cultivate awareness for Land Art, Creativity and IT technologies in Education, through an application of enlarged reality called ActionBound. The participants were asked to respond to problems according to Walla's (1926) stages of the creative process as well as to familiarise themselves with Land Art. In order to do so, the participants had to use technological skills and come in touch with the natural environment of Naxos, Greece. In addition, they were asked to experience social interactions and experience the connection between the permanence of technology to the ephemeral condition of Land Art sculptures. Through an action research it was concluded that, by coming into contact with nature, the participants gained environmental awareness, quickly appropriated the unknown space, cultivated their technological and group skills and cultivated their creativity.

### **Introduction**

Art, can be a tool which can approach knowledge in a multi-disciplinary, an inter-contextually, exploratory and experiential way, by combining all elements of a school's curriculum. Furthermore, art can support and inspire the modern school and educate students to cultivate their own personalities. Art, can also initiate the ones who engage with it, into the complexity of reality and provide them with the opportunity to become capable thinkers of the modern's world parameters, by increasing their knowledge, sensitivity, judgment as well as their democratic and social consciousness (I.E.P., 2015). Several relevant research, point to the connection of creativity and art. Previous research, also underlines that art can be a fruitful approach for the development of creativity (Averkiou, 2011). Moreover, digital communication and informatics technologies can be defined as a sum of tools which can be chosen to promote the creative process. Furthermore, creativity can be expanded by its use, under conditions (e.g. appropriate framework, pedagogical approaches). An interactive process, can have positive impact on learners in various levels. Interaction for example, can promote the engagement of learners, with a game which can provide immediate feedback to the decisions of its users, to the

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observation-recording of the results of an experiment with direct and dynamic feedback (Nikolopoulou & Salta, 2016).

### **Approaching Land Art and ActionBound**

#### ***Land Art***

Optical Art, which is an abstract art in fact, was partly associated with two expressions of this era, Minimal Art and Conceptual Art (Emmanouel, 2013). The birth of the phenomenon of Land Art took place after the Minimalist Movement (Beardsley, 1984). In the U.S.A, since the 1960s' this artistic trend was created by Robert Smithson, Michael Heizer, Dennis Oppenheim and Carl Andre. This trend initially started by making art work in natural, public or urban spaces and promoted the appearance of a great environmental movement during the 1970s. One of the movement's primary goals was to condemn the misuse of natural resources (Howett & Howett, 1991). Since the end of the 1960s' and during the most part of the 1970s', land art's artists opened a new dialogue, through galleries and museums as its primary artistic spaces (Kastner & Wallis, 1998). The traditional closed space to conduct art, almost always would mean a direct engagement with the artwork and thus it would not allow any sort of experience relevant with behaviour. Because of that, many started to explore outdoor spaces, as a new tool for their work (Messer, 2001). A new form of art was born. Where the artwork is not just placed in nature. On the contrast, the artwork derived from nature and is used as a morphoplastic element. In other words, the artist creates the artwork in nature by drawing the needed materials from the environment (e.g. sand, water, stone, etc.) and thus the artwork is presented experientially through the contact of place in time (Charalampidis, 2007; Kastner & Wallis, 1998). These artworks, are sculptures that have to do with the way, the time and the impact of natural forces upon objects (Kastner & Wallis, 1998). Land art can be used by anyone while it uses materials found in nature, such as leaves, tree branches, pebbles, sand or shells (Andrews, 2006; Adams & Chisholm, 1999). Notably, artworks of Land Art present the following three characteristics: (a) they denounce materialism and consumerism, (b) they are ephemeral, hence they make time's passing and its results fairly visible (c) they include tense emotional elements since the artistic environment becomes the symbol of needs, hopes and desires of man's need to be emotionally touched (Polychronatou, 2007). Today's Land artists share not only their vision and experience through their magnificent artwork, but also engage the public to actively participate in the making process. In workshops, participants are given the opportunity to explore nature and express their own creative ideas. Land art enables them to collaborate and create something bigger than themselves. It is seen through enjoyment and appreciation – offering a larger perspective and deeper understanding of the world (Nazdik, 2013).



Figure 6. Spiral Jetty by Robert Smithson, 1970, Utah (Lailach, 2007)

### **ActionBound**

ActionBound is an application which allows digitally interactive *scavenger hunts* to take place in a fun way. These *hunts* lead the learner on a discovery path, through multimedia based rally points which are called *Bounds*. The program lies within other enlarged reality applications and is used widely in smartphones and tablets. By using it, one can create a digital timeline of events or places of interest, simply with the use of GPS coordinates. ActionBound can have many applications. From ice-breaking exercises, historical or archaeological sites or just to represent a vision of the future (actionbound.com). It is a tool that can let someone build an interactive learning object, conduct a treasure hunt or even experience orientation exercises while at the same time, it does so by interacting with its users. User decisions are delivered via a mobile app and the data are recorded via a web interface. The users are invited to answer questions and carry out tasks which are previously setup via a Bound Creator which is accessed by a web browser (University of Brighton).

### **Methodology**

The primary goal of the study, was to create a space where Land Art and Information Technologies could coexist. A space in which the previous link could be established through experiential and mobile learning. Notably all the instructions were given through riddles. The participants had only received one instruction sheet with information regarding how they could download the ActionBound app to a mobile phone (1 cellphone per team). During the first stage (preparatory stage) of the creative process, the problem was issued and the participants started collecting materials in order to solve it. These materials had to be collected from within their natural environment. During the next stage (incubation stage), the formed teams were called to process the collected material(s) in order to solve the problem. At the next stage (insight stage), the solution to the problem started to emerge. The participants, were then asked to find the space where they could work together in order to create the sculpture. At the last stage (evaluation), the participants examined the validity of their product. After they completed all stages, they were called to create their own riddle, which would entail their thoughts and feelings. They were finally called to take pictures of their work.



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### Rating Bound

61 educators participated in the present study. The participants were split in 15 teams. The average duration of the experiential lab was 31 minutes and 39 seconds. According to the data the application collected (Table 1):

Table 1: Rating Bound (scale 1 to 5)

Overall rating	Fun	Variety	Places of interest	Difficulty	Informative
3.5	4	3	4	1.5	4

1: extremely little, 2: some, 3: medium, 4: many/much, 5: extremely much

The evaluation was related to the overall rating of this bound-project, its content (3.5), the extent to which it was entertaining (4), the variety of activities (3), the places of interest (4), the degree of difficulty (1.5) and the degree of information and knowledge of the participants (4).

### Discussion Section

Media-supported learning can have a positive impact on various aspects of learning (Kerres, 2013). The effects that were observed in the course of this project are outlined below:

1. Cultivation of creativity through the course. The trainees went through all stages of the creative process
2. Acquaintance with Land art: they came in contact and approached conceptually the artistic movement of land art and became aware of its context. They also created short lasting sculptures.
3. Cultivation of technological skills: the participants have the opportunity to cultivate their technological skills (used ActionBound, inserted multimedia such as video or pictures in the application, typed in a small text, etc.).
4. Exploration: they explored and became aware of the natural characteristics of the morphology of the island of Naxos.
5. Motivation: through the pedagogical scenario as well as the creative problem solving and the technological support the motivation of the trainees was high in order to follow all stages of the course.
6. Cooperation & Communication: during the course the participants had the opportunity to work in teams, to communicate, express and share their thoughts and emotions
7. Flexibility: the use of the ActionBound application is not exclusive of permanent based equipment or IT buildings.



Figure 2. Artwork



Figure 3. Artwork

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## **IMPROVEMENT OF GRANTS SUPPORT PROCESS IN SCHOOLS**

*Martina Tomičić Furjan, Igor Pihir, Faculty of Organization and Informatics, University of Zagreb, Croatia*

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### **Summary**

The current way of organizing grant and subsidies allocation and implementation in education institutions is significantly administratively burdensome. Grant applicants are expected to collect and deliver documentation proving the right to subsidies, with some of the evidence coming from the education system itself. There occur costs that are related to time spent on resources in each organization, which has to issue and collect documentation for application, both in the education system and outside of it (public administration or local self-government, parent employers etc.). These costs can either be avoided or minimized with use of modern ICT. This research paper describes current and future way of grants support process in education institutions through a process model that shows how to improve efficiency of grant processes through a single ICT solution. The new way enables organization and implementation of grant support process, from every level of subsidy / grant source, from national level (Ministry of Education) to counties, cities and municipalities and the schools themselves, increasing thereby speed and transparency of the process and reducing costs.

### **Introduction**

The study of the school business processes (primary and secondary schools) was part of the e-School pilot project (e-Schools: Establishing a System for Developing Digitally Mature Schools (pilot project) in Croatia) (E-Schools, 2017). One working package of the project particularly focused on the development of reference process models for all schools and on determination of functional specification of future new information system that supports all these processes in schools.

New system is called SIPU – System for IT support of institution processes. Goal of this working package was to research and develop generic process models on selected sample of schools and other process participants (founders, ministries, etc.). Through the project, research was focused on 13 process areas (e.g. Teaching, SIPU Administration, Human Resource Management, Project Management, Property Management, etc.) from which process area Student standard with grants support process is part of our research in this paper.

### **Research methods and sample**

Processes in schools were researched from November 2016 until August 2017 through several process discovery techniques (Dumas et al. 2013).

## **Improvement of Grants Support Process in Schools**

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- Firstly, project team used process discovery technique based on evidence: that included document analysis, observation and current information systems analysis.
- Secondly, project team did field research by setting several meetings with key users in Ministry of education, school founders (municipalities, cities and counties) and school representatives

Through the interview based evidence techniques, the project team gathered knowledge about the domain, work processes, technology and use of current information systems that support this process area. To additionally investigate all processes related to schools, the project team organized several workshops in large cities (Rijeka, Osijek and Varaždin) where the aim was to gather information about the processes and possibilities for further improvement. The same aim should be achieved in the future through a larger project that should digitally transform schools and their processes with use of contemporary ICT.

As a result, process models were developed based on data gathered in Ministry of Education, 4 out of 21 counties (19% of all counties); 3 out of 105 cities (2.85% of all cities) and through the workshops and questionnaires about the processes data from 17 schools out of 1200 schools (1.4% of all schools). This sample allows us to investigate differences between participants in processes of student standard (school founders – counties, cities and municipalities; Ministry of education and schools themselves together with students in primary and secondary schools and in high schools).

Data sets related to schools are usually collected for purely administrative purposes, but they give new opportunities for knowledge management and analysis (Figlio et al. 2015), so in this project our team took special care for involved parties so they would feel that the new way improves their own working processes. Process models were developed in BizAgi process modeler (BizAgi, 2018), in Business Process Modelling and Notation 2.0 (OMG, 2017).

Process area Student Standard (PASS) comprises six business processes:

- Organize student accommodation;
- Organize a student's health check;
- Organize student nutrition;
- Organize student transportation;
- Organize subsidies and scholarships;
- Organize vaccination of students.

In this process area, the most comprehensive change has been made in such a way, that a system that supports the implementation of all processes would be designed and used as single system. That kind of information system would allow all participants to operate all different subsidies and grants through the same system.

## Results in the Support grants process

Support grants process is a set of activities that contribute to the students' standard. For identifying the ways, forms and order of performing the activities of the mentioned process, various forms of subsidies and grants have been analysed.

Support in the education system implies any form of aid for education users (students, program participants, parents or guardians). Grants may be financial (e.g. scholarships or one-time financial assistance), material (e.g. nutrition, books), or subsidized services (e.g. transportation).

This process involves several participants sharing information content needed to perform various activities in the participants' domains of work. In the present mode, these data contents are exchanged in the form of documents or in electronic form. The participants of the process are categorized as subsidy sources, subsidy organizer, grant realizer and grant beneficiary, which in the educational system is mostly the student. Other participants are logical roles, while physical entities (e.g. County office for culture and education or school) can perform several of these logical roles, depending on the type of support. For example, the competent ministry may be the source and subsidy organizer, or the donor can be the source and the realizer of the grant.

A generic review model of the Support grants process was developed (Figure 1) which shows all process activities. Process models were created using the notation BPMN 2.0. (OMG, 2017).

The generic process model activities are shown in rounded rectangles, coloured blue. The gateways in the model (presented with the rhombus symbol) help showing alternative scenarios in execution of the process, and they depend on the type of support. Process participants are represented as large rectangles, where participants are either named or generic, given their role in the process, or individually, if only a certain institution can be responsible for performing the activity. Circles in the model show events that can be initial, intermediate, and final events, respectively indicating the beginning of a sequence of activities, a temporary interruption and continuation of activity of the next participant, or completion of a process with a defined outcome. The links between the activities are shown with a full arrow line (between the sequence activities performed by one participant) or a dotted line with the arrow pointing to the communication between the various participants.

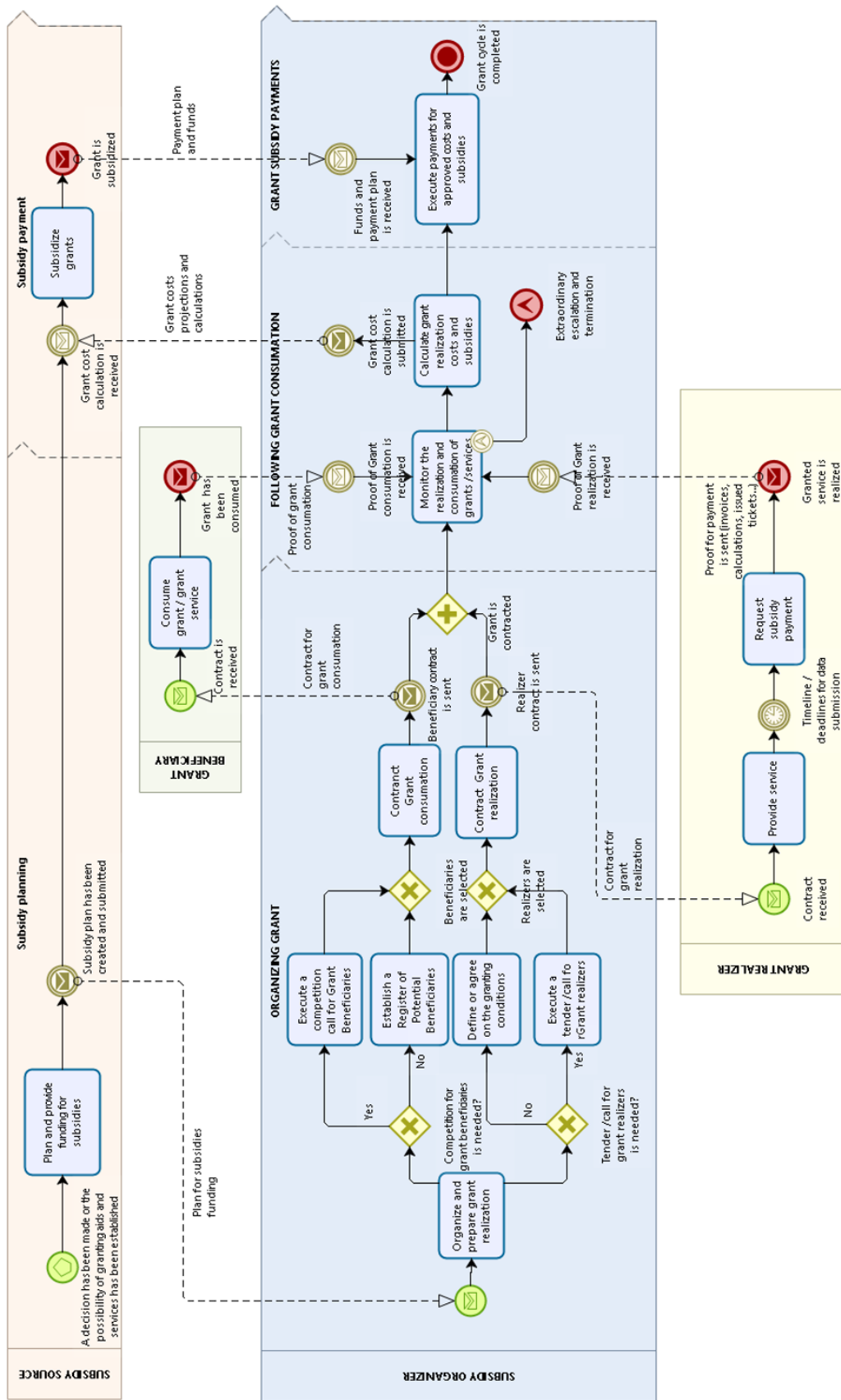


Figure 1. Generic process model Support grants

The generic process model represents a common model of processes that would support an ICT solution and would enable the process of implementing a new mode for all grants and subsidies. A universal solution could be used at all levels by ministries, counties, cities, municipalities, private donors, and schools themselves.

In a functional sense, the segment provides support to key business processes during the lifecycle of the grant (determining the type of grant, targeting the potential population, determining the criteria of grant subsidising, setting deadlines, entering data into the database, including encryption and parameter values) through:

1. publication of tenders;
2. submission to the competition (filling out the online form for submitting a request for support from the applicant on behalf of the beneficiary, submitting the documentation, collecting the data from the registers);
3. evaluation of submitted applications (verification of compliance with formal conditions and deadlines and full documentation, calculation of quantitative indicators);
4. decision-making on grants and publication of results (finalization of tendering procedure, issuance, publication and delivery of judgments, appeal procedure);
5. monitoring the realization of the support (computer support and automation of making individual and aggregate payment orders and recording of their realization);
6. calculation (grant realization calculation, individual and aggregate, by different types and areas of support);
7. analysis and reporting (enabling inquiries and reporting according to different criteria).

### **Process model Subsidizing and organizing of student transportation**

From the Generic process model Support grants, individual models for all forms of subsidies and grants can be derived, using the same graphic symbols as described for the generic model and they represent different execution scenarios of the generic process model.

The grant form for subsidizing and organizing student transportation includes all participants listed in the generic process model and it has been chosen as an example for detailed explanation and model breakdown. Model was developed according to documentation and government decision related to student transportation (Vlada, 2017; Ministry of Science and Education, 2016).

The Model of the Process subsidizing and organizing transportation (Figure 2.) presents two modes of exchange of data between the students as potential grant users, the school as a support organizer, the ministry/Counties as a support source, other institutions issuing the certificates needed to identify potential beneficiaries of subsidized grants and selected financial carriers.

The first mode shows the present process, with the aim of retaining the possibility of exchange of content through paper documents or in electronic form.



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The second mode shows the future way of operation, anticipating the principles of modern ICT application. Modern ICT enables the creation and use a web application through which the student/parent will fill out the online application form for granted support. The certificates required to identify potential beneficiaries and to define the terms of use will be automatically generated through the web service. The activities that will be automated are shown in the picture in purple colour.

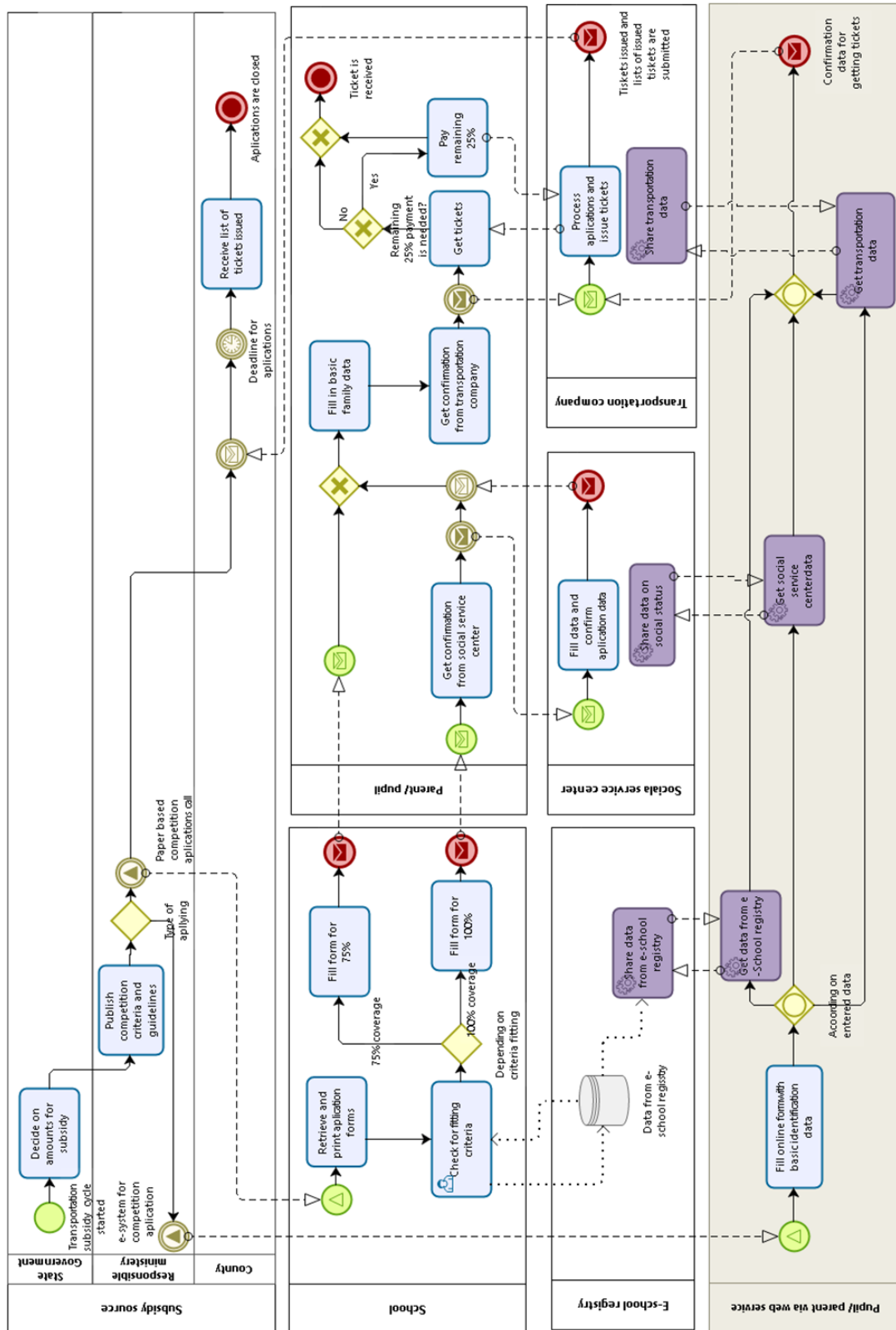


Figure 2. Process Model Subsidizing and organizing transportation

### Conclusion

The grant subsidies segment supported through segment lifecycle processes should be technologically elaborated to allow a high level of process automation.

The system must enable the collection of data related to the application for a grant in such a way that the data can always be downloaded from existing public registers or databases, but that it simultaneously enables to enter the data based on documents or other sources and credible documents. It is also necessary to enable the storage of this data, to perform searches, to report on data and to export data.

After the data collection, the system must provide support for automated evaluation of submitted requests according to the tender criteria and calculation of quantitative indicators (e.g. calculate the per-household member's income as total household income in a single month divided by the number of household members for the reference period), and that will contribute to run the procedure faster, more transparent and cost efficient.

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## **LEARNING & SOCIAL NETWORK AT THE UNIVERSITY OF CRETE (ELEARNING LAB)**

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### **Abstract**

Social networks play an important role in fostering social interaction in eLearning environments since under educational circumstances they are able to support collaborative learning. The eLearning Lab of the University of Crete designed and implement a complete Learning and Social Network (LSN), based on the principles of open software and the principles of collaborative learning.

### **Introduction**

The rapid development of social networks over the last few years has critically contributed to shaping a new environment in the field of eLearning era (Anastasiades & Kotsidis, 2013; Garrison, 2011), at the same time when the fast-moving evolution of knowledge and the management of a vast volume of information have created new concerns about the comprehension of modern ways of learning in today's digital era (Siemens, 2005).

Web 2.0 applications, under educational circumstances, can contribute to learning much more compared to the first generation technologies of the world wide web (Feldmann, 2014; Rahimi, van den Berg, & Veen, 2015). Social networks, due the openness, handiness and support they provide on active participation and collaboration, widen the access to resources, ideas and communities in order to support learning (Ophus & Abbitt, 2009). The employment of social networks requires significant changes in the socio-technological infrastructure and philosophy of educational structures (Lim et al, 2014).

Most notably, social networks introduce a participatory culture, both for educators and learners (Tseng & Kuo, 2014), contributing to the development of a dynamic and flexible learning and teaching environment (Sturgeon & Walker, 2009). In addition, they appear to provide opportunities for the creation of content by the users themselves facilitating material sharing, communication and interaction, ensuring in this way the mobility of a learner's expression of opinions, thereby giving prominence to co-forming opinions in the ambit of a community (Jenkins, 2006).

The aim of this paper is to present a fully-featured social network adapted to the needs of distance learning via ICT, (Learning & Social Network – LSN), which was based on the Elgg open source software platform and was designed and implemented by the “Laboratory for

Advanced Learning Technologies in Lifelong and Distance learning” (LALTLDDL – EDIVEA in Greek) of the Department of Education of the University of Crete.

The structure of the paper is as follows: In the first unit, a general description of the LSN is given. In the second unit, the technological context of the application of the LSN is briefly described, whereas in the third unit, the basic features of LSN are analysed. Lastly, the basic conclusions of the essay are stated.

## **The Learning and Social Network (LSN) of The University of Crete (eLearning lab)**

The “Laboratory for Advanced Learning Technologies in Lifelong and Distance learning” (eLearning Lab – EDIVEA in Greek) ([www.edivea.org](http://www.edivea.org)) of the Department of Primary Education of the University of Crete aims to serve the educational and research needs in the fields of Lifelong Learning, Teacher Training and Distance Learning, with emphasis on the pedagogical implementation of advanced learning technologies and social networks to all types and levels of education, both in Greece and abroad. Within its research activities, eLearning Lab designed and developed the Learning & Social Network (LSN) which aspires to become an open collaborative social network for learning purposes by deploying the philosophy of collaborative culture of Web 2.0 technologies. The LSN creation was based on the Elgg open source platform and its educational design aims at enabling educators and learners to form a personalized environment for teaching, learning and social networking.

The LSN was developed in order to encourage interaction among its human resources by creating the conditions and by actively supporting the development of communities of shared interests, and it aims at promoting collaborative learning by taking advantage of the social interaction opportunities offered by Web 2.0 applications (Anastasiades, 2017; Daud & Zakaria, 2012).

## **The Technological Design**

The technological design of the LSN was based on the employment of the Elgg open source social networking software, which is provided through the GNU General Public License (GNU-GPL), ensuring thereby the right of distribution, customization and use of its source code. It provides a strong framework to build all kinds of social networks by combining features of other Web 2.0 applications. In addition, it stands out due to the possibility it offers of extending its functions through plugins and the support it provides on open standards (Sharma, 2008).

## **The Basic features of LSN (Learning and Social Network)**

Social networks are evolving into social interaction environments among people sharing common interests who can communicate and collaborate, free of time and space restrictions, developing and widening their social and professional relationships (Daud & Zakaria, 2012; Cadima et al, 2010). Over the last few years, some crucial issues to be investigated have emerged, such as privacy, personal data protection (safety) and data security (Fuchs, 2017). Internet-based learning environments offer teachers and students considerable opportunities in

acquiring learning experiences, particularly in collaborative activities, exchange of views and experiences as well as sharing teaching resources (Uzunboylu et al., 2011; Klačnja-Milićević et al., 2017). The LSN was based on the Elgg open source software platform and was designed and implemented by the Laboratory for Advanced Learning Technologies in Lifelong and Distance Learning (LALTLDL – EDIVEA in Greek) of the University of Crete. The Learning & Social Network (LSN) of EDIVEA (Figure 1) aspires to become a fully-featured social interaction environment, adapted to the needs of distance learning.



Figure 1. The LSN Interface (<http://elgg.datacenter.uoc.gr>)

## LSN components

The LSN components are as follows (Figure 2):

- Social Networking Environment;
- Collaborative Networking Environment;
- Education applications / tools;
- File management tools.

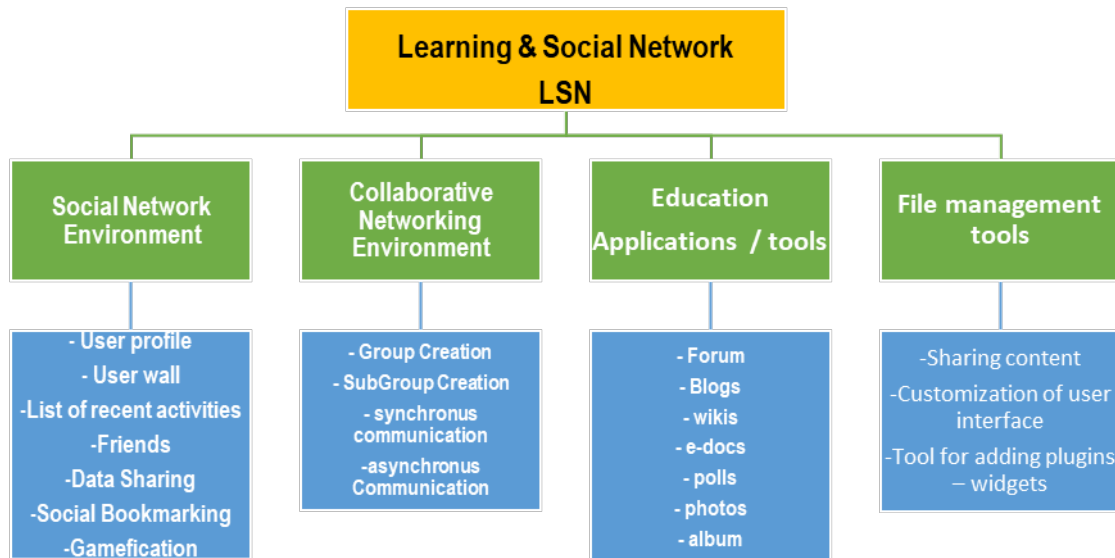


Figure 2. The LSN Components

## LSN Social Networking Environment

The basic features of the Social Networking are as follows:

- The *User profile* page (Figure 3), in which personal information (education, interests, photos etc.) is provided and the user decides who has access to it.
- The *User wall* (Figure 4), in which content can be posted text, photos, video, hyperlink, etc. both by the user and other users selected by the user. In this way, there is communication, exchange of ideas and content as well as interaction among the users of the community. Furthermore, users can comment on content or press *like* to provide feedback.

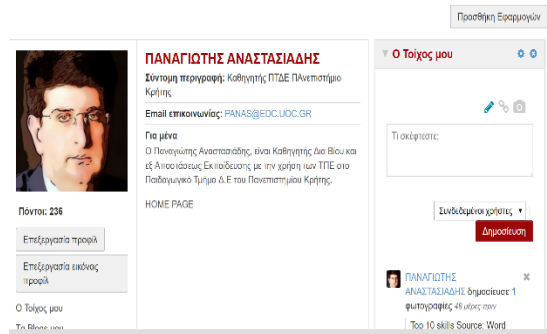


Figure 3. User profile

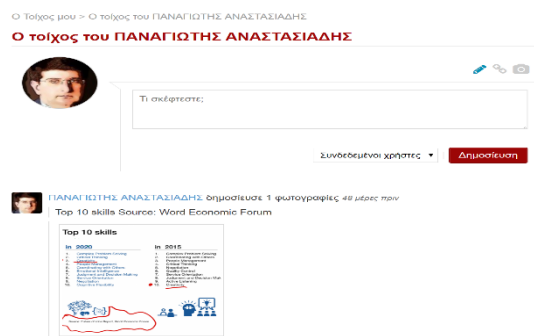


Figure 4. User wall

- The *List of recent activities* (Figure 5), which provides instant update on recent activities of ourselves, of our friends, as well as of all the users of the community.
- Another essential feature is *Friends* (Figure 6), which enables users to search for *friends* and choose who they wish to communicate, share information and content, and interact with.
- Gamification: The user is rewarded with the collection of points which are ranked according to his/her participation (in terms of quantity and quality) in the network.

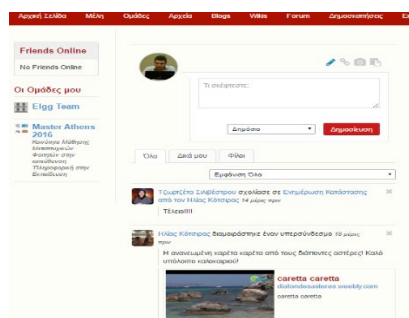


Figure 5. Recent activities



Figure 6. User's friends

### Collaborative Networking

- Group creation: A structural and essential feature of every social network is creating groups. The LSN enables users to create their own group and add whomever they wish to it, as well as to participate in other groups by creating common communities for communication, interaction and learning. In fact, every group has its own wall, blogs and wikis, forums, event calendar, poll tools as well as its own storage space for its files (group files). Lastly, a group can be open or closed, depending on its purpose and member needs.
- Subgroup creation: An important LSN feature is the ability to create subgroups with all the functions which groups have.
- Communication: Additionally, the user can send personal messages or engage in real-time chatting, both with *friends* and other selected users of the community.

### Education applications / tools

Furthermore, each user can create their own blog, in which they can post text or multimedia content, such as pictures and videos, enabling at the same time other users to make comments or share the content with other users, thus helping to foster a collaborative spirit among users (Wopereis, Sloep, & Poortman, 2010).

At the same time, the LSN enables users to co-create their own wiki, that is, to collaboratively modify the content and structure of its content by commenting on or modifying posted content or by adding text, image and video, which contributes to realising what they can achieve through collaborative work.

An important LSN application is the online discussion site, the *Forum* (Figure 7), in which users can communicate and exchange views, both within a group and within a community, depending on their needs. Moreover, the LSN provides users with *poll* creation tools (Figure 8), through which they can draw useful conclusions, as well as with an event calendar through which they can be informed about important affairs and events.



### Δημιουργικότητα στο Σύγχρονο Σχολείο

Από Κωνσταντίνος Κωσταδής 347 μέρες πριν · Απαντήσεις (14) Περιορισμένως/ήν Επεξεργασία Κλείσιμο

Δείτε την ομιλία του Ken Robinson για τη δημιουργικότητα στο σχολείο και καταγράψτε τα κυριότερα σημεία της ομιλίας που είδατε προκειμένου να τα συζητήσουμε στην πρώτη μας τηλεδιάσκεψη!

Στη συνέχεια διαβάστε το άρθρο "ΤΠΕ και Συνεργατική Δημιουργικότητα στο Σύγχρονο Σχολείο" (Αναστασιάδης, 2014) και γράψτε στο forum τι σημαίνει για εσάς δημιουργικότητα στο Σύγχρονο Σχολείο.

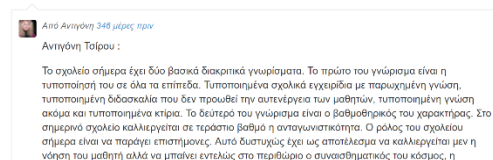


Figure 7. Forum

**Μετά την επεξεργασία και την ολοκλήρωση του προφίλ της κάθε ομάδας, προτείνουμε να αλλάξει η ρύθμισή τους και να γίνουν δημόσιες, ώστε να μπορούν όλοι οι επιμορφούμενοι να έχουν πρόσβαση στο περιεχόμενο και επικοινωνία με τα μέλη των άλλων ομάδων, μετά από αίτησή τους στην αντίστοιχη ομάδα. Συμφωνείτε;**

Από Κωνσταντίνος Κωσταδής 324 μέρες πριν Περιορισμένως/ήν Επεξεργασία

Η ψηφοφορία ολοκληρώνεται την Κυριακή , 12/3 στις 12 το βράδυ.

Ναι, θέλω περισσότερη διασύνδεση. (30)

Όχι, δεν νιώθω έτοιμος/ή μέχρι στιγμής. (2)

Συνολικός αριθμός ψήφων: 33

Προβολή Δημοσκόπησης

Σχόλιο Μου αρέσει



Figure 8. Polls

## File management

- Sharing content: What is more, the application of sharing files enables users to upload and share files, such as documents, presentations, hyperlinks, audio files, photos, videos etc. A community user can select a certain file and modify, delete or comment on it.
- Customization of user interface: The LSN structure enables users to add add-ons (plugins) and other applications or widgets, in a quick and easy way, thus facilitating autonomy as well as personalization.

## Conclusions

Given that there are popular environments of social networking (e.g. Facebook, etc.) and educational activities (e.g. Edmodo), our attention was focused on designing a complete learning and social environment on the web, which would be able to foster collaborative learning by combining social interaction with learning activities.

The contribution of the LSN could focus on the following points:

- Private Social Network: The data are not publicly viewed but only by the entity managing the LSN.

- Open source philosophy: In essence, this means that every learning entity can adapt it to their particular needs / demands.
- The LSN combines social networking and collaborative learning features: creating groups and subgroups, individual or collaborative forums, blogs etc.
- The LSN can be connected to any learning management system, which contributes to the integration of learning and social interaction environments.
- It provides the element of Gamification with variants (points) which can be configured by the designers depending on their particular needs / demands.

Currently, in the LSN:

- There are 150 registered users (educational – research staff, teachers, postgraduate students).
- Over 1,000 posts and about 2,000 comments have been written on the users' walls.
- Over 2,000 personal messages have been sent

Furthermore, in the LSN environment, 40 groups, 150 blogs, 40 wikis, 20 recent forums (with 150 answers) and 20 polls have been created, and over 250 files (text, image, video etc.) have been shared. The improvement of specific features, the provision of videochat and videoconference services as well as the improvement of the graphics of the environment are in our future priorities.

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## **AN ANALYSIS OF CONTENT AND POLICIES IN COMPUTER SCIENCE EDUCATION IN UNITED STATES**

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### **Abstract**

This paper discusses views and particularities of teaching and implementing computer science curriculum content and policies in American education, in attempts to analyse the tendency of implementing new policies of introducing computer science curriculum in schools. While the United States is perceived as not only having the most advanced digital technology in the world, but also the country globally promoting new digital trends, the analysis of computer science curriculum in pre-university level shows that, despite the high level of computing skills that the related industries display, learning computer science is not systematically implemented in the pre-university level. While recently major reforms started to be implemented to promote programming in school. After analysing the policies, I was noticed that computer science education is more presently proposed as the new curricula promotes more an explicit approach towards learning programming and software design.

### **Introduction and Theoretical Framework**

The introduction of learning digital technologies is implemented differently in different countries (Kozma, 2011; Tan & Stoilescu, 2016). As such, computer science education has become an important point of discussion, as many educators see it as a way of speeding up the process of fostering knowledge and assuring that future specialist are creative and productive in insuring new technologies (Stoilescu, 2005; 2009). More than 3 decades ago, the Association for Computing Machinery (ACM) organisation presented important recommendations for high-school computing curriculum. The objective of introducing computer science curriculum in all schools remains an important milestone to achieve (Seehorn et al., 2011; Stephenson, Gal-Ezer, Haberman, & Verno, 2005). Yet, the successfulness of implementation remains somehow partial (Deek & Kimmel, 1999; Seehorn et al. 2011). For instance, the process of certifying competent computer science teachers remains a difficult approach. The percentage of qualified teachers remains low despite multiple efforts to increase the body number of teachers. As well, it is difficult to design and implement an adequate content of computer science curriculum.

It is well known that the jobs in computer science are high paid and have one of the highest rates of increase. As a result, computer science undergraduate programs are one of the fastest growing programs (Fisher, 2015). This can be explained by several factors. For instance, in the US, public opinion considered computer science as important as literacy and mathematics (Horizon Media, 2016) and most parents want to have opportunities to study computer science

for their children. With all of these advantages, the number of computer science classes in secondary schools remains still low (code.org, 2015). One of the main reasons is the problem of creating an adequate number of computer science teachers competent enough to help creating an adequate number of IT professionals (Google & Gallup, 2015).

In particular, the United States has seen important changes in its computer science curriculum (Computer Science Teachers Association Teacher Certification Task Force, 2008). This is similar to tendencies encountered in other countries such as UK (Brown, Sentance, Crick, & Humphreys, 2014) or Australia. In all US states, the governments sustained important efforts to implement adequate technological updates, so that they provide a very sustainable computer and internet infrastructure. In addition, introducing programming classes in pre-university curriculum had recently become an important point in American computer science curriculum (Seehorn et al, 2011). As such, the curriculum is structured in three main levels: Computer science and me (K-6); Computer science and community (6-9); and Applying concepts and creating real-world solutions (9-12). It has five important strands: (a) computational thinking; (b) collaboration; (c) computing practice and programming; (d) computer and communications devices; and (e) community, global, and ethical impacts.

Some notions and key terms are different in different states from the United States. For instance, the computer science syllabus has different terms in California, New York and Texas states, as we focus this discussion in only these states as they contain the largest population in United States. This research has several goals. The first goal is to analyse the content of the computer science curricula at national level and show some similarities and differences occurred since 2008. The second goal is to understand policies and the way computer science policies are structured for teachers and students. Third, this study intends to understand ways in which computer science is treated as a passive way of using technology or as an active way of learning programming and software design.

## **Methods and Findings**

This research uses qualitative research methods in order to perform document analysis (Rapley, 2008; Wesley, 2010) to understand and explore the computer science curriculum in United States high schools. For Rapley and Wesley, document analysis is a valuable practice consisting in finding, appraising, synthesising and making sense of informational and contextual content presented in these documents as social artefacts. This method can be used together with other techniques but can be used as well as a stand-alone technique of qualitative analysis.

While it is well known that United States allows states to have a large degree of differences in education, this is strongly emphasized with the computer science curriculum content and policies. A recent study (Stephenson, Gal-Ezer, Haberman & Verno, 2005) gave some recommendations for the development of a sustainable computer science curriculum. First they asserted a strong connection is needed between the outcome required and the strategies in use so that changes are driven by real learning needs and not through politically contrived needs. As well, they suggested that the intervention of implementing an adequate computer science

curriculum needs to be a long-term expansion and not a short-term one, so that all major stakeholders have a major agreement among the roles and processes involved. In addition, the researchers requested that all these educational changes need to be projected in a broad social and economic context and dedicating adequate resources to each stage of implementing the new computer science curriculum.

We noticed that the computing is separated in three general areas: Educational Technology, Information Technology and Computer Science. The first approach, Educational Technology is defined as using computer technology to learn about other disciplines. For instance, this includes learning about other STEM areas or learning different software for desktop.

Information technology (IT) is defined as using, sharing and manipulating information in its various forms. It involves not only selecting and using appropriate hardware and software products, but also installing, customising, integrating hardware and software products with infrastructural and organizational needs. Some of the topics studied are: (a) installing maintaining and customising hardware and software packages; (b) installing, securing, and administering computer networks; (c) designing, administrating, and securing data and communication systems; (d) designing and implementing web resources; and (e) creating multimedia resources.

Computer science curriculum contains the study of computational thinking as presenting algorithms in flexible techniques, as showing fundamental ideas of abstraction and steps in a computable way, without narrowly asking to implement in a specific programming language. As well, it contains theoretical foundations for robotics, computer vision, simulation, and intelligent systems. Some of the topics of study are: designing and developing software, developing effective ways to solve computing problems, and devising new ways to use computers. These ideas were very similar with the new computer science curriculum. It was noticed that while the computer science curriculum strongly promotes programming skills, learning programming is recommended to not be taught in a narrow way. More exactly, learning programming needs to be part of a broad STEM (Science Technology Engineering Mathematics) curricula. There are given several examples of using computer science in connecting with other STEM topics such as climate change, study of diseases, biology, genetics. As well, computer science is described as *important intellectually*, as a way to learn various skills such as logical reasoning, algorithmic thinking, and structured problem solving.

Another important aspect remains the level of flexibility in computer science education. The present US computer science curriculum does not require a specific number of hours for each stage. This is left to the decision of local schools and teachers. Another aspect represents the possibility of choosing different levels of difficulty. More exactly, different from similar national curriculum such as Australia where there is only one level of difficulty, the US curriculum contains three levels of difficulty (levels 3A, 3B, and 3C), with the last one offering a professional computing certification.

## Discussions

It was noticed that while the tendency of integrating computer science in all learning areas remains an important objective, the focus now is on integrating and designing adequate solutions and learning algorithmic and programming skills for the purpose of applying to process information and create new software. Therefore, different from previous versions of the computer science curriculum, it is believed that the new US curriculum provide a stronger emphasis on programming and advancing computer science knowledge at the next level as the present US workforce contains over ten million people working in IT related jobs. This requirement is really challenging for the computer science teachers as they have now a complex set of topics, software packages, and digital devices resources that are changing at a very fast pace, skills that requires effort and dedication for them, in order to master these topics in pedagogical meaningful ways.

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## **“CONNECTING SCHOOLS” PROJECT: WORKING FOR AN INCLUSIVE LEARNING NETWORK**

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### **Abstract**

This poster explains the “Connecting schools” Project, which has been created by airea e-learning (<https://airea-elearning.net/en/>) with the aim of providing a learning virtual network involving teachers from different countries so as to share experiences, doubts and best practices about inclusion. Based on the principles of understanding knowledge as a common good, supporting inclusive education and fighting for Societal Transformation, this project offers a meeting point to everyone who wants to change the focus of the teacher centred approach of education to the student centred one in order to generate a democratic educational and connected community. At the same time and when interacting and creating content in digital environments, it is expected that the digital teaching competence of the participants will increase, obtaining more opportunities for the horizontal exchange of educational experiences of professionals from different parts of the world who work for inclusion.

### **Learning and community**

Historically, the main challenge of pedagogy was to develop a strategy in order to enable students to recite a set of facts, previously explained by the teacher, paying no much attention to the level of comprehension of the subject. However, learning is a much more complex activity that involves as Downes (2012; p.16-17) explains a “concrete personal understanding” in a concrete environment.

This environment is related to the community, as it is the place where people have learning experiences and share them with the others. It can also be defined as the totality of society’s knowledge, understanding this term as the experiences of that particular community transformed into experiences. Learning and community are therefore indivisible terms that enrich each other and promote meaningful learning experiences as they are not based in the individual but in the network of knowledge.

### **Connective knowledge**

The traditional model of knowledge is a statement that presumably is a univocal correct representation of the world that acts as a belief, leaving no space for doubts or further investigation. It acts like a belief. On Wittgenstein words, however, what we know is reflected in detail in what we do, in how we behave, in how we feel, in how we express ourselves (Wittgenstein, 1967). In fact, our knowledge is the result of our body and brain interacting in

and with the world. Connections between neurons and connections between humans and their artifacts build the kind of knowledge Downes (2012) refers to.

This argument leads us to the term of Connectivism coined by George Siemens, which understands knowledge as a network of learning connections. The model of learning that focuses only on memory and one-sided instruction is inaccurate as it avoids the real essence of the acquisition of knowledge: immersion, Discovery and Communications (Downes, 2012; p.9). Therefore, it is obvious that learning is not a way of transferring knowledge from teacher to students but a matter of common creation.

## **Digital environments**

Giving an accurate definition of the term “community” nowadays is such a complex task. Globalisation’s impact has dynamited the existing barriers among communities (Johns, Smith, & Strand, 2003; p.85). There is, therefore, a new aspect reflected in the definition that has to do with the reconciliation of physical and virtual environments. Rhiengold (1993) considers that the meaningful interactions and intellectual stimulation are the keys to a community, no matter the spatial dimension where it occurs.

Digital environments constitute a great chance for connecting people that are far away from each other but have much things to share. In fact, sharing experiences and best practices is a powerful social learning strategy. Thanks to technology, it is now possible to promote social interactions and obtain meaningful learning from them. With no space-time boundaries it is easier to form larger communities and therefore wider knowledge.

## **Inclusive education**

Regarding to the history of the term *inclusion* in the education system, it was in the late 1980’s in a meeting in Toronto when it was first applied to people with disability with the aim of laying aside the traditional negatively-based model which only emphasized on the lack of abilities. In 1994 took place a meeting in Salamanca, in which UNESCO endorsed inclusion of all students at the same regular school classrooms. Nevertheless, this term was still only used for people with special needs.

Some teachers, however, go for a different style of understanding education. For them, inclusive schooling involves not only a method but also a way of life that values heterogeneity. This approach considers individual needs to assure equal access for every student in regular classroom settings, that’s to say, a school where everyone is taken into account regardless of the difference and making the most of diversity.

## **Engaging students’ voices**

Traditionally, school decisions were made by teachers, while other opinions (mainly the students and their families’ ones) were never listened, or what’s worst, never asked. The educative community, itself is formed by teachers, students, families and environment,

## **“Connecting Schools” Project: Working for an Inclusive Learning Network**

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therefore everyone’s opinion counts, mainly the learners’ ones. Building student-centred learning environments, helping them to make decisions about how and when learning happens.

This innovative approach, called “Engaging students’ voices” and hardly studied by Fielding (2011) is a new way of understanding the teaching-learning process. According to this author, there are two positive orientations within this approach: person centred education and democratic fellowship. The first concept tackles the right of each student to make decisions about educational way wants to follow, while the second one facilitates the view of participation at school as a pedagogical goal.

### **“Connecting schools” Project**

As said above, no meaningful learning process can be developed in a one-sided relationship, therefore, the main aim of “Connecting schools” Project, created by Airea e-learning, is to generate a virtual community where teachers from Spain and Latin America working on schools that promote participatory dynamics, can share their educational practices. In fact, it is conceived as a network that unites, empowers and inspires educational agents to achieve progress in the challenge of Societal Transformation.

Our departure premise is the value of understanding knowledge as a common, that can be enriched through learning networks, constantly in progress, always reflexing. In order to achieve this goal, “Connecting schools” is based on four editions (spread over two years) of virtual training in the art of “Engaging students’ voices”, where teachers of Spain and Latin America, share their experiences about implementing this approach in their real contexts in order to feed their schools with inclusive and participative techniques. In this way, global educational priorities can be connected with real contexts and concrete strategies, from connected digital environments.

Apart from the virtual training Moodle platform, social media are also vital in this project. Using Facebook and Twitter potentialities as a meeting point of the members of this always growing community, everyone can provide the own experience and at the same time, learn from other experiences. As it is mentioned in the project’s website ([www.conectandoescuelas.org](http://www.conectandoescuelas.org)), during the second year a virtual congress is going to take place. In this free event, everyone interested in this subject and in being a member of this community can take part.

The main goal and success indicator of “Connecting schools” is not only to offer a training process, but to build a horizontal self-supporting network that will remain alive and active even when the training finishes, because it means that a real virtual community has born. As it is mentioned in the UNESCO publication “Rethinking education: Towards a global common good?” “education is at the heart of our efforts both to adapt to change and to transform the world within which we live” (2015; p.3). We see an optimistic future for this project: more countries involved, wider contents and the permanence of an always bigger network. In order to achieve this goal, we continue imagining new inclusive scenarios where everyone has place. Because to connect is to grow. Because technology offers us the chance to open a world-wide window of opportunities and relationships for the construction of a better world. Because we

feel called to be the connectors of so many people who believe and fight for a better world and find their weapon in Education. That is why we would like to show this project at conference in Genova.

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## RESULTS OF ADVANCED STATISTICS EDUCATION FOR ECONOMISTS ON B.SC COURSE

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### Introduction

From the academic year of 2013/14 at the Budapest Business School we gradually started to teach the subjects Statistics II. on computers. The teachers of the university published in 2014 an electronic curriculum – which includes audio material – exercises and test questions for Statistics II.

According to the curriculum, Statistics II. takes place in the third semester, but students often take the course later, because they haven't accomplished the criteria before. This assumes a certain amount of experience in learning at a higher educational institution, which makes students more serious when preparing for the exam. The course ends with a colloquium, the participation on contact hours is essential to achieve teachers' signature. Because of absenteeism from the lessons – contrary to the Statistics I study – students are barely receiving a signature refusal. Continuous work on seminars is considered important by most students; in the event of their foreseeable absenteeism, in many cases, the students enter and work on another course.

The subject Statistics II is based on the subjects Mathematics II and Statistics I. In the next section of our article, we would like to analyse the efficiency of the courses.

### Full time training

More than 96% of the applicants were present at the exams every year, and about 70% of the students passed in the exam period. In the third third of the examined period – from the first semester of 2015/16 – we introduced a new opportunity. Students can fill tests online on Coospace (electronic system), which is not an obligatory task, but they can collect some points answering questions about the theoretical curriculum. These tests can be filled twice in a term, and maximum 20 points can be gathered from them (10-10). These points can be added to one's first exam points (maximum 100). From the results it can be seen (Figure 1), that this new idea had a motivating effect.

## Results of Advanced Statistics Education for Economists on B.Sc Course

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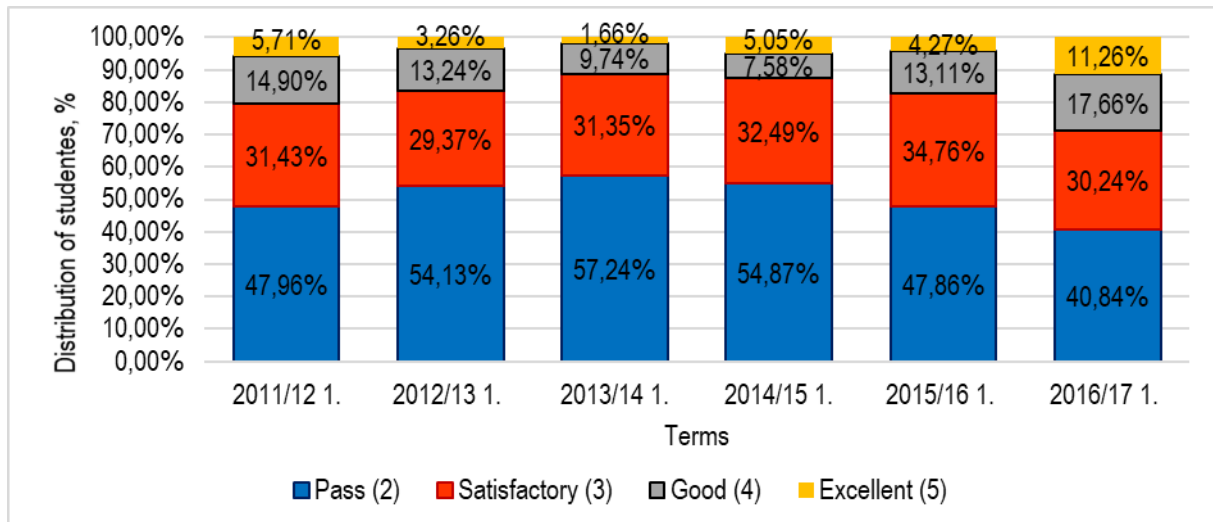


Figure 1. Statistics II. exam results, full time courses, in 2011/12 1. – 2016/17 1. terms; percentage (%); Own editing, source: BGE Neptun system

Significant change was that the proportion of students who just passed dropped below 50% compared to the semester before the introduction of the “Point-Collection”. In the last examined period it hardly exceeded over 40%. Satisfactory marks were achieved every term by almost one third of the students. In the last period more than a quarter of students got the marks good and excellent.

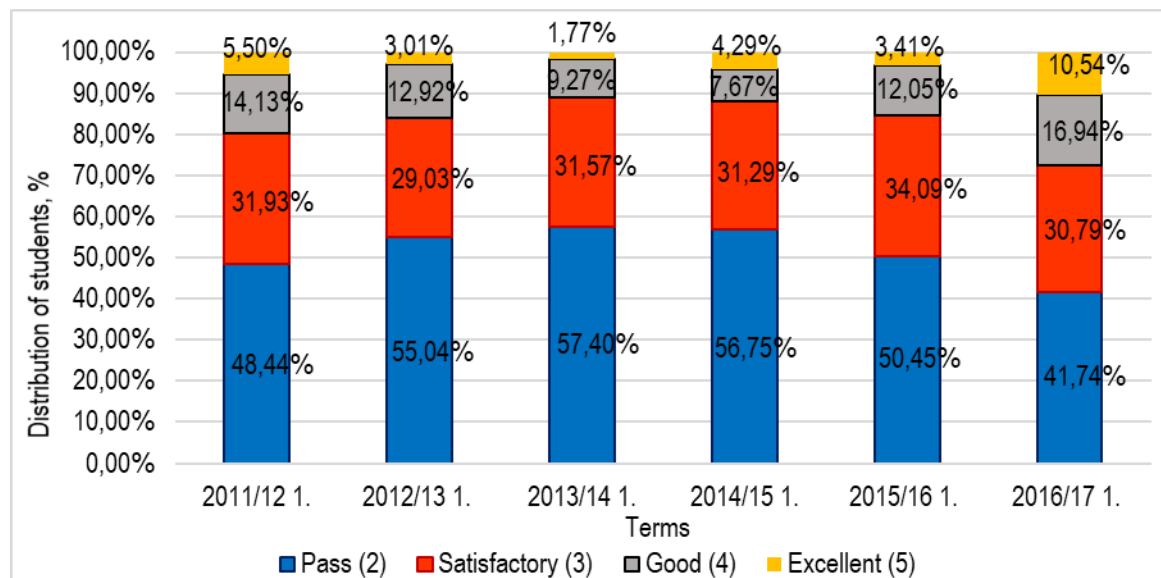


Figure 2. Rate of students performing the Statistics II. course by final results, full time training, in 2011/12 1. – 2016/17. 1. terms, percentage (%); Own editing, source: BGE Neptun system

Compared to the previous figure (Figure 3), which is completed with the second exam course results. It shows that the share of weaker marks has increased and- the number of the better ones decreased. While 70% of the students complete the course during the exam period, it increases with the exam course to around 75-80%. However, experience shows that two thirds of the candidates in the exam course have accomplished the subject during the first half of the examined period, and only about half of them in the remaining period (Figure 3).

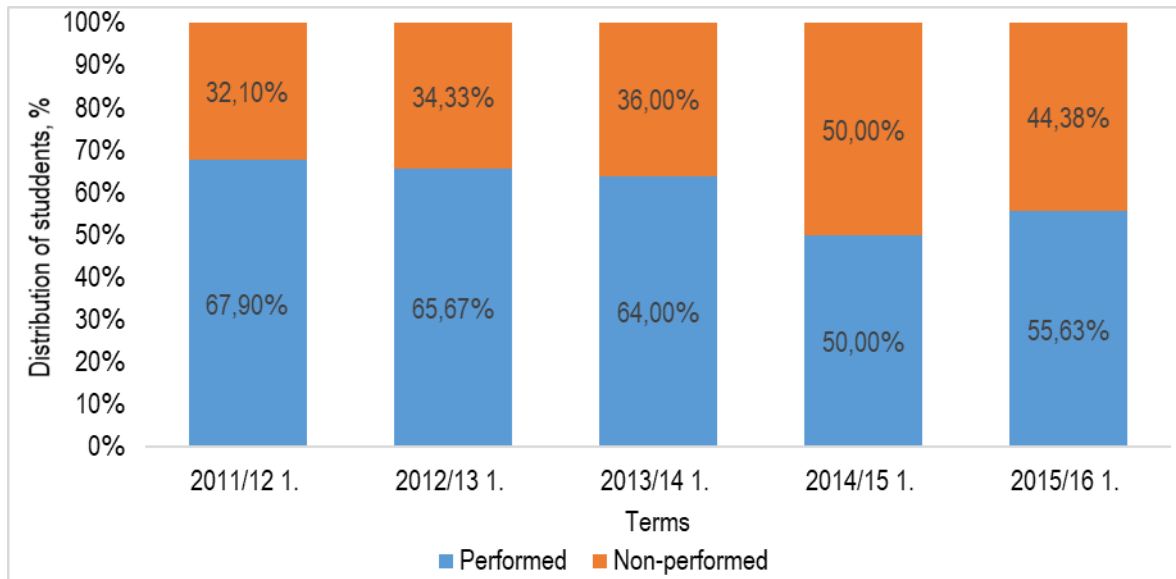


Figure 3. Distribution of students in second exams by Statistics II., full time training, in 2011/12 1. – 2015/16 1. terms;  
Own editing, source: BGE Neptun system

Relatively few full-time students attend the lectures of subjects which are the basis for statistics. The most are interested and present at the last lectures of the quarters / semesters when the teachers hold summary lessons of the major topics that may occur during the exams. The nature of the subject would require a reduction in the number of lectures and an increase in the proportion of seminars and practical lessons. This would probably improve deeper and more secure knowledge of the students. However, the huge number of students (Statistics I: 850-900 people, Statistics II: about 600 people in the examined semesters), the limited number of computer rooms and, in particular, the low number of teachers does not allow this.

### Distant learning course

In the case of the subject, the proportion of those passing in each semester was lower than that of full-time students. In the first two semesters using Excel (first terms of 2014/15 and 2015/16), the proportion of succeeding students dropped, but they improved by 6-10 percentage points in the exam courses. By the end of the exam period aided by computers, only 25-30% of the students could pass compared to the *paper age*, when an average 45% completed the subject. In the first semester of 2016/17, the proportion of those performing on the exam showed an improvement, over 40% passed, which is still not a very good result. The results expanded with the grades of the exam course can be found in Figure 4.



## Results of Advanced Statistics Education for Economists on B.Sc Course

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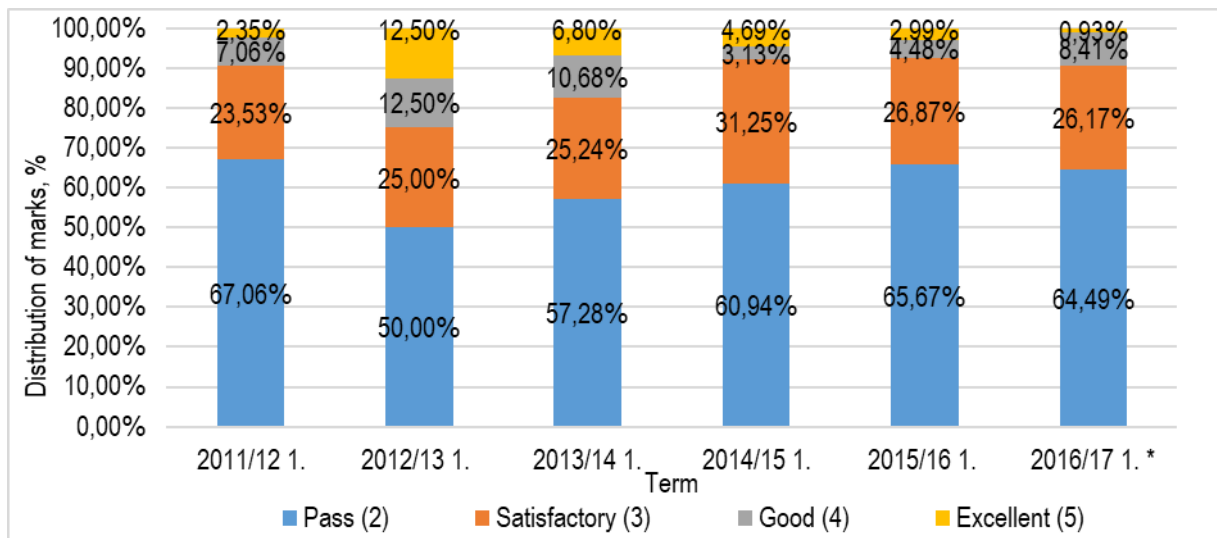


Figure 4. Rate of the marks of distance learning students in the exam period and exam courses of Statistics II., 2011/12 1. – 2016/17 1. terms, percentage (%) \*without second exam in 2016/17 1.; Own editing, source: BGE Neptun system

It is assumed that distance learning students are using the computer at their workplace, so the study of Statistics II does not ignore the technical problems. Based on experience this is not the case. On the other hand, the age of students in week-end education is decreasing, there are many students who sign up for full-time education in the distance education system. In many cases, this is because they were forced to work on a day-to-day basis to secure their subsistence, and because of their lack of time to spend much of their time, there was much failure for them. Younger distance students, however, do not have the proper digital competences as well as their more experienced counterparts.

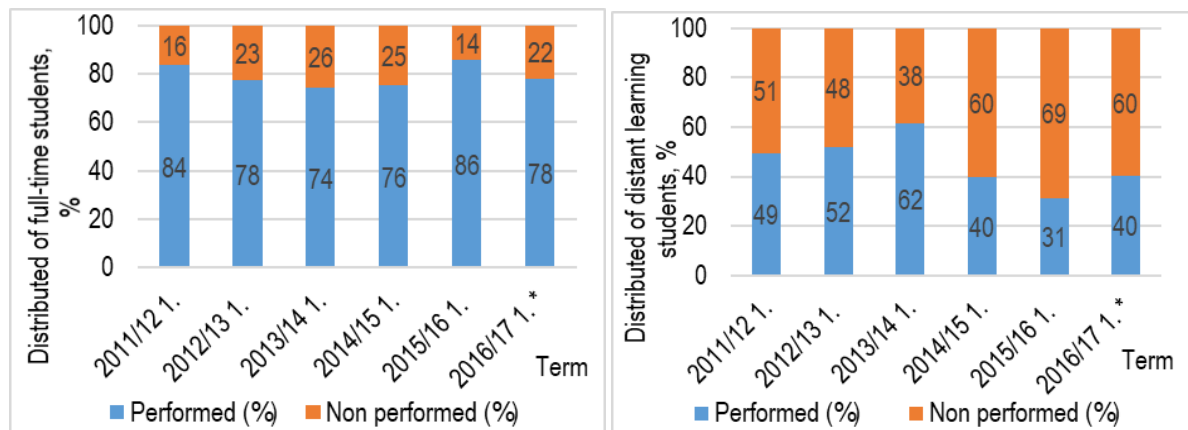


Figure 5. Distribution of students after second exams by Statistics II., full time training and distant learning, in 2011/12 1. – 2016/17 1. terms, \*without second exam in 2016/17 1.; Own editing, source: BGE Neptun system

Compared to the results of the subject Statistics II of full-time and distant learning students, it can be seen that even in distance education, the proportion of middle-graders is around 25-30%. Better grades are less frequent for those who attend classes on weekends, but the proportion of those who just passed (due to the point-collection for daytime classes) is significantly higher in the last three semesters.

Students of distance learning must acquire the same curriculum (4x4 contact hours per semester) as full-time students (1+2 hours a week for 11 weeks). The e-learning material helps them to prepare at home, but the teacher's explanation and help, in our opinion, greatly contributes to the acquisition of the material. However, it is not compulsory for them to attend weekend consultations and contact hours because these students have many of other activities.

## **Recommendations / Suggestions**

Students who apply for economist trainings should be expected to reach a standard level of mathematics during the recruitment process, as without the right basic knowledge, the fulfilment of mathematics and statistics at higher educational institutions – in large proportion – is difficult.

High school graduates arrive to the university with very different levels of knowledge and skills. Differentiated education, catching up would be very important, but under the current educational conditions – it is also physically impossible.

Due to the currently high number of students and low number of educators, frontal methods are predominant in universities. With lower student numbers and more teachers, more practical lessons, consultations, and teamwork could be possible. For example, independent task-solution, student cooperation, project presentation and arguing are becoming more and more important in the labour market, and it would also be increasingly important in public education.

## **Future ideas**

After introducing the past and the present, we outline the future ideas about the education of Statistics at the Budapest Business School.

In the first semester of 2017/18., a new system of training starts at our university after the review of the subjects. After describing the rearrangement of subjects and materials, we highlight some important changes that affect our department.

The number of Mathematics classes decreases, the teaching of probability theory – previously a full-time semester subject – is involved in the curriculum of Statistics I.

In a relatively new specialisation, the IT economy, General Statistics I-II. subjects will also be computer supported.

The subject of students of higher vocational training, which had strong semblance to statistics (later Economic Calculations II., now the Basics of Statistics) was accepted on B.Sc. courses at the application process. Credits for the training could be acknowledged, as the curriculum was similar. Now it is not possible, because a new subject, called Business Analysis contains a minimal level of Statistics on higher vocational training. This course's credits are not accepted on B.Sc. levels, as the curriculum is too different from the university subjects.

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## **DEVELOPMENT OPPORTUNITIES FOR LABOUR MARKET COMPETENCES AT THE BASE OF HIGHER EDUCATION**

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of Technical Pedagogy, Hungary*

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### **Abstract**

The early empirical research on the entry into the labour market of the graduates' and their career opportunities, began in the mid-2000s, and ended by 2013. The focus of the investigations was firstly on the comparative analysis of the labour market "utilization" of the diplomas issued by HEIs and secondly on the competences of graduates and expectations of the labour market. The results of the questionnaires conducted between 2004-2012 by the Hungarian Chamber of Commerce and Industry and Institute for Economic and Enterprise Research, as well as the student interviews in Graduate Course Tracking System (DPR), agree on one substantive issue. In many cases the students were not aware of the labour market opportunities after graduation, the labour market expectations and they lacked individual professional aspirations.

There were also lecturers at the Department of Technical Pedagogy at the BME who did research on the issues and had a competitive market experience which they used to develop a curriculum for a freely selectable course (Szabóné, 2013), which served to expand the knowledge on the world of work.

The lack of preparation for entry into the world of work (European Commission, 2017) is not only evidenced in the results of the research, but also more directly visible in the growing interest in the freely selectable course offered to BME students. During the semester, student activity related to the course, positive student feedback, successful job- and career-seeking applications among the respondents supported the hypothesis that students need to prepare for the world of work during higher education studies. This was a novel initiative, which meant that the methodological and technological opportunities provided by the infocommunication technology should be incorporated into subject activities to maintain student interest and develop labour market competencies.

The aim of the authors was to provide a modern, atypical teaching methodology that uses gamification (Fromann, 2017). The method of gamification in the subject mentioned allows flexible learning pathways, student-centred, tailor-made adaptive teaching, encouraging student awareness, autonomy, and responsibility for career planning. In this poster, we intend to present the characteristics of the gamification method developed and applied within the subject, the results of the effectiveness and the results of an empirical survey conducted among

## **Development Opportunities for Labour Market Competences at the Base of Higher Education**

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students. We conducted our quantitative based questionnaire survey among full time students of the Budapest University of Technology and Economics using a simple random sampling in the fall of 2017. In the course of the study, we focused on learning how much are the students' aware what competencies are expected by labour market at the start of their career, how effective is the course, how much did it contribute to the development of labour market competences among students. Our results firstly match the challenges of today's digital pedagogy and the motivational needs of the digital generations and secondly clearly contribute to a new approach to the subject. This way, the pilot can be called successful. We believe that by developing our ICT based support system and by expanding our innovative, experience-based methodology solutions based on BYOD, we can greatly contribute to the design of new curricula in the field of methodological cultural.

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## **FACILITATING YOUNG PEOPLE'S INDUCTION INTO THE WORLD OF WORK THROUGH THE WWW ONLINE APPRENTICESHIP SIMULATOR**

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### **Abstract**

The article is based on the Erasmus+ We Welcome Work (WWW) project (No.2016-1-RO01-KA202-02471). The article gives insights into the WWW project's online apprenticeship simulator, which offers young people opportunities to cope with changes, link theory to practice and get the employability, entrepreneurship and digital skills necessary to get a job. The simulator involves students in interactive training sessions of apprenticeship, proposing virtual work situations related to several jobs identified by research as most wanted (mechanic, electrician, nurse etc.).

### **Introduction**

The new challenges related to education and employment that Europe is facing nowadays are creating unprecedented demands for schools, which have to meet their students' growing needs. The Council of Europe has repeatedly stated that all states' commitments should be channelled towards young people so that they will benefit from quality education and training, from decent work and living conditions, which will enable them to contribute to the development of our society (Council of Europe, 2015). However, despite these commitments, opportunities offered to young people to help them cope with changes, link theory to practice and get the necessary employability, entrepreneurship and digital skills are still scarce. On the other hand, lack of workplace experience and the related skills contributes to the skills gap and reduces their chances of getting a job.

Although career orientation has been part of school policy, in spite of all efforts and under the pressure of dramatic and fast changes, young people do not have enough information about their future jobs, the skills they need, responsibilities they have; tasks they have to do or challenges they may face in their future jobs. The We Welcome Work (WWW) project attempts at meeting this gap. The main aim of our partnership is to facilitate young people's induction into the world of work by connecting the theoretical knowledge they acquire at school with the world of work (We Welcome Work, 2017).

## **Project presentation**

The We Welcome Work (WWW) project (2016-1-RO01-KA202-02471) is based on a partnership made up of a wide range of educational institutions from Romania, Cyprus, Germany, Italy and Spain. The project targets high school students and young people including students with disabilities, students with learning disabilities and foreign students, who find it difficult to get a job due to lack of workplace experience and the related skills and competences. The project's main aim is to facilitate students' transition from school to the world of work by providing virtual work opportunities for them to acquire the skills they need to support their transition and, thus, achieve a better skills match and career orientation.

To this end the project has created synergies among the consortium teachers, students and companies with a view to bridging the gap that students have in their experience. Thus, the project research has created a data base of support resources addressing young people from diverse backgrounds. The data base comprises job profiles relying on the research findings in each partner country highlighting most wanted jobs for young people, professions obtained in non-formal ways and jobs in which young people from disadvantaged groups can be successful. Interactive tools meant to test and evaluate students' competences and skills have also been devised to enable teachers and school counsellors to help students identify their specific needs and guide them in their career orientation.

The project's main output, the online apprenticeship simulator, involves students in interactive training sessions of apprenticeship, simulating work situations related to several jobs identified as most wanted by the research (mechanic, electrician, nurse etc.); the simulation engages the student in the form of a problem-solving animation game; students get engrossed in practical activities which help them to develop and improve various competences: workplace skills, problem-solving, teamwork, foreign languages, IT, social media skills, communication skills, etc.

## **Methodology**

Simulations have been widely used in education recently because they create a safe, immersive, and fun environment in which participants take risks and learn (Wright, 2017). They are considered to improve students' motivation to learn by delivering information to students in a way that stirs their curiosity and heightens their interest in understanding it. Simulations require active engagement, provide prompt feedback, present challenging but achievable goals, have uncertain outcomes, and generate feelings of autonomy, accomplishment, relevance, relatedness to others, and pleasure among participants (Carnes, 2011).

Simulations use real life situations that pose questions participants have to answer after completing the suggested materials. Research has acknowledged the role that effective game technologies have in engaging participants in formal and informal learning (Morgan & Kennewell, 2005). Simulations foster even greater engagement because they draw on gaming and technology completely. Positive learning outcomes of using simulations have been

highlighted throughout the years: improved social skills, cognitive abilities and motivation to learn, social and emotional development, decision making (Hromek & Roffey, 2009), logical and critical thinking (Lee, 1994), problem solving and collaboration as well as communication and team-building skills. In addition, simulations may become incentive for participants to identify and define their career goals (Chiang et al., 2011).

Simulations also change students' attitude towards mistakes: they start to be perceived as part of the learning process (Zunzarren, 2012). While exploring, trying new things and making attempts until accomplishing something students learn that mistakes happen naturally during the learning process. Learning through simulations is personal and effective in nature, influencing both feelings and emotions as well as enhancing knowledge and skills. It goes beyond classroom learning and ensures a high level of retention. Simulations enable personalized learning. Participants set their own learning pace. Combining technology and simulations with experiential learning, the online materials are available anytime and anywhere, across multiple devices.

Assessment is automatic; students get feedback to their answer on the spot. If the answer is not the correct one, the student can try again and the comments which are part of the feedback will help him get nearer the right answer.

### **The WWW online apprenticeship simulator**

The www online apprenticeship simulator focuses on several jobs covering a range of professions from industries such as entertainment, public services, sports and leisure, and information technology. The jobs have been selected according to the findings of the project research. Project partners identified ten most wanted jobs in each country. Thus, in Romania, the following jobs are available: hotel and office cleaners and helpers; car washer; workers in vegetal crops; seller on the street; workers in the manufacturing industry; workers in transport and storage; sewing machine operators; sales agent; travel agent; hotel receptionist. There are five simulations focusing on some of these jobs. The simulation created by the Romanian team is focused on the auto mechanic job.

Students are encouraged to explore materials and take time to make their own decisions. The simulation stimulates young people to think about their career, allowing them to discover details about jobs such as responsibilities, tasks or challenges they may not have thought of before.

The simulation debuts by creating the atmosphere: there is a virtual person Sarah or Marius who will introduce themselves and guide the student in each stage of the simulation. The candidate is directly addressed, which helps him/her to get involved in the interview; everything becomes a personal experience. ("Welcome! I'm Sarah Jones, the hiring manger. Thanks for coming in today").



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The material the student has to cover is also presented at this stage. Sarah or Marius will invite the student to read the content of the material carefully and get ready to answer their related questions. The students will have to cover all the stages in the simulation (job interview, first day at work, tasks at work, team work and challenges at work) in order to get familiar with the job.

Thus, at the beginning of the first stage, "Job Interview", after the introductions, the students are given the materials they have to go through: best car service website, cover letter, job offer, CV, online research on tips for preparing a job interview. They review the content of the mentioned files carefully and prepare for Sarah's or Marius's questions.

In the next stage the student learns about his/her first day at work: responsibilities, what he would like to know about his future workplace, opinions on car inspections or communication with clients. Then he/she is introduced to tasks at work and how to solve them. Learning is enabled by a chain of situations and challenges related to team work, tasks or customer service that the student has to solve based on his/her previous readings, such as:

- What do you do if your customer, who is driving his car, suddenly phones you to tell that light smoke comes from a wheel?
- What should an auto mechanic do when he/she hears a strange noise coming from the front side of the car, from the left wheel?
- At the moment the customer pushes the brake, he feels a very strong vibration in the steering wheel. What should an auto mechanic do?
- How should you answer your customer's questions about car repair estimates?
- A car that stopped in motion after the engine was warmed up, was checked by an electrician who made the diagnosis and identified problems with the crankshaft and with the camshaft sensor. The electrician changed the 2 sensors, but the car continued to stop in motion. The car has been moved to the mechanic shop, what would you do?

Students are given six answers to choose from. Once they click on their chosen answer they also get useful comments on why an answer is good or bad. Students are guided towards a complete answer covering all important issues that will really impress the employer and help them decide on the most suitable candidate: interest in the job, essential information related to the job, experience, skills. Comments also highlight items that have been omitted from the answer and are essential to the job.

### **Example: What can you tell us about yourself?**

*Good answer*

*I am very interested in your job offer. I graduated from the Regional Technical vocational school and I took my certificate in Auto Body and Repair, in 2017. I have knowledge of automobile mechanic systems acquired at school and in my family's garage over the years. In addition, I also acquired customer service skills during my part-time employment as a waiter while in high school.*

### Comment

*Your answer is very good, because from the beginning you showed your interest in the job and gave essential information about yourself. It's very important that you added that you have a specialisation and a certification in auto repair. Your speaking about your experience is also a good point. Your customer service skills experience is worth mentioning as it is requested in the job description.*

### Incomplete answer

*I graduated from the Regional Technical vocational school and I took my certificate in Auto Body and Repair, in 2017. I have knowledge of automobile mechanic systems acquired at school and in my family's garage over the years. In addition, I also acquired customer service skills during my part-time employment as a waiter while in high school.*

### Comments

*Your answer is good. You gave essential information about yourself. It's very important that you added that you have a specialisation and a certification in auto repair. Your speaking about your experience is also a good point. Your customer service skills experience is worth mentioning as it is requested in the job description. However, you could show more clearly that you're interested in the job.*

### Unprepared answer

*There are so many things I can tell you about me... What precisely do you want to know?*

### Comments

*This answer is not to your advantage. It shows that you haven't prepared for the interview- as this is one of the questions any applicant expects to be asked.*

The simulation teaches young people not only what elements are essential to be included in a complete answer but also how to make their answer convincing. Students are told to avoid listing arguments and are asked to support their arguments by giving concrete justifications from their own experience, anchoring their answers to their development and the company they want to be part of.

Thus to the question "Why do you want this job?" the employer expects concrete explanations supporting interest in the job; all supporting details should be related to personal experience, the role that company has on the market, or personal future development in the company. The simulation insists on the candidate giving support to justify their answer in order to be convincing and make a good impression on the employer.

**Example: Why do you want this job?**

Answer

*I love repairing cars and the satisfaction I get from helping customers solve their car problems. Besides this, I've always been passionate about cars, my interest in cars began in childhood: I have been working on cars in my father's garage since I was twelve years old. Besides, I think this company is doing great things, so I want to be part of it. I would like to invest in these skills in the future as well and continue to work as an auto mechanic.*

Comments

*Your answer is very good; you show that this job is not just a job but a passion and that you relate your work to the customer's satisfaction. It is very good that you mentioned your long lasting interest and that you've made steps since you were younger in practicing it. It was very good that you said that you consider the company as being important on the automobile market and that you related your future development to the company.*

**Example: Why do you want to work with us?**

Answer 1

*I've been interested in this company for a long time and I know that you have a good reputation on the market. Best Car Service is committed to the highest quality and offers a full range of services.*

*I consider myself well-suited for the job, as a mechanic, because I'm team-oriented, focused, and responsible; I would like to be part of your team. I know that your company can help me to develop my skills and I saw that you also offer competitive compensation and benefits.*

Comments

*Your answer is very good. You showed that you know the history of the company and that you know the motto of the company. It is a very good point that you pointed out your skills along with the job description requirements. This shows that you know very well what the job expectations are.*

Answer 2

*It's a nice place with wonderful people.*

Comments

*The answer is too general; it can apply to any interviews. If you can't provide specific details about why you want the job, the interviewer will assume that you're not very interested in the company.*

The simulation teaches students how important it is to show one's interest, for instance by asking questions. Questions show initiative and preparation: the candidate has envisaged the working place and all its defining elements before the interview; taking into account each component helps the candidate give good answers. Each detail counts a lot and speaks volumes about the candidate, who should not be afraid of asking questions himself.

**Example: Let me know what you would like to know about your work place on your first day.**

*Answer 1*

*I would like to see the workbench where I will work and the tools I will use. I would like to meet my colleagues and learn the professional rules. In addition, I think I would like to observe the team working and check my responsibilities. If I have questions, I will ask.*

**Comments**

*It is essential to get familiar with your working place and equipment to be used. Figure out the working teams and landscape. Learn the professional rules. Listen and observe. Prepare and ask questions.*

*Answer 2*

*I don't want to neglect any duties, so I think it is better for you to tell me what I'll have to do.*

**Comments**

*Your answer doesn't show any interest and initiative. Try to be more interested in the place you will work in; ask about your responsibilities and the colleagues you will work with.*

By accessing the simulation students are introduced to customer service rules, how to deal with customers, to be polite, ask for customers' permission or apologise.

**Example: Customer mentions a strange noise coming from the front side of the car, from the left wheel. What should an auto mechanic do?**

*Answer 1*

*Ask for the customer's permission to do a road test. Transfer the car in the service and place it on a forklift. The mechanic checks all the components from the steering system and suspensions. Remove the front wheel to check the damaged parts. Identify the issue. Put the diagnosis. Inform the customer on the car issue and what you have to replace (the steering rod and the arm bushing). After replacing the parts, you advise the customer to adjust the steering angle of the car.*

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### **Comments**

*Your answer is very good; it shows respect for your customer (asking for his permission to do the test) and follows all the steps an auto mechanic should consider.*

### **Answer 2**

*Check all the components from the steering system and suspensions. Remove the front wheel to check the damaged parts. Identify the issue. Put the diagnosis. Inform the customer on the car issue and what you have to replace (the steering rod and the arm bushing). After replacing the parts, you advise the customer to adjust the steering angle of the car.*

### **Comments**

*Your answer is almost good because you forgot that it is essential to ask for the permission of the customer to do a road test so that he/she is able to help you in identifying the car problem.*

## **Conclusions**

The www project's online apprenticeship simulator offers young people opportunities to cope with changes, to link school to the world of work and get the employability, entrepreneurship and digital skills necessary to get a job. The simulator involves students in interactive training sessions of apprenticeship, proposing virtual work situations centring round several jobs identified as most wanted by the project research (mechanic, electrician, nurse etc.). The simulator facilitates bridging the gap between theory and practice. Thus, by applying what they have read and learned in concrete contexts that are personally relevant to them the students also develop and enhance their critical thinking, problem solving and decision making skills along with the specific job related skills. That makes this approach to learning so engaging and memorable.

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## LE INTERAZIONI TRA DOCENTI NEI SOCIAL NETWORK: UN CASO DI STUDIO SUI GRUPPI CHIUSI DI FACEBOOK

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### Obiettivo della ricerca

I social network sono entrati a far parte dell'esperienza quotidiana di moltissime persone, sia per scopi ludici e sociali che per motivi formativi o professionali. Riguardo questo ultimo aspetto, le ricerche più recenti stanno indagando sulla validità di questi strumenti come luogo per l'apprendimento informale e opportunità per il lifelong learning professionale. La presente ricerca, di carattere quanti-qualitativo, intende indagare i contenuti e i significati delle interazioni che avvengono all'interno di alcuni gruppi Facebook, in particolare quelli dedicati ai docenti. L'obiettivo è quello di comprendere in che misura Facebook rappresenti un supporto per l'arricchimento e la formazione professionale degli insegnanti, soprattutto tramite la condivisione di pratiche ed esperienze ideate dai singoli e messe a disposizione della comunità. Prima di procedere con la ricerca sono state ripercorse alcune delle tappe che hanno condotto alla nascita di questi gruppi di professionisti che si riuniscono nei social network. È stata esplorata l'importanza del concetto di *lifelong learning*, o formazione continua, e le tappe storiche che hanno condotto al suo riconoscimento come perno su cui si fonda la società del cambiamento. Successivamente è stato indagato il contributo offerto in quest'ottica dalla costituzione di comunità di professionisti che si riuniscono per accrescere la propria formazione professionale, in particolare con riferimento al concetto di comunità di pratica teorizzato da Wenger. La diffusione delle tecnologie e di internet ha portato ad una rivoluzione nel panorama della formazione professionale e delle comunità di pratica perciò si è passati allo studio di alcuni autori, come Calvani e Trentin, che si sono occupati dello studio e della definizione di queste realtà professionali. Infine, sono stati presi in esame i più recenti contributi, in particolare in ambito italiano, legati all'uso dei social network come Facebook nella formazione professionale.

### Il campione

Il campione preso in esame da questa ricerca è formato da quattro gruppi Facebook dedicati principalmente ad insegnanti di ogni ordine e grado. Tutti i gruppi selezionati sono di tipo chiuso e tematico; la prima caratteristica fa sottintendere una maggiore selezione delle iscrizioni al gruppo e quindi un monitoraggio più rigido da parte degli amministratori. La seconda serve a garantire una certa omogeneità dei risultati, poiché sono stati scelti dei gruppi caratterizzati da un interesse verso un argomento specifico, più precisamente inerenti l'uso delle tecnologie; i gruppi sono rispettivamente dedicati all'uso della lavagna interattiva multimediale (LIM),

all'uso dell'iPad, agli animatori digitali ed infine alla pratica del coding assieme a quella della robotica. Inoltre, tutti i gruppi sono accomunati dalla volontà dei fondatori di riunire una comunità di docenti per lo scambio di informazioni, suggerimenti, esperienze e impressioni. Di seguito sono riportate le caratteristiche principali dei quattro gruppi.

Tabella 1: I quattro gruppi indagati

Nome	Anno di nascita	Numero di membri*	Numero di amministratori	Finalità
DOCENTI E LIM 2	2011	3.680	3	"Docenti e LIM è uno spazio di scambi didattici, di best practice, anche, a volte, di sfoghi mantenendo ovviamente un tono adeguato"
L'iPad in classe	2011	2.731	4	"Questo 'luogo' è riservato ai soli docenti che hanno usato, usano e useranno l'iPad in classe..."
Animatori Digitali	2016	2.083	1 (+ 1 moderatore)	"aiuta i tuoi colleghi a trovare risposte utili ai quesiti che vengono posti, indica i libri che per te rappresentano una risorsa di crescita professionale racconta i tuoi progetti o esperienze che hai vissuto che possano essere utili ad altri insegnanti"
Robotica educativa e coding	2015	2.690	4	"L'obiettivo di questo gruppo è quello di creare una comunità aperta a tutti, incentrata su robotica educativa e coding, in cui sia possibile confrontarsi, sostenersi, scambiare esperienze didattiche, attività, suggerimenti."

\*Dimensioni del gruppo al 21 ottobre 2017.

## Metodologia e fasi della ricerca

Sono stati analizzati tutti i post pubblicati su ognuno dei quattro gruppi nell'arco di 12 mesi, a partire da luglio 2016 fino a giugno 2017. Da un primo esame superficiale è emersa la presenza di post non inerenti alla tematica di riferimento o non conformi alle istruzioni fornite dagli amministratori nella descrizione iniziale, i cosiddetti *off topic*. Per questa ragione prima di procedere con l'analisi dei singoli post è stato scartato il materiale non inerente. Successivamente i post sono stati analizzati tramite una codifica a posteriori del testo e sistemati in categorie di classificazione tratte dai risultati ottenuti dal lavoro di Ranieri, Manca, e Fini (2012) e dall'indagine svolta da Frumiento e Ranieri (2013) per essere infine adattate ai dati ottenuti da questa ricerca:

- **Aggiornamento professionale:** si tratta di un raggruppamento unico per tutti quei post che contribuiscono all'aggiornamento professionale dell'insegnante tramite la segnalazione di eventi e di risorse (collegamenti a link che riguardano articoli giornalistici o informativi, pagine web, blog, informazioni su nuove tecnologie, cioè

tutte le risorse che vengono segnalate tramite altre pagine web). (Frumiento & Ranieri, 2013).

- Esperienze didattiche: si tratta della categoria di maggiore interesse per questa ricerca e contiene tutti quei post che riguardano la condivisione di pratiche, esperienze, risorse, progetti che i docenti hanno ideato e sperimentato personalmente, e che vogliono condividere con gli altri.
- Messaggi personali: riguardano sia riflessioni personali sul mondo scolastico che altre forme stereotipate di discorso (saluti, auguri e soprattutto ringraziamenti).
- Richieste di aiuto: si tratta di tutte le domande da parte dei membri, che espongono il proprio problema e sperano di trovare risposta all'interno del gruppo.

## I risultati: dati descrittivi

Nel corso dei 12 mesi è stato pubblicato un totale di n. 1824 post così distribuiti:

Tabella 2: Totale dei post pubblicati per ogni gruppo

	Mesi	Gruppo 1	Gruppo 2	Gruppo 3	Gruppo 4	Totale
2016	Luglio	30	49	26	22	127
	Agosto	8	26	30	22	86
	Settembre	57	52	47	49	205
	Ottobre	40	48	31	58	177
	Novembre	46	42	49	51	188
	Dicembre	33	52	34	35	154
2017	Gennaio	44	71	37	52	204
	Febbraio	26	35	40	49	150
	Marzo	30	44	43	57	174
	Aprile	22	28	22	47	119
	Maggio	25	15	27	33	100
	Giugno	46	34	35	25	140
	Totale	407	496	421	500	1824
	M mensile	33,92	41,33	35,08	41,67	38

Sul totale dei post pubblicati nei quattro gruppi è stata calcolata una media mensile di n. 38 post, con alcuni mesi più attivi rispetto ad altri. In particolare, si può notare come nei mesi di settembre, novembre e gennaio in ognuno dei quattro gruppi siano stati pubblicati un numero di post superiore alla media mensile, mentre ad agosto e maggio inferiore. Nella prima fase dell'analisi per ognuno dei quattro gruppi sono stati isolati i post inerenti da quelli non inerenti (*off topic*), mentre i post che presentano un contenuto non visualizzabile sono stati etichettati come non valutabili. Di seguito vengono riportati i risultati ottenuti per ogni mese analizzato.

Tabella 3: Distribuzione per inerenza: gruppo1 – DOCENTI E LIM 2

Mesi	Totale	Inerenti	Non inerenti	Non valutabili
Lug	30	3	27	0
Ago	8	0	8	0
Sett	57	10	45	2
Ott	40	9	31	0
Nov	46	8	38	0
Dic	33	12	21	0

## Le Interazioni tra Docenti nei Social Network: Un Caso di Studio sui Gruppi Chiusi di Facebook

Francesca Zanon, Denise Benvenuto

Genn	44	10	30	4
Febb	26	5	21	0
Mar	30	8	22	0
Apr	22	8	14	0
Magg	25	14	10	1
Giu	46	32	14	0
Totale	407	119	281	7
%	100	29	69	2

Tabella 4: Distribuzione per inerenza: gruppo2 – L'iPad in classe

Mesi	Totale	Inerenti	Non inerenti	Non valutabili
Lug	49	26	22	1
Ago	26	17	8	1
Sett	52	34	14	4
Ott	48	32	16	0
Nov	42	20	22	0
Dic	52	34	18	0
Genn	71	34	34	3
Febb	35	14	20	1
Mar	44	25	17	2
Apr	28	10	18	0
Magg	15	8	7	0
Giu	34	20	12	2
Totale	496	274	208	14
%	100	55	42	3

Tabella 5: Distribuzione per inerenza: gruppo3 – Animatori Digitali

Mesi	Totale	Inerenti	Non inerenti	Non valutabili
Lug	26	19	7	0
Ago	30	21	8	1
Sett	47	40	7	0
Ott	31	25	6	0
Nov	49	25	20	4
Dic	34	17	15	2
Genn	37	24	12	1
Febb	40	30	10	0
Mar	43	25	17	1
Apr	22	14	8	0
Magg	27	18	9	0
Giu	35	24	11	0
Totale	421	282	130	9
%	100	67	31	2

Tabella 6: Distribuzione per inerenza: gruppo4 – Robotica educativa e coding

Mesi	Totale	Inerenti	Non inerenti	Non valutabili
Lug	22	21	1	0
Ago	22	18	4	0
Sett	49	42	3	4
Ott	58	53	2	3
Nov	51	50	0	1

## Le Interazioni tra Docenti nei Social Network: Un Caso di Studio sui Gruppi Chiusi di Facebook

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Dic	35	35	0	0
Genn	52	46	5	1
Febb	49	46	2	1
Mar	57	44	8	5
Apr	47	41	5	1
Magg	33	32	1	0
Giu	25	23	2	0
Totale	500	451	33	16
%	100	90	7	3

I risultati ottenuti nei quattro gruppi sono abbastanza eterogenei. Come si può osservare nella Tabella 3 relativa al gruppo1, nell'arco dei 12 mesi indagati è stato pubblicato un totale di 407 post e solo 119 tra questi (corrispondenti al 29%) risultano inerenti alle finalità descritte dagli amministratori ( $p=0,004$ ). Il gruppo2 ha una percentuale di post inerenti pari al 55% (274 su 496 totali,  $p=0,03$ ) mentre il gruppo3 pari al 67% (282 su 421 totali,  $p=0,0001$ ). Infine, il gruppo4 è caratterizzato da una alta percentuale di inerenza, pari al 90% (451 su 500 totali,  $p=2,6$ ). I post inerenti ricavati dall'analisi appena esposta, sono stati ulteriormente elaborati ed assegnati alle rispettive tipologie; i risultati ottenuti sono illustrati di seguito.

Tabella 7: Distribuzione per categorie: gruppo1 – DOCENTI E LIM 2

Mesi	Agg. Profess.	Esp. didattiche	Mess. personali	Richieste d'aiuto
Lug	2	1	0	0
Ago	0	0	0	0
Sett	6	2	1	1
Ott	3	5	0	1
Nov	4	1	0	3
Dic	10	2	0	0
Genn	8	2	0	0
Febb	3	2	0	0
Mar	5	2	1	0
Apr	5	2	1	0
Magg	7	1	6	0
Giu	2	1	29	0
Totale	55	21	38	5
%	46	18	32	4

Tabella 8: Distribuzione per categorie: gruppo2 – L'iPad in classe

Mesi	Agg. Profess.	Esp. didattiche	Mess. personali	Richieste d'aiuto
Lug	23	1	1	1
Ago	13	2	2	0
Sett	26	1	7	0
Ott	30	1	0	1
Nov	16	2	1	1
Dic	13	2	19	0
Genn	17	7	9	1
Febb	10	3	0	1
Mar	21	2	1	1

Apr	5	4	1	0
Magg	6	2	0	0
Giu	9	3	8	0
<b>Totale</b>	<b>189</b>	<b>30</b>	<b>49</b>	<b>6</b>
<b>%</b>	<b>69</b>	<b>11</b>	<b>18</b>	<b>2</b>

Tabella 9: Distribuzione per categorie: gruppo3 – Animatori Digitali

Mesi	Agg. Profess.	Esp. didattiche	Mess. personali	Richieste d'aiuto
Lug	14	1	2	2
Ago	14	0	2	5
Sett	29	0	6	5
Ott	18	0	3	4
Nov	17	0	7	1
Dic	14	0	2	1
Genn	23	0	1	0
Febb	18	1	8	3
Mar	16	0	4	5
Apr	13	0	0	1
Magg	10	2	4	2
Giu	7	0	13	4
<b>Totale</b>	<b>193</b>	<b>4</b>	<b>52</b>	<b>33</b>
<b>%</b>	<b>68</b>	<b>1</b>	<b>19</b>	<b>12</b>

Tabella 10: Distribuzione per categorie: gruppo4 – Robotica educativa e coding

Mesi	Agg. Profess.	Esp. didattiche	Mess. personali	Richieste d'aiuto
Lug	8	9	3	1
Ago	15	1	2	0
Sett	35	4	4	1
Ott	40	9	4	0
Nov	30	15	4	1
Dic	27	6	2	0
Genn	27	14	5	0
Febb	29	10	4	3
Mar	26	14	2	2
Apr	16	8	13	4
Magg	22	7	1	2
Giu	12	9	2	0
<b>Totale</b>	<b>285</b>	<b>106</b>	<b>46</b>	<b>14</b>
<b>%</b>	<b>63</b>	<b>24</b>	<b>10</b>	<b>3</b>

In ognuno dei quattro gruppi i post più numerosi sono quelli sull'aggiornamento professionale, che nei gruppi 2, 3 e 4 superano il 60% del totale (gruppo 2: 69%; gruppo 3: 68%; gruppo 4: 63%). Inoltre, va specificato che i messaggi personali sono quasi esclusivamente composti da ringraziamenti. Addentrandosi nell'analisi dei singoli casi, nel gruppo1 si nota un picco nel numero di messaggi personali nel mese di giugno (29 su 38), mentre nei mesi precedenti, ad eccezione di maggio, il numero di tali post si aggira tra 0 e 1. Le richieste di aiuto sono in totale 5, mentre i post che riguardano la condivisione di esperienze didattiche rappresentano il 18%

del totale. Nel gruppo2 i post che riguardano le esperienze didattiche rappresentano l'11% mentre i messaggi personali sono il 18% e come per il gruppo precedente sono caratterizzati da un picco nel mese di dicembre (19 su 49). Le richieste d'aiuto sono solo il 2%. Per quanto riguarda il gruppo3 si evidenzia un ridotto numero di post riguardanti la condivisione di esperienze didattiche (1%) ma una percentuale relativamente alta di richieste d'aiuto, pari al 12%. Anche in questo caso la categoria dei messaggi personali presenta un incremento di post concentrati in uno specifico mese. Infine, il gruppo4 presenta una percentuale abbastanza alta di post riguardanti la condivisione di esperienze didattiche (24%) e piuttosto bassa di richieste d'aiuto (3%); anche qui la categoria dei messaggi personali è caratterizzata da un incremento di valori nel mese di aprile.

### **Commenti**

I dati qui raccolti e analizzati permettono di effettuare alcune considerazioni relative alle modalità di utilizzo di Facebook da parte dei docenti; queste non hanno la pretesa di diventare delle generalizzazioni estendibili ad ogni realtà ma vogliono rappresentare uno spunto di riflessione e perché no, uno pretesto per mettere in discussione l'utilizzo di Facebook e dei social network in ambito professionale. Innanzitutto, è stata riscontrata una distribuzione abbastanza costante dei post pubblicati mensilmente, con una media che si aggira sui 38 post al mese, almeno uno al giorno. Per quanto riguarda la percentuale di inerenza dei post, questa varia per ogni gruppo e il dato più interessante riguarda la bassa inerenza dei post pubblicati su DOCENTI E LIM 2 seguito da L'iPad in classe. Per il gruppo1 questo dato potrebbe essere spiegato da almeno due fattori; il primo riguarderebbe proprio il nome, che farebbe pensare ad un gruppo dedicato ai docenti in generale e solo in secondo luogo all'uso della lavagna interattiva multimediale, con la conseguenza che molti docenti si sentirebbero liberi di pubblicare post riguardanti il mondo scolastico in generale. Il secondo fattore potrebbe essere riconducibile ad un basso controllo da parte degli amministratori, che hanno il potere di filtrare e selezionare i post che vengono pubblicati da parte degli utenti iscritti; analogamente anche per il gruppo2 sembrerebbe esserci un basso controllo dei contenuti pubblicati, poiché il nome "L'iPad in classe" è specifico e non basterebbe a spiegare una percentuale così alta di post non inerenti. Infine, è interessante valutare l'alto tasso di inerenza del gruppo4, che potrebbe essere spiegato, oltre che dal maggiore controllo degli amministratori, dal fatto che la robotica educativa, e in secondo luogo il coding, sono una metodologia piuttosto emergente e ancora poco diffuse nelle scuole; questo potrebbe far presupporre una fascia di utenti omogenea, composta da docenti o appassionati che fanno attivamente uso di queste tecnologie e più interessati allo scambio di informazioni e pratiche. Venendo all'analisi della tipologia dei post raccolti, è stata registrata un'alta percentuale di post riguardanti l'aggiornamento professionale; questo dato va a confermare i risultati ottenuti da Frumiento e Ranieri (2013) che nel loro studio su un gruppo Facebook di docenti, avevano individuato questo tipo di contenuti come quelli più frequenti. Anche per quanto riguarda la categoria dei messaggi personali si riscontrano similarità con la ricerca di Frumiento et al. (2013), che avevano evidenziato un aumento improvviso di messaggi con funzione fatica concentrati in giornate specifiche. Le richieste di aiuto sembrano occupare una posizione di poco conto rispetto agli altri post, anche se la

percentuale rilevata nel gruppo Animatori Digitali sottolinea una più elevata necessità da parte dei membri di ricevere chiarimenti e informazioni. Questo potrebbe essere spiegato dal fatto che tale gruppo non è dedicato ad una pratica specifica, ma a docenti che hanno determinati compiti e responsabilità (relative all'innovazione tecnologica); tale tipologia di comunità sembra quindi più interessata a discutere di problematiche o a ricevere determinati aggiornamenti piuttosto che alla condivisione di esperienze e progetti intrapresi nelle proprie scuole. Infine, è interessante soffermarsi più approfonditamente sul dato che riguarda la condivisione di esperienze. Quello che emerge è una bassa percentuale di post appartenenti a questa categoria, che nel migliore dei casi si attesta intorno al 24%; questo potrebbe dimostrare che l'elemento della condivisione di pratiche ed esperienze non sia uno degli obiettivi più importanti all'interno di questi gruppi, nonostante le finalità espresse dai fondatori/amministratori facciano pensare il contrario. Questa inclinazione potrebbe trovare riscontro nel fenomeno della *digital content curation* e più precisamente nelle conseguenze causate da questa pratica: la quantità di contenuto condiviso sembra superare quella di contenuti creati. In effetti la *social recommendation* (ossia la raccomandazione di certi contenuti da parte degli utenti) viene indicata una tendenza che si sta affermando rispetto alle tradizionali modalità di accesso e fruizione delle notizie online (Ranieri & Manca, 2013).

### **Aspetti critici**

Uno degli aspetti critici riscontrati nel presente lavoro riguarda la metodologia applicata, cioè quella della ricerca interpretativa tramite codifica a posteriori del testo; ciò riconduce ad una scarsa affidabilità dei risultati dovuta all'ampio margine di interpretazione del ricercatore. Un possibile rimedio è quello di far condurre il processo di codifica a due o più codificatori, i quali poi confrontano il sistema di categorie costruito giungendo ad un accordo di interpretazioni (Trincherò, 2009). Un altro aspetto critico è rappresentato dal tipo di contenuto che si è scelto di analizzare. Infatti, data la quantità di materiale da codificare si è preferito non indagare anche i commenti, le condivisioni e i "mi piace" annessi ad ognuno dei post. Inoltre, il campione selezionato rappresenta un determinato tipo di utenza, per questo i dati raccolti potrebbero non trovare corrispondenza con un'altra tipologia di gruppo. Per quanto riguarda le caratteristiche proprie di Facebook, è importante tenere presente che i membri del gruppo hanno la possibilità di pubblicare o condividere ripetutamente lo stesso identico contenuto; questo aspetto fa sì che alcuni dei dati raccolti possano essere in qualche modo compromessi dalla presenza di molteplici post uguali. Infine, bisogna sottolineare che non è stata fatta una distinzione tra il contenuto pubblicato dagli amministratori e quello pubblicato dal resto degli utenti; anche questo dato consentirebbe di chiarire le dinamiche di un gruppo e come vengono influenzate le tipologie di contenuti condivisi.

### **Conclusioni**

I quattro gruppi analizzati in questa ricerca sono un campione rappresentativo di una sola parte della complessa realtà dei gruppi Facebook dedicati ai docenti. Dal punto di vista quantitativo i risultati rilevati sono simili per tutti i gruppi, ovvero la quantità di contenuto pubblicato è abbastanza omogenea tra le quattro realtà. Per quanto riguarda l'analisi qualitativa, vi sono



gruppi in cui i post sono tendenzialmente inerenti alle regole e alle finalità del gruppo, mentre altri caratterizzati da una quantità elevata di messaggi *off topic*; tale differenza potrebbe essere spiegata da tre fattori e cioè la modalità in cui gli amministratori selezionano il materiale da pubblicare, ammesso che lo facciano, la chiarezza del nome scelto per il gruppo e il grado di diffusione e conoscenza generale sulla tematica. Inoltre, sono state registrate similitudini tra tutti i gruppi nella tipologia di post pubblicati; come dimostrato da altre ricerche, la maggior parte dei contenuti è finalizzato all'aggiornamento professionale ed è caratterizzato dalla ricca condivisione di materiale già pronto e rintracciato nel web. Al contrario vi è una bassa tendenza a creare contenuto o scambiare materiale prodotto autonomamente o riferito ad esperienze personali. Sembrerebbe quindi che il livello di collaborazione raggiungibile in gruppi di questo tipo rimanga su un livello superficiale e impersonale, caratterizzato dalla volontà di aiutare gli altri nell'aggiornamento continuo su tutte le novità del mondo scolastico anche tramite la pubblicizzazione di convegni e risorse web, ma allo stesso tempo dalla resistenza allo scambio di risorse personali ed esperienze realmente vissute.

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## DIGITAL LEARNING FOR BOTH SELF-DIRECTED AND COOPERATIVE LEARNING IN LIFELONG LEARNING

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### Abstract

In this paper we navigate in the micro and meso dimension of educational training. In particular, we would like to focus on a didactical blended learning design, called 3Methods (3M), which involves self-directed learning (micro-dimension) by digital learning and teamwork cooperative learning within a University environment (meso-dimension). The design is essentially based on mobile digital didactics realized by the e-learning centre of the University of Modena and Reggio Emilia. The 3M is appositely studied to be applied to a scientific course of the first University year. The principal aims of 3M are the following: (a) to start educating for lifelong learning; (b) to correctly acquire a new “forma mentis” typical of the scientific subjects. The 3M gives the possibility to practice the suitable scientific specialized language, theory and exercises before doing the final examination, in a class team-work training context through peer discussions and/or the guide of an expert facilitator. Some results of the students’ perceptions, feedbacks and performances about this first experimentation are reported.

### Introduction

Flavia Colonna and Glenn Easley (Colonna et al., 2011) suggested that any teacher has to help students to reach their best possible performance, which is necessary especially in scientific subjects. The authors outline the necessity of a radical change of the traditional didactic methods, which are only beneficial for a limited number of students. They suggest to change the teacher way of thinking starting from both primary and secondary school when the students’ minds are more malleable. However, teachers themselves are influenced by their didactic experiences implemented during the course of their studies and therefore also at University. Some teachers tend to emulate their professors without even thinking of alternative didactic methods, thus perpetuating a model that could be greatly improved. Therefore, also for future teachers, it becomes really useful and important to change the teaching strategy in the didactic experiential path at University. A teaching strategy must certainly take into account the learning outcome but also the didactic methods adopted to facilitate learning. Felder and Silvermann (1988) underlined in the Index of Learning Style Theory the importance of reaching the appropriated learning styles for most possible students. These learning styles can be shortly listed as follows: Active, Reflective, Sensing, Intuiting, Visual, Verbal, Sequential and Global. Just a brief example: intuitive people may be quicker at grasping new concepts and feel often more comfortable than sensing people with abstractions and mathematical formulation. Active

learners tend to best retain and understand information by doing something active with it, i.e. by discussing or applying it or explaining it to others.

In this paper a didactic strategy is proposed to help students of a first university scientific course, with the aim to offer them the opportunity to reach the best possible academic performance in maths. It is based on (mobile) digital learning (see Section 3) combined with two active methods (described in Sections 4 and 5), namely Training Student Class (TSC) and modified Team Based Learning (mTBL), which required students to work cooperatively. There are also different goals of this new didactic strategy, one of them is to stimulate the self-directed learning which is the first step towards lifelong learning; another important one is to improve active and cooperative learning in order to facilitate also active learners or those who felt less familiar with the subject. This study is introduced in Section 2 while Sections 6 and 7 describe the results, the discussion and the conclusion.

## **The study**

This work is carried out within the module of Geometry held at the University of Modena and Reggio Emilia, Italy at “Dipartimento di Fische, Informatiche e Matematiche” in the 2017/18 academic year. It analysed the results of the students’ knowledge and perception in the framework of a collaborative and active learning way of teaching (Johnson et al., 1989). The students were given a questionnaire on their perception of the new didactic methods in order to improve them. The Geometry module was attended by 40 students.

The course lasted 12 weeks and was divided into two parts: six weeks reserved to a juxtaposition of on line education (videos) and a traditional classroom teaching and other six weeks reserved to the application of the Flipped Classroom method (Santiago, 2014), integrated with the new opportunities offered by technology: a type of blended learning which is an educational proposal aimed at attaining a new product towards cooperative learning and active learning. (Johnson, 1989))

The following needs-problems (n-p) are at the fundamental pillars behind the choice of the didactic methods illustrated below:

- To educate to lifelong learning;
- To stimulate a self-directed study;
- To empower a pre-preparation study before the class-activities;
- To acquire a specific and correct scientific “forma mentis” typical of a scientific university course;
- To train theory and practise, also with errors, in order to reach a deep exploration of the introduced concepts;
- To guarantee the right evolution of the course even if a student misses some class activities;
- To learn in a team.
- Often only 7% of what a speaker says (with words) is acquired by the listener.

## Digital Learning for Both Self-Directed and Cooperative Learning in Lifelong Learning

Beatrice Ruini

- The physical and mental involvement of the students in the studied topics leads to a deeper comprehension of the subject.
- Each student has different learning styles at his/her disposal, but it is essential for him/her to match his/her favourite individual learning style in order to reach the best possible “performance”.

In the next three Sections the three didactic methods chosen are shown – they are all integrated in order to solve the needs-problems from 1 to 10, namely:

- mDL: (mobile) Digital Learning;
- TSC: Training Student Class;
- mTBL: (modified) Team Based Learning.

The methodologies Training Student Class and (modified) Team Based Learning are realized only thanks to the (Mobile) digital learning support, in other words mTBL and TSC are based on mDL.

### (Mobile) digital learning

The Geometry module is a BLECS course which means that more than 70% of the lessons of the course are available to students on the platform Dolly (Moodle) of the University of Modena and Reggio Emilia, which the students can use with any mobile device or computers. The digital-lessons are organized in 20 videos of about 20 minutes each, realized by the Centre of E-learning of the University of Modena and Reggio Emilia. The Mobile digital learning is an answer to some of the needs listed below:

- (n-p) 2.: it educates students to autonomously study with the use of the videos by following a scheduled timetable from the first week of the course. In the meantime, as many times as students want, they may watch again the video topics that they have found harder to understand. The videos are supported by short guides, from which the video slides are taken. Also a bibliography is given, so that the interested student can find further details of a specific argument.
- (n-p) 1.: In lifelong learning people have to learn subjects by themselves but at the mean time they also have to find the study material. Since the digital didactic method just stimulates the self-learning on the basis of already available and preselected materials, it is just a first step towards lifelong learning.
- (n-p) 6.: It can happen that a student misses a lesson-class. With digital didactic the topics of the course are quite completely covered by videos, therefore if a student misses a lesson-class s/he just misses an in-depth study.
- (n-p) 9.: Students can organize the study of videos by choosing their own favourite time (Morning? Night?) and their own favourite space (Bus? Home? University? Outdoor?) in order to be more concentrate; they can stop the video every time they need, and in the mean time they can rewind the videos to listen again to some arguments not well understood: students are more mentally involved as protagonists of their own possibility of possessing knowledge.

- (n-p) 10.: Each video is supported by a small textbook so that it can offer instructions that students can both see, hear (video) and also read (textbook).

## **Training Student Class, TSC**

There are many advantages teaching in a class of 40 people. There is the opportunity to know the students' name and become familiar with their knowledge, learning styles and way of thinking about mathematical discussions. Learners have benefits from working in such small groups, because they increase the contact time with their facilitator-instructor. You will find out that learners are more comfortable asking questions in these small group sessions than in larger lectures.

There are two stages or phases in TSC. These can all take place in and around a single lesson-class. The stages are:

- Student preparation;
- Student-x in face-to-face contact with group-class.

### ***Student preparation***

In this stage, the student completes a task such as watching one or two videos (following the scheduled timetable) and/or a reading a few pages of the available manuals (from which the videos are directly constructed to help comprehension). This preparation is based on the (mobile) digital learning.

### ***Student-x in face-to face-contact with group class***

In this stage a learner (student-x) comes to the blackboard and the facilitator sits down with the other students. The student-x tries to summarize the assigned-video recalling definitions and/or proofs of prepositions/theorems. Moreover, he also attempts to solve related-problems. It is not important if he has well understood every concept and how the level of the student-x is: he is helped in the exposition step by step by each member of the class and by the facilitator. Every mistake is a great opportunity to underline the right version of the discussion/sentence/definition. The activity-class becomes a learning environment where students find time for assimilation, reflections, curiosity, tips. The class is no more a place for monotonous and or quick presentation from behind the podium and the teaching is not too elementary nor beyond comprehension levels: every student is involved and every student's answer mirrors the level of understanding. Finally, but not less important, the student-x beats the time avoiding that the teacher explains the reasoning too quickly.

The TSC Training Student class is an answer to needs:

- (n-p) 1-2-3: Thanks to the comparison with other students each student is motivated and reinforced to be prepared at the next class-activity, spending more time in self-directed learning and starting lifelong learning, thus becoming more responsible of his own learning

- (n-p) 4-5.: The “forma mentis” is acquired by students in class-activity since each student-x’s reasoning, deduction, definition, theorem, proof and exercise is checked and corrected step by step by the facilitator and class-group. Therefore, the student-x from the first week of the course has the possibility of explaining a mathematical concept in a correct way and of simulating an exam situation without being evaluated or judged.
- (n-p) 7.: The students practice and receive feedback in challenging interactions with other learners, with minimal threat. Moreover, they are stimulated in doing better and in contributing to the next discussion with evidence of preparation. It is obvious that the learners receive also frequent feedback and are encouraged by the facilitator.
- (n-p) 9.: Especially the student-x is physically involved in the lessons standing up at the blackboard and giving shape to his ideas with hands, chalk, pen and copybook and in this way he makes a physical and mental experience of “creating” maths.
- (n-p) 10.: This activity was particularly addressed to those students whose favourite learning style was a creative one (experience learning), but also reflective learners could benefit by simply thinking and sitting in the class.

### **(Modified) Team Based Learning**

The University of Modena and Reggio Emilia is participating in a didactic project which has adopted the Team Based Learning (see <http://www.teambasedlearning.org>; Michaelsen et al., 2008) as one of the possible teaching methods. The mTBL is an application of Team Based Learning made of four stages:

- Student Preparation;
- Readiness Assurance;
- Application;
- Peer Assessment.

#### ***Student Preparation***

In this stage, the student completes a task, such as watching four or five videos and/or reading the corresponding textbooks, and he takes part to the TSC related to the single assigned videos.

#### ***Readiness Assurance***

It uses a short set of open questions and exercises over the understanding of the assigned videos-manuals. The students individually take the test in half an hour and then the students take the same test again (in half an hour) but in a team of 7 people. Once the time is over, the “first team” who finished clarifies and shows his written work at the blackboard and each team that makes a correct comment on the exposition earns a score which is subtracted from the scores of the “first team” (this is called Cards Game I).

#### ***Application***

It uses a short set of open, higher-level application exercises in which each Team has to apply what they had to study for the Readiness Assurance creating a mathematical object with specific features. The available time is half an hour. Again, as in the Readiness Assurance, once the time

is over, the “first team” who finished, clarifies and shows his written work at the blackboard and each team that makes a correct comment on the exposition, earns a score which is subtracted from the scores of the “first team” (this is called Cards Game II).

### **Peer Assessment**

It is used to increase team members’ accountability to one another.

MTBL is obviously an answer to needs 1-2-3-5-7-8-9-10.

### **Questionnaires and results**

As regards the evaluation phase of the students’ perception of the experimentation, it has been decided to implement a qualitative research tool (with open questions) aimed at assessing the individual perception of the active and collaborative didactic activity in order to improve the flipped learning for the next year. Therefore, the student is given a questionnaire. The result has been satisfactory and it has risen students’ appreciation of blended courses associated with the three didactic methods: mDL, TSC, mTBL. The most relevant data for the purpose of the discussion come from the final questionnaire. The questionnaire section also proposed five statements which the students had to assess on a scale of 1 to 5. All five statements received very positive consensus:

- “I enjoyed working in a team (mTBL)” (4.32 out of 5);
- “I think the TSC didactic method is useful” (4.38 out of 5);
- “I suggest blended courses with mTBL and TSC from the beginning of the course” (4.38 out of 5);
- “The 3 mTBL done has boosted my study before the end of the course” (4.1 out of 5);
- “I feel more competent and certain in scientific discussions after attending the 3 mTBL” (4.1 out of 5);
- To the statement “I enjoyed the Cards Game. Why?” the class is divided in two parts, one appreciating the positive competition which creates more attention and participation, and the other part experiencing a bit of confusion in class, which broke the harmony of the team work creating a too noisy competition.

The analysis of the open answers to the questionnaire revealed that the students appreciated their work

- in mDL since they found the videos quite clear and very user-friendly to manage – thanks to the service of the e-learning centre of the University of Modena and Reggio Emilia;
- in mTBL since the students studied with other people, in a more informal way; they created discussions on several doubts and on how to find different solutions to the same problem, therefore the study became stimulating, motivating, funny and also more relaxing; in other words, it was not as hard as working alone;
- in TSC because it helped both the student-x and those who were sitting in the class: students were stimulated to better learn thanks to the comparison with student-x and



learning from the discussion with the peer group; moreover, the constant teacher support certainly helped to solve mistakes, to fill in gaps and difficulties; the rhythm of learning was more moderate than the more traditional lesson context (only one student considered the TSC slowing down what had already been understood but at the same time he realised that the TSC helped to better understand the subject). Moreover, the deadline of mTBL forced many students to study before the end of the course and they were stimulated to better perform in the subsequent mTBL activities, in order to create a more collaborative and efficient team.

Students were requested to complete the following sentence with a word: “the mTBL makes the study ...”; some of the chosen words are shown below: more continuous, interesting, simple, targeted, challenging, diluted, systematic, fluid, intriguing, flowing, light, motivated, less chaotic, less monotonous, less heavy, less boring, less complex. One student also completed the sentence by writing that “the mTBL makes the study a new approach to Geometry”. The percentage of 78.6% of the class definitely preferred team-tests (T-test) to individual tests (I-test).

In terms of knowledge acquisition, the average of scores is the following:

Table 3: Average scores for the students who participated in the 3 mTBL and took the final examination

Average of scores	I-tests	T-tests	Final examination
18-21	33%	17%	0%
22-26	50%	50%	50%
27-30	17%	33%	88%

The percentage of average scores from 27 to 30 for students who participated in the 3mTBL and took the final examination (in the first Session), the average scores increases from 17% for I-Test up to 88% for the Final examination.

## Conclusions

At the end of the experimentation, students who took the final examination in the first possible Session are 60% of freshman students and they had an excellent performance; the students who took part in all three mTBL activities are 80% of freshman students. The teaching efficacy and appreciation of the Flipped Classroom methods strongly depends on the class-activity carried out in the amount of time saved by using an innovative didactic approach.

In the class activity few questions were made about the videos, while a lot of problems were focused on the theory-applications: this means that the students applied the self-directed study of mDL in a successful way, thus starting to practice the methods of lifelong learning and becoming more aware of the individual way of learning in terms of cooperative learning, by acting as real protagonists of their university experience. The teamwork stage proved to be positive not only from a didactic point of view but also as far as socialization was concerned.

The results from the questionnaires reinforce the idea that it is possible, in a University context, to design and implement scientific didactic contents based on self-directed study, cooperative

learning and skills training with the great appreciation of students who feel more actively involved in their university life and the final result is really successful since nine to ten students took the highest score (greater than 27/30) in the final examination.

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## **ESPERIENZE DI DIDATTICA UNIVERSITARIA ATTRAVERSO UNA PIATTAFORMA VIDEO: LA PROSPETTIVA DEL DOCENTE E LE PROPOSTE DI STUDENT ENGAGEMENT**

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### **Introduzione**

Negli ultimi anni, dato il sempre più diffuso utilizzo di risorse video da parte dei docenti, è nata l'esigenza di adottare uno strumento condiviso che permettesse a tutto il personale di Ateneo di creare, gestire e condividere video. Tale bisogno, espresso soprattutto nei processi di didattica gestiti grazie alla piattaforma Moodle, si è manifestato anche cercando di superare i rigidi limiti imposti da Moodle per quanto riguarda i formati e le dimensioni di caricamento. Inoltre, l'uso discrezionale di altre piattaforme gratuite, o a pagamento, a seconda delle necessità, come YouTube, Vimeo o Amazon, aveva reso dispersivo e frammentario il monitoraggio e la interoperabilità delle risorse prodotte.

Dopo una ricognizione delle piattaforme disponibili che offrissero servizi video integrati, la scelta è caduta sulla piattaforma Video Kaltura, la prima piattaforma video open source per il video management. I principali motivi che hanno portato ad adottare tale piattaforma sono stati quindi:

- l'integrazione, che avviene facilmente ed efficacemente, con qualsiasi sito;
- le funzionalità avanzate e interattive multimediali, come ad esempio la ricerca, l'upload, l'importazione, l'editing, l'annotazione, il remix e la condivisione di materiale fotografico, video, e audio;
- l'integrazione con single sign on, che permette a tutta la comunità Unipd di accedere e usare strumenti per creare, modificare, salvare, visualizzare e condividere contenuti video e audio;
- la disponibilità per tutti di un software da installare in locale che registra facilmente video (video lezioni, video screen casting, interviste, video consegne, ecc) in autonomia con il proprio computer;
- la possibilità di utilizzare gli stessi strumenti attraverso due ambienti, il portale video Mediaspace (<https://mediaspace.unipd.it/>) e le piattaforme Moodle di Ateneo;
- la perfetta integrazione con Moodle attraverso un plugin di facile ed intuitivo utilizzo che rende il docente (ma anche lo studente) autonomo nella realizzazione, nel caricamento e nella pubblicazione dei video nei propri corsi;
- La piattaforma contiene anche funzionalità di collaborazione uniche che consentono a gruppi di utenti di creare dei flussi di lavoro collaborativi in tempo reale. Tutta l'attività

dalla ripresa alla distribuzione dei contenuti multimediali, passando attraverso l'editing video e audio, avviene all'interno della piattaforma stessa;

- La prima fase *pilot* è partita a gennaio 2017 con l'obiettivo principale di diffondere il più possibile lo strumento attraverso l'integrazione con il plugin Moodle, evidenziando subito le potenzialità d'uso nella didattica.

In questo paper si presentano alcuni dati progettuali, di monitoraggio e di ricerca del primo anno e mezzo di sperimentazione (secondo semestre dell'A.A. 2016/17 e entrambi i semestri dell'A.A. 2017/18) ovvero le azioni tecniche e formative compiute per introdurre Kaltura, la descrizione delle principali funzioni del doppio ambiente di utilizzo (Moodle e Mediaspace), la narrazione di alcune tra le esperienze didattiche di docenti da noi intervistati e alcune considerazioni connesse al potenziamento di strategie di *student engagement* attraverso la piattaforma video.

## **Risultati attesi e azioni di diffusione**

Il portale video è stato scelto inizialmente soprattutto per la perfetta integrazione con le piattaforme Moodle su cui si basa tutta l'architettura e-learning di Ateneo. Il plugin Kaltura per Moodle permette agli studenti, ai docenti e a tutto lo staff che ha accesso alle piattaforme Moodle, di registrare, caricare e pubblicare facilmente, nei propri corsi, video e audio di alta qualità.

Il progetto inizialmente si è concentrato sulla diffusione del modulo video integrato in Moodle tra i docenti di Ateneo, partendo da quei docenti che già usavano risorse video nei loro corsi. In un secondo momento abbiamo progettato e popolato il portale video per presentarlo al personale dell'Ateneo aprendo la pubblicazione di video e di canali a tutta la comunità dell'Università. Abbiamo in questo modo realizzato una serie di workshop (dati relativi al periodo 1 gennaio 2017 – 31 maggio 2018) che ha coinvolto complessivamente 350 persone (tra docenti e personale tecnico) e circa 400 circa studenti coinvolti in alcuni corsi universitari. Il numero totale di video pubblicati da strutture, dipartimenti e centri di Ateneo, a fine maggio 2018, è di circa 6.000 e il numero di contributori è pari a 724.

Tabella 1: Dati relativi al caricamento e alla fruizione video (dal 1 gennaio 2017 al 31 maggio 2018)

Numero di video caricati	Numero di visualizzazioni	Totale minuti visualizzati	Media minuti visualizzati	Media Drop-off visualizzazione
5.969	162.662	36823	13:34	54,44%

Nella tabella 1 è possibile vedere alcuni dati quantitativi riferiti all'intero sistema, relativi al periodo scelto: con il caricamento di circa 6000 video abbiamo avuto più di 160.000 visualizzazioni per un totale di quasi 37.000 minuti circa (pari a 615 ore circa) e una media di circa 13 minuti visualizzati per persona; la percentuale di drop off ci dice che circa il 54% esce dalla visualizzazione prima della fine del video.

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I risultati attesi per questo periodo di sperimentazione pilota, dichiarati prima del suo inizio, erano:

- raggiungere almeno 180 utenti attivi in piattaforma;
- ottenere il caricamento e la pubblicazione di almeno 500 risorse tra Moodle e Mediaspace
- aumentare l'interesse da parte del personale e la partecipazione ai workshop dedicati
- inserire il modulo video per Moodle

Dal confronto tra i risultati attesi e i dati finali possiamo affermare che lo strumento stia soddisfacendo pienamente le aspettative mostrando inoltre, mano a mano che passa il tempo, la varietà degli usi che docenti, ricercatori, personale tecnico amministrativo e studenti mostrano realizzando e pubblicando gli artefatti digitali.

L'offerta del portale e degli ambienti e *tool* ad esso connessi è stata affiancata da interventi formativi rivolti al personale che si sono concentrati inizialmente sul modulo video per Moodle, per favorire l'uso dello strumento a quei docenti che già nei propri corsi integravano videolezioni e materiali multimediali. Nei percorsi formativi è stata data enfasi alla facilità di realizzare video con lo strumento integrato "Capture Space" che permette di registrare dal proprio computer e dalla webcam collegata delle video lezioni, esigenza spesso emersa negli ultimi anni e fino ad ora per alcuni aspetti era ritenuta particolarmente complessa (software proprietari, peso eccessivo dei file video) e non di immediata realizzazione. Tale caratteristica della piattaforma sta quindi attirando molti utenti, che vedono semplificate (anche nella dotazione delle funzioni di editing a dire il vero) le loro azioni con il software.

### **Il portale video Mediaspace**

Mediaspace è un portale video che mette a disposizione degli utenti, quindi della comunità intera dell'Università di Padova, la possibilità di caricare e pubblicare video in un proprio canale, dividerli con un link privato, instaurare forme di collaborazione più o meno ristrette.

Il portale ha due principali funzioni. Nella parte che chiameremo portfolio/istituzionale vengono inseriti i video prodotti dall'Ufficio Digital Learning e Multimedia (DLM) che vengono aggiornati di continuo mano a mano che vengono rilasciati, in modo da creare un piccolo palinsesto aggiornato. Nel dettaglio troviamo video promozionali per corsi di laurea, promozionali per progetti europei, documentazione di eventi e conferenze organizzati dall'Università, documentazione di laboratori e progetti organizzati dall'Università, comunicazione e disseminazione della ricerca, video relativi al patrimonio scientifico dell'Università, tutorial, interviste e brevi reportage, lezioni e presentazioni. In un futuro prossimo anche i referenti dei vari Dipartimenti, delle Scuole, dei Centri e degli Uffici potranno pubblicare sulla parte istituzionale.

Nella parte dedicata ai canali sono gli stessi utenti a creare e caricare i loro video. Per il momento l'argomento e i temi dei canali non hanno restrizioni particolari. Si possono creare canali per un progetto o per un dipartimento, per una playlist di video lezioni o per condividere pratiche

digitali. Analizzando i canali troviamo le seguenti tipologie di video pubblicate: tutorial, interviste, video informativi, promozionali, lezioni/presentazioni, documentazione eventi, comunicazione della ricerca, progetto alternanza scuola lavoro, concorsi. Nella parte istituzionale/portfolio di Mediaspace sono stati caricati 70 video prodotti dal Servizio Digital Learning e Multimedia per un totale di 1100 visualizzazioni. Nei channel pubblici sono presenti circa 550 video e 200 foto.

## **Esperienze didattiche**

In letteratura si trovano narrate diverse esperienze e ricerche connesse con l'uso del video nella didattica universitaria. Nonostante sia una pratica consolidata, le evoluzioni tecnologiche degli ultimi anni (device e sistemi di video recording ed editing, accessibilità a repository online, supporto da parte di piattaforme di e-learning) hanno permesso una differente e maggiore diffusione sia in termini di tipologie di sperimentazioni che in termini meramente numerici. Alcuni recentissimi articoli ne mostrano gli aspetti più generali e trasversali (O'Callaghan et al., 2017; Lucarelli et al., 2017; Mendoza et al., 2015), altri invece presentano specificità legate al contesto o alla disciplina coinvolta (Wache & Teoh, 2017; Shen et al., 2017), altri ancora si concentrano sul coinvolgimento degli studenti stessi (Pappas et al., 2017). Sulla base di queste ricerche si può affermare che il video è uno strumento in grado di:

- agevolare il coinvolgimento degli studenti;
- facilitare la rielaborazione e la memorizzazione dei contenuti;
- proporre temi e processi context-oriented;
- simulare azioni professionali, situazioni comportamentali o performative;
- favorire processi di autoapprendimento e quindi di autonomia nello studio;
- fornire materiale di supporto e approfondimento alle lezioni in presenza integrandole ed espandendole in termini spazio-temporali;
- favorire gli aspetti osservativi dell'apprendimento;
- proporre contenuti multimodali per arricchire il processo d'apprendimento stesso.

A partire da tali considerazioni, il servizio DLM ha incentivato i docenti all'uso del video fornendo sia occasioni di formazione che l'accesso alla piattaforma Kaltura di Ateneo; dopo il primo anno e mezzo di utilizzo è possibile quindi fare un bilancio delle esperienze. A tal proposito alcuni tra i docenti più attivi nell'uso del video, e che utilizzano Kaltura, sono stati invitati a fornire un quadro della loro percezione ed esperienza della didattica con il video. L'adesione a tale indagine è stata volontaria e gli esiti sono riassunti nei seguenti paragrafi.

### **Opinione dei docenti sul ruolo del video nella didattica universitaria**

Nella prima parte dell'intervista i docenti coinvolti hanno espresso, secondo loro e in base alle loro esperienze, quale sia il ruolo del video nella didattica. Le affermazioni riportate in Tabella 1 sono state riordinate in base ad un decrescente livello di adesione. Riportiamo quindi le principali risposte (con indicata la percentuale) date dai docenti che rispecchiano le loro opinioni sul ruolo del video nella didattica universitaria:

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- Avere la possibilità per gli studenti di rivedere parti delle spiegazioni non chiare o di seguire più volte per potenziare la comprensione e la memorizzazione (92%);
- Avere la possibilità di presentare contemporaneamente diverse modalità (multimodalità) di comunicazione: uditiva e visiva, testo orale e scritto, immagini statiche, in movimento, animazioni, ecc. - (67%);
- Avere la possibilità per studenti assenti o non frequentanti di seguire ugualmente le lezioni (67%);
- Mettere a disposizione materiali e relazioni di autorevoli esperti disciplinari (67%);
- Mettere a disposizione materiali di archivio (58%);
- Proporre informazioni più strutturate e consequenziali, sintetiche, più ricche e dense di informazioni (50%);
- Avere la possibilità di proporre attraverso la visualizzazione esempi concreti, simulazioni e modelli di comportamento, scene sul campo, situazioni reali (50%);
- Sperimentare forme diverse di rappresentazione dei contenuti (50%);
- Consentire anche agli studenti di esprimersi con una forma di scrittura multimediale diversa da quella tradizionale scritta (17%);
- Proporre forme di analisi di testo diverse da quello scritto anche con sistemi di video-annotazione (8%).

Tra le diverse risposte ricevute, possiamo rilevare che quasi la totalità degli intervistati ritiene che con il video si possa potenziare la comprensione e la memorizzazione; mentre una buona percentuale crede che il video possa facilitare la “frequenza” e l’accesso a contenuti di qualità per degli studenti e facilitare l’apprendimento attraverso la compresenza di modalità comunicative ed esplicative di natura diversa. La metà degli intervistati crede che il video sia una modalità di proposta di informazioni più efficace e concreta. Infine sono pochi coloro che immaginano un uso attivo del video per lo studente (creato in prima persona o analizzato con adeguati strumenti).

### ***Motivi e modalità di utilizzo della piattaforma video di Ateneo***

L’introduzione della piattaforma ha dato la possibilità ai docenti di cimentarsi in nuove proposte didattiche o di riorganizzare pratiche già consolidate da anni. Per sintetizzare, i motivi che hanno portato i docenti da noi intervistati a utilizzare Kaltura sono di varia natura e sono descritti nei punti riportati di seguito:

- Risolvere delle problematiche di visualizzazione tramite tablet e smartphone da parte di studenti lavoratori e allo stesso tempo ripubblicare video realizzati con metodi obsoleti in un CdS interamente online;
- Aggregare risorse video online che si utilizzavano precedentemente;
- Dare la possibilità agli studenti di Padova di apprendere attraverso la visualizzazione di video creati da professori di altre università, anche straniere (accesso a risorse aperte – OER)
- Postare video di lezioni/esercitazioni o altro, prima ostacolata in buona parte dal limite di 256 Mb (limite di upload di Moodle);

- Per chi lavora con studenti adulti e con i GIS si sono presentate due necessità: (a) fornire materiali per chi non riesce a frequentare, (b) rendere visibili esercitazioni e dimostrazioni in maniera molto più efficace di una guida testuale o di presentazioni realizzate con PowerPoint;
- Una funzione fondamentale data dall'integrazione con Moodle ha portato ad adottarla e ad aggiornare o integrare il materiale già presente nel corso online;
- Poter presentare agli studenti materiale di archivio e didattico;
- Necessità di fornire contenuti nuovi agli studenti, non avendo sufficienti ore a disposizione per la didattica frontale.

Tutte le risposte sulle motivazioni hanno menzionato anche il fatto che le occasioni informative e formative sulla piattaforma video, proposte dall'Ateneo, ne hanno mostrato l'utilità e sollecitato l'introduzione nella gestione di singoli corsi universitari e quindi hanno incentivato la sperimentazione. I docenti hanno anche descritto in che maniera hanno utilizzato la piattaforma, fornendo delle idee che sicuramente possono *contagiare* altri colleghi. Andiamo quindi a presentare le loro stesse parole per descriverne la sintesi degli usi:

- *Registrazioni*: (a) Registrazione delle lezioni frontali (con computer in aula oppure con il tablet) da mettere a disposizione degli studenti su Moodle; (b) Registrazione di esercitazioni al computer e di role play in aula: approfondire e far vedere esempi pratici di sperimentazioni; (c) video-recording al fine di consentire agli studenti di avere a disposizione il materiale anche in fase di revisione e preparazione; Realizzazione di video-tutorial per istruzioni codificate e ripetitive (procedure), come ad esempio: strutturare una tesi, creare un corretto indice bibliografico; ecc.; Realizzazione di video-tutorial per istruzioni codificate e ripetitive (procedure), come ad esempio: strutturare una tesi, creare un corretto indice bibliografico; ecc.;
- *Pubblicazione e diffusione*: (a) a livello di CdS, pubblicazione delle video lezioni presenti nei singoli corsi, ma anche dei materiali e delle relazioni di autorevoli esperti disciplinari; (b) Integrazione delle lezioni in presenza, completando con video aggiuntivi argomenti che non si è riusciti a spiegare o ad approfondire in funzione di un insegnamento personalizzato; proposta di materiale scientifico a disposizione degli studenti con spiegazione audio; realizzazione e diffusione di video-tutorial per istruzioni codificate e ripetitive (procedure), come ad esempio: strutturare una tesi, creare un corretto indice bibliografico;
- *Coinvolgimento di esperti esterni*: realizzazione di interviste a esperti esterni.
- *Valutazione*: proporre forme di video-quiz e video assignment.

Le intenzioni implicite, ma anche gli effetti di questi usi appena descritti sono: (a) l'auspicio di raggiungere più studenti; (b) dare la possibilità di "rivedere" e "risentire" le lezioni personalizzando i propri tempi di apprendimento, sia in termini di maggiore regolarità nello studio che a distanza di mesi e all'avvicinarsi di un esame; (c) fornire occasioni di approfondimento e di valutazione diverse; (d) dare un taglio maggiormente pratico all'apprendimento e alla fruizione dei contenuti; (e) proporre contenuti in veste maggiormente internazionale.



### ***I vantaggi dell'uso della piattaforma video***

Tra i vantaggi menzionati dai docenti possiamo distinguere quelli di tipo maggiormente tecnico da quelli di tipo didattico. Nel primo gruppo possiamo evidenziare che la piattaforma video di Ateneo ha permesso di risolvere o migliorare alcune situazioni che dal punto di vista tecnico rappresentavano un limite o un ostacolo. In particolare i docenti hanno menzionato i seguenti vantaggi da loro stessi riscontrati: rendere i video facilmente fruibili in Moodle, superando gli ostacoli spesso connessi allo SCORM (Lo SCORM, acronimo per Shareable Content Object Reference Model, è un modello di standard e protocolli che permettono di catalogare, tracciare e riutilizzare contenuti didattici in piattaforme diverse, rendendo il contenuto un oggetto trasferibile da un ambiente ad un altro); maggiore immediatezza nella fruizione rispetto a piattaforme esterne e non integrate, risoluzione dei problemi di visualizzazione video con smartphone e con tablet mantenendo tutto il contenuto multimediale (video su Youtube, video-lezioni, video-quiz) in un unico spazio per il riuso del materiale didattico con una maggiore facilità di formattare e registrare i video rispetto a Camtasia (software di video recording e video editing). Un altro aspetto tecnico è dato dalla gestione migliorata del tempo dedicato alla produzione di video lezioni. Il portale, e i tool ad esso connessi, si è rivelato quindi molto più veloce e facile anche per la “possibilità di condividere rapidamente con più corsi lo stesso video, replicare in formato di lezione video in sessioni diverse, effettuare rapide modifiche (trim) e creare quiz. Ottimo per archiviare, comunque una propria videoteca da recuperare per le lezioni in qualsiasi momento. Facile, intuitivo e pratico”, come un docente ha dichiarato.

Sul fronte invece degli aspetti più squisitamente didattici, i miglioramenti espressi dai docenti sono stati: una maggiore serenità da parte degli studenti nella comprensione dei contenuti potendo rivedere i video più volte; dal punto di vista della tipologia di contenuti, i video hanno potuto mostrare aspetti delle conoscenze disciplinari più concreti (ad esempio nel corso di medicina veterinaria si sono potuti mostrare più lesioni o a tutti gli studenti la stessa lesione, virando la didattica verso aspetti più vicini ai contesti di formazione sul campo); si è notata una riduzione importante del numero di studenti che al primo anno si presentavano al ricevimento, pochissimi sono stati i casi di richiesta chiarimento. Va aggiunto che Kaltura si è rivelato utile anche per monitorare l'impegno e il coinvolgimento degli studenti (visualizzazioni, engagement, ecc.) ed è riuscito a “portare l'esperto in classe!”. Un altro aspetto interessante è dato dal fatto di potere rispondere a dubbi e domande degli studenti con un intervento video realizzato ad hoc dopo aver raccolto le richieste di chiarimento degli studenti.

### ***Piattaforma video e strategie di student engagement***

Abbiamo visto che l'uso del video da parte dei docenti è uno dei fattori di stimolo e di coinvolgimento per lo studente, come numerose ricerche in ambito universitario hanno mostrato (Costley et al., 2017; Shelton et al., 2016; Wankel & Blessinger, 2013). I docenti hanno dichiarato che la loro proposta di contenuti in forma di video ha permesso di presentare contemporaneamente diverse modalità (multimodalità) di comunicazione: uditiva e visiva, testo orale e scritto, immagini statiche, in movimento, animazioni. Sono riusciti inoltre a favorire il coinvolgimento e l'apprendimento degli studenti non frequentanti, facilitando

comunque anche coloro che frequentano regolarmente e una didattica universitaria che nel complesso cerca di introdurre nuove forme di comunicazione educativa (Gilboy et al., 2015) e che riesce in alcuni casi a mettere a disposizione materiali e relazioni di autorevoli esperti disciplinari aprendo metaforicamente le porte dell'aula con il mondo esterno (Guo et al., 2014). Questo primo anno e mezzo di sperimentazione ha reso i docenti attori di alcuni cambiamenti nella progettazione e organizzazione didattica dei loro corsi, proponendo forme più attrattive di rappresentare i contenuti. Ciononostante, come loro stessi hanno dichiarato, ci sono ampi margini di miglioramento rispetto ad un coinvolgimento attivo degli studenti sulla produzione e l'analisi dei video loro proposti.

Come già puntualizzato precedentemente, nelle sperimentazioni all'interno dell'Università il coinvolgimento attivo nell'uso di Kaltura da parte degli studenti era inizialmente un obiettivo in secondo piano rispetto all'uso diretto da parte dei docenti. Questo non significa che i docenti, mano a mano che hanno preso confidenza con il sistema, non si siano immaginati anche come gli studenti potrebbero venire coinvolti maggiormente anche chiedendo loro di diventare produttori di artefatti. Tale richiesta prevede di immaginare forme di compiti o artefatti che si realizzano attraverso la scrittura multimediale, con livelli di complessità e di qualità da definire a priori. Alla domanda: "Se dovesse coinvolgere gli studenti, dando la possibilità di creare e condividere video realizzati da loro, che tipo di attività richiederebbe?", i docenti hanno risposto con diversi suggerimenti e idee, in dipendenza anche della disciplina d'insegnamento. Abbiamo quindi raccolto le risposte e le abbiamo ri-categorizzate in base alla tipologia di azioni didattiche che potrebbero venire promosse con la piattaforma di creazione e condivisione video (Figura 1).

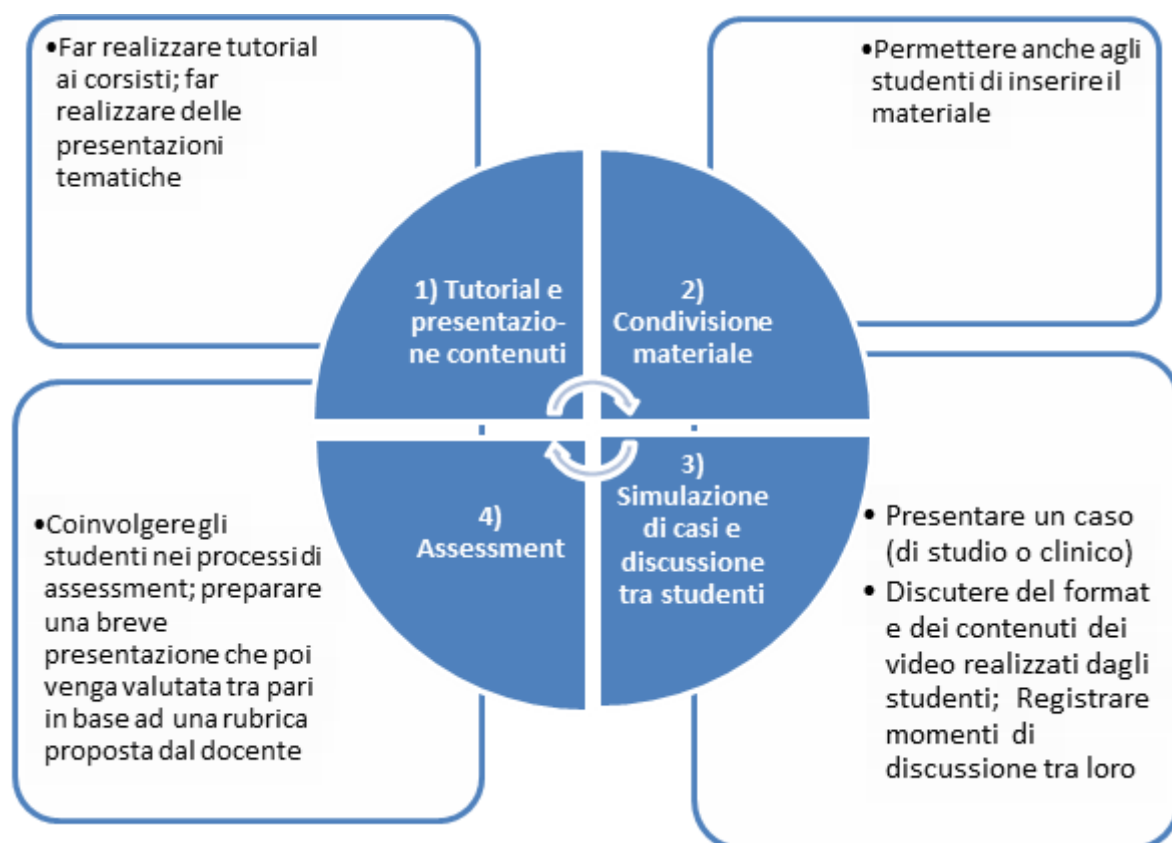


Figura 1. Prospettive future per processi di student engagement

Concludendo, l'uso della piattaforma video ha permesso di progettare ed erogare una forma di didattica *Student centered* in cui lo studente consulta il materiale dove e quando preferisce anche con device mobili (flessibilità spazio/temporale) e in base ai suoi bisogni d'apprendimento (Heflin et al., 2017), inoltre dato che la video lezione registrata in aula resta archiviata, non solo nella sua parte scritta, ma anche nei commenti fatti dal docente, lo studente riesce a ricostruire la situazione didattica originaria, anche quando si fosse trovato in difficoltà a frequentare. Questo aspetto mostra una flessibilità maggiore rispetto l'organizzazione della frequenza e i tempi di studio degli studenti. Un altro aspetto di centralità è dato dalle esperienze in cui gli studenti sono stati coinvolti in prima persona nella produzione di video come nei casi in cui hanno realizzato: videocurriculum, video di una esperienza di progettazione di attività didattica sulla letto-scrittura da condividere nella comunità di apprendimento di un corso, video dimostrazione di matematica, video di valutazione finale di un corso da parte di studenti stranieri, video simulazione di un caso clinico, ecc.)

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## **A MULTIPLE APPROACH TO SUPPORT INTERNATIONAL COLLABORATION ON MOOC DESIGN: THE EXPERIENCE OF TOMORROW'S LAND MOOC**

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### **Abstract**

This paper presents the experience of “Tomorrow’s Land” MOOC, developed in the framework of the “Tomorrow’s Land” Erasmus+ Project. It describes the processes and approaches used to develop the MOOC in order to reach the learning objectives. In particular, the paper reports the experience focusing on the storytelling approach, that is the main linchpin on which the whole project is built, but which is strictly correlated with other three main pillars: creativity, openness and collaboration. The integration among these different approaches has valorised the multiple perspectives brought by the different European partners, effectively supporting the MOOC design and development and enhancing the achievement of unexpected results.

### **Introduction about the experience**

“Tomorrow’s Land” MOOC has been realized in the framework of the “Tomorrow’s Land” Erasmus+ Project (Key Action 2, Cooperation for innovation and the exchange of good practices, 2016-2018) financed by the European Commission. The main focus of “Tomorrow’s Land” project is to develop the next generation of young social innovators fully capable of influencing and contributing to the development of a better, more inclusive and innovative society.

The project is focused mainly on the development of soft skills useful for young people in order to access the job market, nurturing social innovation and the entrepreneurial ecosystem in general as pathways to economic growth. The ambition to reach young creative people to boost the application of new way of acting, requires new learning approaches and methods. “Tomorrow’s Land” project has therefore set the foundations to prepare citizens for preferable future scenarios by delivering a framework on which several learning resources are based to support educators training new young entrepreneurs with a social perspective and aiming at contributing to the collaborative economic environment.

Consistently to the objective of “Tomorrow’s Land” project, the “Tomorrow’s Land” MOOC is offered as part of a co-designed online learning experience, involving six partners coming from across Europe, which have contributed with their specific expertise. In particular, the partnership is composed by creative and future thinkers, private institutions devoted to the

development of soft skills and to support young social innovators, one research centre focused on social innovation and collaborative economy research and one research centre with high expertise in the field of innovative learning methodologies and tools.

The project is based on four major outputs which set the base, test and disseminate the Tomorrow's Land MOOC.

The first one, delivered on July 2017, is a strategic foresight research delivered as a road map for the next stage of the project. It aims to capture the state-of-the-art, the possible, and the surprising, identifying future developments, new societal demands and challenges, risks and opportunities basing on creative research, future studies and design thinking methodologies. In particular, this stage has been focused on "Foresights into Tomorrow's Land" and on the description of profiles of future social innovators (the "Creative thinker", the "Implementer", the "Connector", the "Catalyst of change", the "Techie"), which are the main targets to address while designing and implementing the MOOC.

The second output, delivered in beta version on March 2018, is constituted by the MOOC and the Learning Academy, the online learning environment that provide access to the MOOC. This output is aimed at supporting educators across Europe (and abroad) to facilitate learning experiences on the topic or related to the development of soft skills. Leveraging on the lessons acquired through the research phase, the consortium has designed and deployed both digital learning resources organised in the "Tomorrow's land" MOOC and support materials, the "Tomorrow's Land MOOClet" a printable version of the MOOC contents and activities, useful during face to face trainings.

The third main output of the project, is devoted to test the MOOC with the target users, gathering feedback to fine tune a final version of the course. To this aim the project is organising two courses addressing facilitators and potential project end-users. In particular, a "Champions of Change" face to face course, organised on March 2018, is going to target seven trainers and facilitators to support them on delivering learning experiences based on the "Tomorrow's Land" MOOC.

The fourth output is an international Bootcamp, structured with a blended approach, will address thirty potential end-users such as social innovators and change makers. It will require participants both to enrol in the Tomorrow's Land MOOC, and to participate in a face to face one-week course on June 2018.

Finally, an international conference, the "Collaborative Journey", will be organised on November 2018 to deliver a final presentation about the project, to gather feedback about the outputs, to involve stakeholders and create awareness around the topic supporting potential future exploitation opportunities.

## **Approach and methodologies**

The idea of a “Tomorrow’s Land” to discover and to explore has been the main linchpin on which the whole project has been developed. According to that, a storytelling approach has shaped all the materials and activities of the MOOC and it has inspired the look and feel of the Learning Academy itself. Around that, other three main pillars and approaches have characterised the MOOC and the whole project design and development.

The first one is the creative approach, which has shaped the design process supporting the valorisation of the multiple perspectives brought by different partners. The second one is the open approach which has influenced all the decisions taken in terms of open source tools to be adopted and open educational resources to be delivered. The third one is related to the strong collaborative approach, among all partners and among all the project stakeholders. We will go into details about these three approaches here below.

### **Storytelling**

Following the project general approach, the Tomorrow’s Land MOOC is based on the journey metaphor. “Tomorrow’s Land” is an unknown place to discover and to explore, acquiring the skills useful to succeed in the future. This approach has been used both in the design phase and in the delivery phase.



Figure 1. Tomorrow’s Land Map, compass and materials produced to support the “travel story”

Storytelling as MOOC pedagogy is not new to MOOC world and it has already been used with great success in terms of completion rate, user appreciation and feedback as reported in Aidan (2016) and Andrews et al. (2009).

The storytelling approach is effective for students and has been widely used in the e-learning field (Banister & Ryan, 2001; Green & Brock, 2000; McDrury & Alterio, 2003; Robin, 2016), proving to be useful. Not only it supports people engagement: in the first phase, it allows to gain learner attention lowering the access threshold and it reduces resistance or anxiety of learning.

Furthermore, it is suitable for delivering contents such as soft skills because it supports the identification in specific situations and empathy. Finally, it introduces people in an easy and creative way to complex and open-ended concepts such as social innovation. For these reasons, the partnership of the project, composed by creative thinkers, storytelling experts and instructional designers, decided to adopt the storytelling approach as silver thread of the whole project and specifically in designing the MOOC structure.

The MOOC has been organized as a virtual journey through the Tomorrow's land, and this approach is clear also in the title of the MOOC itself (Experience Tomorrow's Land) that includes a strong call to action.

As in every journey, you need to prepare yourself and to gain confidence within the environment to succeed and have a positive experience. For this reason, the Tomorrow's Land MOOC provide one introductory module to guide participants in understanding who are their travel companions, which is the approach of the MOOC and how to take advantage of the learning experience.

A second module presents the Tomorrow's Land Map and it proposes activities to explore it. The idea is that, once participants gain confidence in the exploration path, being inspired by the areas presented in Tomorrow's Land Map, they will be much keener to share their experience and to gain valuable ideas for the development of their social innovation idea.

Following the two-introductory path, five learning paths focuses on the development of soft skills needed to succeed as change maker. Every path is devoted to exploring one of the aspects emerged during the design phase and during the preliminary focus group: they are thus focused on creative thinking, active research, networking, servant leadership, digital collaboration. The learning path titles include a call to action in the title itself, in order to engage the participants, or future "travellers", and to make them clear since the very beginning the hero journey they are called to start. The paths are the following: "Switch on your creativity", "Understand a wider context", "Build relationships", "Lead with servant approach", "Be collaborative, be digital".

The MOOC adopts a very flexible structure: all the five modules devoted to soft skills development are self-consistent and it is not compulsory to follow a sequential path or all of them: the learners are free to navigate the course according to their learning styles and interests and, of course, according to their time constraints.

The partnership used the well-known structure of the Hero journey as an inspiration source to design the MOOC with the storytelling approach. In fact, the first learning path asks the participants to reflect about the ordinary world in which they live, asking them to discuss and declare the change they want to apply. After this first reflective phase, the participants accept the call to adventure and start with the journey preparation: they explore the Map and prepare the backpack with all the tools needed, using the materials provided by the following MOOC learning paths.



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During the journey, each traveller meets some companions (some structured moments of sharing among participants have been planned in each module through a forum) and mentors, the so-called Pioneer of Tomorrow's Land. The pioneers are hosted in the MOOC as guests willing to share, through some shorts videos, their experience about the skills to be developed. An essential part of the hero journey is the challenge. In each learning path, some challenges are proposed to the travellers ("Challenge yourself" activities). Furthermore, they can tackle themselves through some test related to the theoretical knowledge acquired. The journey ends, with a reward that consist in the valuable knowledge gained and declared by a final certificate of achievement.

While the macrostructure of the MOOC has been designed keeping in mind the Hero Journey, the microstructure of the five learning paths focusing on soft skills development are designed following a common structure which itself reflect the same steps to take in order to organise and experience a travel.

In fact, they are composed by an initial presentation which foster the reflection on the path that is about to start. A short theoretical part follows with references to links and resources, aimed at sharing information and fostering knowledge to support travellers during the journey. The third inspirational part reports the direct experience from external experts and professionals. Then, travellers are stimulated to "challenge" themselves with practical activities which are the core content of each path. To tackle the challenge, they can use "Tools" which are presented in the "Tools for your backpack" section. Finally, the "Sofa moment" is devoted to reflection and sharing with travel companions on the results achieved.

The storytelling approach used within Tomorrow's Land MOOC is intended to create a funny and effective learning environment for learners. In such a framework, a great importance is given to activities which spur reflection on the experience made: reflection is crucial to foster the recognition and consolidation of the knowledge and skills acquired through the learning activities and it helps participants to apply them in the everyday life.

### ***Creativity***

The creative approach has shaped the whole design process guiding through new and broader perspectives. The first stage of the project has been focused on a creative research based on the "Double Diamond" technique (Design Council, 2006), a "framework for creative thinking and an essential tool for structuring the creative process". The Double Diamond technique is built upon divergent and convergent thinking processes. The divergence phase creates opportunities and opens for more perspectives. The convergence phase asks for decisions and closes in on concrete ideas.

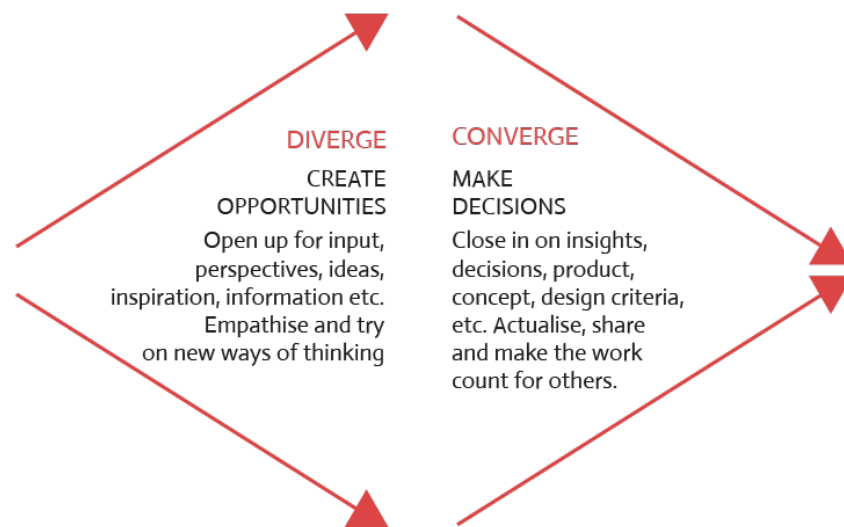


Figure 2. "Double Diamond" technique, Design Council (2006)

This approach has led to the creation of the Tomorrow's Land Map, characterised by eight regions describing eight plausible insights from the future focusing on opportunities to exploit or challenges to tackle. In the meanwhile, a qualitative research based on six focus groups held in the six partner countries, has led to the definition of the five profiles of social innovators, described with their main skills and competences: the "creative thinker", the "implementer", the "connector", the "catalyst of change", the "techie". These profiles have been correlated to the eight insights in order to choose the specific skill to address to effectively react to the tomorrow's challenges and opportunities.

The Double Diamond process has been used also during the MOOC contents design phase. During divergence phases, all the partners have been required to search and share with the whole group a great number of sources and contents related to the different topics of the course. During convergence phases, contents have been structured in detail, in order to be homogeneous in terms of style, formats, quantity, quality and baseline approaches.

The creative approach has thus led to a MOOC that valorise the experience and expertise of each partner and, furthermore, is characterised by divergence, in terms of multiple perspectives adopted and multiple contents addressed, but also by converge, in terms of declining each topic toward a social dimension.

### **Openness**

The open approach has influenced all the decision taken in terms of tools to be adopted and contents to be delivered. In particular, the tool used to create the Learning Academy is the open platform MOODLE (version 3.2.2+) which has been personalised using an open theme (Adaptable).

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These in order to create a structure of the contents and of the whole Learning Academy space which could fit in the aim, characteristic and constrains of the project and which could answer to the need of the main target (creative people, willing to access to an easy to use platform).

Furthermore, all the video contents produced to open each path or to report experts experience in different fields are licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). The same licence has been used to release the MOOClet, that is the printable version of all the MOOC contents.

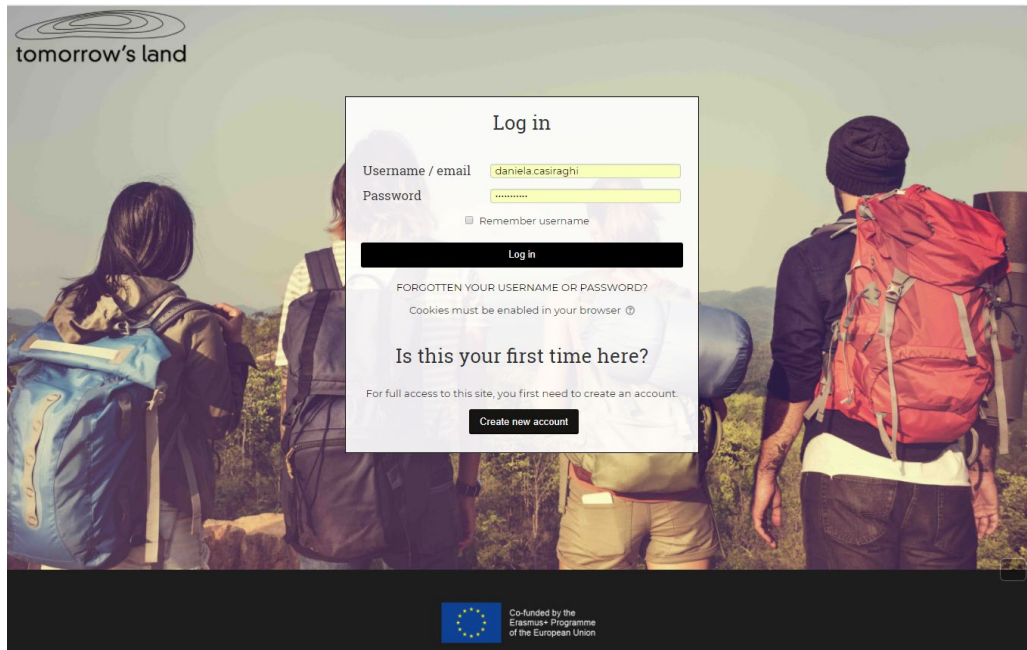


Figure 3. Tomorrow's Land Learning Academy Login

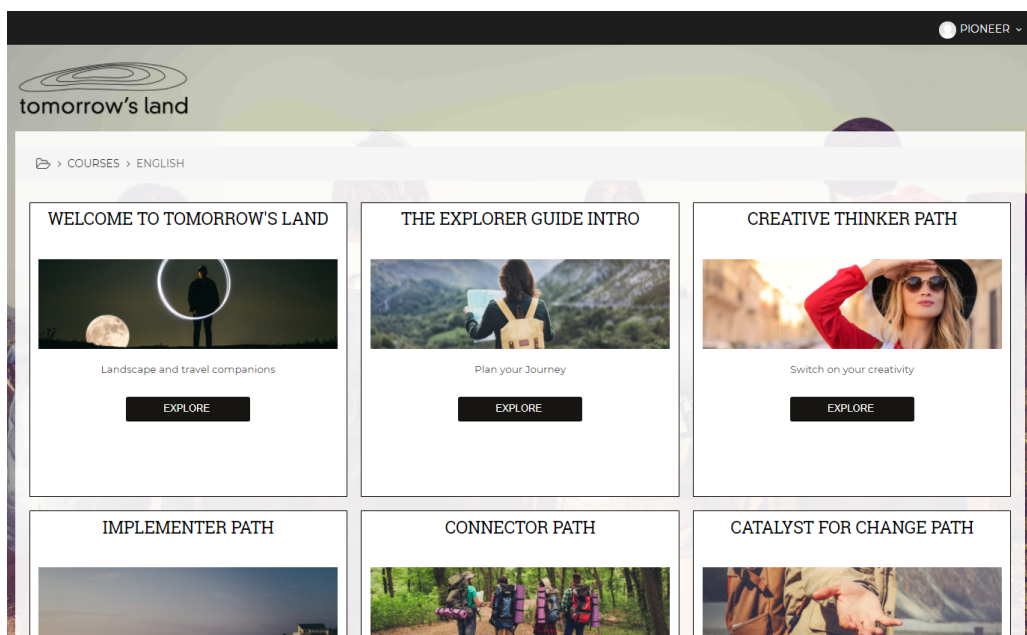


Figure 4. Tomorrow's Land MOOC – Access to the Learning Path

## ***Collaboration***

The MOOC development has seen the strict collaboration among all the partners as, each of them, has participated in the elaboration of the strategic foresight research, the road map of the project and MOOC itself, and has taken care of the design and realization of the learning paths.

To this aim, the collaboration has been supported through management processes, tools and methods at the different stage of the MOOC design and development. The main idea and structure of the course has been initially defined and agreed by all partner, during a partner meeting, and responsibility of each partner have been defined.

The detailed structure has been worked, discussed and reviewed though online meetings among the whole partnership. Furthermore, several online meetings have been organised between the MOOC coordinator, which is responsible for the entire output and for the design of the two introductory modules, and each of the five partners, in charge of the learning path related to soft skills development.

After this co-design activity, the MOOC coordinator has created a shared folder containing a detailed “table of contents” and short guidelines to produce each type of content and activity, this in order to guarantee a homogeneous development among the different paths.

In particular, the coordinator shared with all the partners:

- format for video storyboards, with the main topic to be presented through videos and indication of the length (number of character);
- formats to collect sources with detailed description of the type of sources and the info to be collected (author, date, short description, link, keyword);
- formats to design all the activities with filed required such as: the aim of the activity, duration, sources, organization, etc...;
- formats to collect interviews from experts on the field and suggestion on how to shoot videos.

The MOOC Coordinator has been constantly in contact with the five partners producing the contents, solving doubts, updating the whole group with the state of art of each learning path to be delivered and the majors changes proposed by each partner, sharing good ideas and good practices in designing or producing contents and activities.

Finally, the MOOC coordinator has organised a review of all the contents involving all the partners. This final review allowed to gather useful comments, then discussed and used to improve and fine tune the final version of the MOOC which has been finally implemented online in Beta version and delivered through the Learning Academy.

The result is MOOC that has strongly been shaped by the collaborative approach: it presents common features, structures and formats of the contents, but also specific contents related to each partner' experience. It has been a meaningful experience for all the partners, since it has

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required to work together and to reciprocally enhance the chances to learn new approaches and methods.

This experience has proved how MOOCs are, from this perspective, a concrete “educational resource” (Sancassani, Corti, & Baudo, 2007) for the developing institutions working in international teams, because they foster the mutual knowledge exchange, while reaching a better-shared result.

The collaborative approach seen as a leverage to foster new knowledge is also a critical element on which the course is set up. For example, the most part of activities proposed are designed with the possibility to be conducted in pairs or groups.

Peer interaction and learning assume a key relevance: each path concludes with “sofa moments” aimed at fostering the discussion and collaboration among participants, also to support the creation of the Tomorrow's Land network, which is particularly meaningful in a course addressing young active people willing to support social change.

### **Conclusion and further research**

At the time of this writing the MOOC has been fully designed and implemented in beta version.

The design phase, which is one of the core phase of the project because of the above-mentioned approaches on which it is based, has come to an end and it is one of the main output of the project.

The testing phase of the MOOC is going to be organised with different targets in the next months. After that, an improvement report will be written collaboratively by all partners. The suggestions drawn up in the report will be included in the final version of the MOOC, to be delivered online in five European languages during Autumn 2018.

At the moment, we are not able to present results in term of learning experience for users or completion rate, since the MOOC is not open yet to the public. However, this experience seems to be innovative and interesting for the community because demonstrates how MOOCs can foster the collaboration among international partners with different expertise boosting the achievement of unexpected results, when designed and implemented basing on proper methodologies and approaches.

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## I MOOC PER L'ALTA FORMAZIONE: I MASTER SU EDUOPEN ATTIVATI DALL'UNIVERSITÀ DI MODENA E REGGIO EMILIA

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### Abstract

Il contributo descrive le procedure adottate dall'Università di Modena e Reggio Emilia per istituzionalizzare l'utilizzazione di MOOC in ambito accademico nei contesti dell'alta formazione, in particolare in riferimento alle Linee Guida approvate per l'attivazione di Master e Corsi di Perfezionamento. Inoltre, presenta riflessioni sull'attivazione di due master di primo livello istituiti secondo tale modello: il primo in "Formazione per l'assistente alla comunicazione e per l'autonomia personale degli alunni con disabilità sensoriale"; il secondo, nato dalla collaborazione con gli atenei di Bari, Foggia, Genova e Milano Bicocca, in "Metodologie e Tecnologie per la Open e Digital Education". Il portale scelto per l'erogazione dei corsi è la piattaforma EduOpen ([learn.eduopen.org](http://learn.eduopen.org)), attivata da circa due anni da un network di 17 atenei italiani impegnati in un progetto di innovazione didattica e tecnologica di cui lo stesso ateneo svolge l'azione di coordinamento.

Nell'erogazione dei master on line in modalità open, i singoli insegnamenti e gli interi moduli sono fruibili in maniera gratuita dagli utenti di EduOpen. L'iscrizione formale (preventiva o conclusiva) al percorso formativo è destinata a quanti intendano perfezionare la propria formazione con lo svolgimento di attività di stage e di valutazione in presenza e il rilascio di certificazioni verificate.

### Introduzione

Le analisi sul ruolo assunto dai MOOC nel settore dell'alta formazione oscillano fra i pareri entusiasti di chi ritiene che le università finiranno con lo scomparire e le opinioni di quanti credono che a sparire come "bubbles" sarà proprio questa modalità di offrire formazione on line (Billington & Fronmueller, 2013; Kim, 2016). I MOOC, definiti alla loro prima apparizione come *credit-less* (Pappano, 2012), sono al contrario connotati attualmente da pratiche di certificazione gratuita, verificata o con erogazione di crediti universitari in percorsi istituzionalizzati (Shah, 2016). La risposta a tale fenomeno da parte di ciascun ateneo e di ciascun sistema educativo nazionale è personalizzata e in via di definizione (Sandeem, 2013).

Nonostante le critiche e i dubbi che affollano il dibattito scientifico sui MOOC è innegabile che essi presentino caratteristiche uniche che supportano un movimento verso una visione dell'apprendimento permanente e on-demand per coloro che lavorano a tempo pieno o hanno

preso una pausa dall'istruzione formale. Le recenti ricerche evidenziano che gli utenti dei MOOC sono prevalentemente persone occupate e con un buon livello di istruzione (Dillahunt, Wang, & Teasley, 2014). La necessità di accogliere nei sistemi d'istruzione utenti lavoratori è quanto mai reale. Questo è un motivo che ha spinto le piattaforme più note per l'erogazione di MOOC (Coursera, Udacity, Future Learn), con milioni di utenti attivi da tutto il mondo, ad avviare un difficile processo di integrazione di percorsi formali legati alla Higher Education in percorsi fruibili on line attraverso MOOC.

EdX, ad esempio, dal 2015 sta investendo consistenti risorse nell'erogazione di MicroMaster completamente on line per l'Alta Formazione che si sostanziano in un percorso di accreditamento che fornisce un'istruzione di alta qualità da parte delle maggiori università per aiutare gli studenti a lanciare o far progredire la loro carriera, o a seguire un percorso accelerato di master (gli studenti possono svolgere le lezioni completamente on line sulla piattaforma edX per l'equivalente di un semestre e terminare il master nel campus, senza la necessità di frequentare l'intero corso in loco). Le motivazioni che hanno spinto l'azienda a produrre questa tipologia di corsi e la loro struttura organizzativa spingono a considerare i MicroMaster come ciò che a livello internazionale più si avvicina ai Master universitari previsti nel sistema educativo italiano. Dalle parole del CEO, Anant Agarwal: "Oggi il luogo di lavoro sta cambiando più rapidamente che mai e i datori di lavoro hanno bisogno di talenti altamente sviluppati. Nel frattempo, i laureati vogliono avanzare professionalmente, ma si stanno rendendo conto che non hanno le competenze rilevanti per la carriera che il moderno posto di lavoro richiede. EdX riconosce questa discrepanza tra business e istruzione per studenti, impiegati e datori di lavoro [...]. L'iniziativa MicroMasters fornisce il prossimo livello di innovazione nell'imparare a colmare questa lacuna di competenze creando un ponte tra l'istruzione superiore e l'industria per creare una forza lavoro abile e di successo del 21° secolo". Attualmente on line edX ha reso disponibili 43 MicroMaster, rispetto ai 20 del 2016, promossi da circa due dozzine di università della rete (Shah, 2018).

Ogni MicroMaster, però, ha un costo di iscrizione compreso tra \$540 e \$1,500. Questo dato porta l'esperienza "fuori" dalla filosofia open, nonostante Rafael Reif stesso, Presidente del MIT, affermi nell'articolo che racconta il lancio del primo MicroMaster (Bradt, 2015) che: "L'aumento del costo dell'istruzione, combinato con il potenziale di trasformazione della tecnologia di insegnamento e apprendimento on line, presenta una sfida a lungo termine che nessuna università può permettersi di ignorare".

L'attivazione di procedure di formazione specialistica richiede quindi una riflessione sull'economicità e sulla flessibilità dei percorsi: è questa la sfida per l'Alta Formazione nel contesto italiano.

In Italia i Master universitari, difficilmente identificabili con altri percorsi formativi nel contesto internazionale, coesistono – e in alcuni casi spartiscono i piani formativi – con i corsi di perfezionamento e di aggiornamento professionale, istituiti dalla Legge 341/90. I secondi sono generalmente più brevi dei Master che invece prevedono attività formative e di tirocinio per almeno 60 CFU. Generalmente, infatti, un Master non dura meno di un anno accademico.



La popolazione a cui si rivolge è quella dei neo-laureati di I o II livello finanche ai professionisti che già svolgono un'attività lavorativa.

A partire da questo scenario il contributo descrive le procedure e le modalità adottate presso l'Università di Modena e Reggio Emilia per istituzionalizzare l'utilizzazione di Mooc in ambito accademico nei contesti dell'alta formazione. Dal 2017 sono state approvate linee guida per la realizzazione di corsi di alta formazione in modalità open e in seguito nel corrente anno accademico sono state messe in atto procedure di attivazione di Master e Corsi di Perfezionamento erogati attraverso MOOC sul Portale EduOpen. Ciò rappresenta un unicum non solo nel panorama nazionale, ma probabilmente anche internazionale. La peculiarità, oltre che nel meccanismo di erogazione full-online, consta nell'offerta di contenuti didattici di alta specializzazione che sono aperti e fruibili on line da parte di tutti secondo i principi dell'open education condivisi dal network EduOpen.

### **Le linee guida per l'attivazione di Master o Corsi di Perfezionamento in modalità MOOC dell'Università degli Studi di Modena e Reggio Emilia**

Le Linee Guida per l'attivazione di Master o Corsi di Perfezionamento in modalità MOOCs sul portale EduOpen sono state approvate dal Consiglio di Amministrazione e dal Senato Accademico dell'Università di Modena e Reggio Emilia nelle rispettive sedute del 27 gennaio e 14 febbraio 2017.

L'ateneo ha definito le modalità attraverso cui proporre lo svolgimento di Master e Corsi di Perfezionamento in modalità open e in particolare attraverso Mooc (e Pathway) erogati su EduOpen ([learn.eduopen.org](http://learn.eduopen.org)) piattaforma attivata da oltre due anni da un network di 17 atenei italiani impegnati in un progetto di innovazione didattica e tecnologica dei processi di formazione e apprendimento. La partecipazione al network comporta l'adesione a standard tecnici e metodologici e la possibilità di strutturare in maniera modulare i corsi sul portale in corsi singoli o percorsi formativi riconosciuti dalle stesse istituzioni. L'elemento di innovazione introdotto si ritrova nel fatto che i moduli e i singoli insegnamenti dei corsi sono fruibili in maniera gratuita dagli utenti della piattaforma che, pur senza ricevere una certificazione verificata e possedere i requisiti minimi di accesso al percorso formativo, possono partecipare a un percorso formativo di alta formazione. La scelta adottata per Master e Corsi di Perfezionamento con il documento qui presentato è stata proposta negli ultimi due anni accademici per alcuni insegnamenti (o parte degli stessi) afferenti a Corsi di Laurea attivi presso l'ateneo modenese. Con queste Linee Guida, si passa da un'apertura parziale di percorsi di apprendimento a una totale condivisione di saperi e azioni didattiche presenti in un percorso formativo formale.

La tabella 1 sintetizza gli elementi fondamentali contenuti nel documento e li suddivide in 4 ambiti: attivazione dei corsi, studenti, docenti e tutor, amministrazione e contabilità.

Tabella 1: Processi di attivazione di percorsi di alta formazione nell'Università degli Studi di Modena e Reggio Emilia

Area	Indicatori	Descrizione
Attivazione dei corsi	Durata della proposta istitutiva da parte degli organi accademici	Durata triennale con rinnovo automatico e possibilità per gli studenti di terminare il percorso formativo nel triennio
	Collaborazioni interateneo	Definizione in fase di istituzione dell'impegno e delle attività di docenza e tutorato (deroga dal limite del 30% di docenza interna)
	Sede delle prove di valutazione	Anche sedi diverse da quella di erogazione con il versamento di un contributo aggiuntivo
Studenti	Numeri	Non previsto un limite minimo e massimo predefinito di studenti ammessi
	Tempi di iscrizione	Prima dell'avvio del percorso formativo (iscrizione preventiva) o in prossimità della chiusura (iscrizione conclusiva)
	Procedure di selezione	Ammissione al corso in funzione dei requisiti richiesti senza procedure di selezione dei candidati
Docenti e tutor	Attività di docenza	I docenti erogano la loro attività didattica a titolo gratuito se non in casi eccezionali (docenti esterni non contrattualizzabili in altro modo). Ricevono un incentivo a conclusione dell'edizione del master/corso come fondi di ricerca solo se hanno svolto precedentemente il loro carico didattico. L'erogazione dei Mooc non concorre al raggiungimento del carico didattico.
	Attività di tutorato	I tutor vengono selezionati tramite bando e sottoscrivono contratti non a titolo gratuito.
Amministrazione e contabilità	Gestione amministrativa-contabile	Affidata al Dipartimento con possibilità di delega al Centro Interuniversitario Edunova
	Piano finanziario	Il piano finanziario attesta l'integrale copertura della prima edizione, garantendo l'impegno alla copertura delle due successive. Alla fine di ogni edizione è verificata l'entità dei fondi da ripartire fra il personale docente e, in caso di collaborazioni interateneo, tra le università coinvolte
	Contributi	Quota completa, per iscrizioni preventive; destinata a tirocinio e titolo finale, per iscrizioni conclusive (a tale somma vanno aggiunte le

quote di iscrizione ai singoli moduli del  
percorso formativo)

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La scelta dell'ateneo di consentire la fruizione on line gratuita di corsi di alta formazione è certamente un'innovazione se letta attraverso le lenti di interpretazione della filosofia dell'open education: in tal modo si afferma che contenuti specialistici e altamente qualificanti inseriti in percorsi formali di istruzione terziaria possono essere condivisi attraverso l'utilizzazione di ambienti digitali di apprendimento aperti e gratuiti come EduOpen. Significa eliminare le pareti delle aule universitarie, dare la possibilità a tutti di varcare la soglia d'accesso degli atenei svincolando la partecipazione alla formazione da contributi monetari, certificazioni e obblighi stringenti e restituendo alla stessa formazione il suo ruolo di strumento per lo sviluppo della persona umana e della società civile.

Il documento presenta numerosi elementi di innovazione che propongono in una modalità del tutto nuova lo svolgimento di attività dedicate all'alta formazione non solo per quanti scelgono di partecipare ai corsi senza un'iscrizione formale presso l'ateneo ma anche per chi decide di iscriversi per conseguire un titolo. I corsi restano attivi e accessibili per un intero triennio e consentono, come si legge nella Tabella 1, un'iscrizione preventiva o conclusiva, parziale o completa. Con questa strategia gli studenti possono "rateizzare" i costi e i tempi di partecipazione alle attività formative, possono cioè partecipare in periodi lunghi (adeguati anche a studenti-lavoratori ad esempio) e con costi di iscrizione ai corsi che, dilatati nel tempo, possono venire incontro anche a esigenze economiche diversificate.

La modalità on line libera dal problema dei numeri delle iscrizioni: è indispensabile identificare un numero minimo di studenti da far partecipare ai corsi? È indispensabile fissare un numero massimo di iscritti? In entrambi i casi la risposta è negativa: non ci sono numeri troppo ridotti di studenti iscritti tali da non giustificare l'attivazione dei corsi e la costituzione di un gruppo di lavoro adeguato, né numeri troppo elevati da richiedere "aule più capienti" di quanto non possano esserlo gli spazi digitali. L'attivazione del master nasce da un impegno significativo dei docenti che, eccetto in casi di finanziamenti per progetti, ricevono il compenso solo al termine del triennio e se il corso ha ottenuto il successo sperato. La realizzazione dei corsi non è giustificata dall'adesione al percorso di un numero di studenti interessati, ma da una progettualità di studio e ricerca che definisce gli argomenti da affrontare e le specializzazioni da attivare.

La figura di riferimento la cui presenza nell'organizzazione di tali master va pensata, inserita, retribuita, è quella del tutor che funziona come intermediario fra i contenuti, l'ambiente digitale e gli studenti. La presenza dei tutor non è posta al servizio soltanto degli studenti iscritti formalmente al master ma di tutti coloro che partecipano ai corsi su EduOpen.

## **I Master attivati**

Il primo dei percorsi formativi attivati dallo scorso febbraio è il Master di I Livello in "Formazione per l'assistente alla comunicazione e per l'autonomia personale degli alunni con

disabilità sensoriale”. Come si legge nelle schede di progettazione, il master si propone di formare lo studente su “un patrimonio di conoscenze di base relative alla rete dei servizi territoriali, degli elementi legislativi, delle istituzioni e dell’evoluzione dei servizi nonché degli elementi clinico diagnostici connessi alla cura e all’intervento riabilitativo. La partecipazione al master fornisce anche un bagaglio di competenze specifiche che riguardano l’abilità nell’uso di strumenti comunicativi per l’apprendimento (LIS, Braille, CAA), nell’uso di metodi psicopedagogici e didattici destinati ad alunni con disabilità sensoriale”.

Il percorso formativo è organizzato su EduOpen in quattro Pathway corrispondenti ai quattro moduli che definiscono il piano didattico del Master. Al momento è stato reso disponibile il primo Pathway (Figura 1) di cui si riportano i numeri di iscritti e di attestati rilasciati a quanti in modalità del tutto gratuita hanno frequentato e concluso le attività didattiche previste nel corso su EduOpen (Tabella 2).

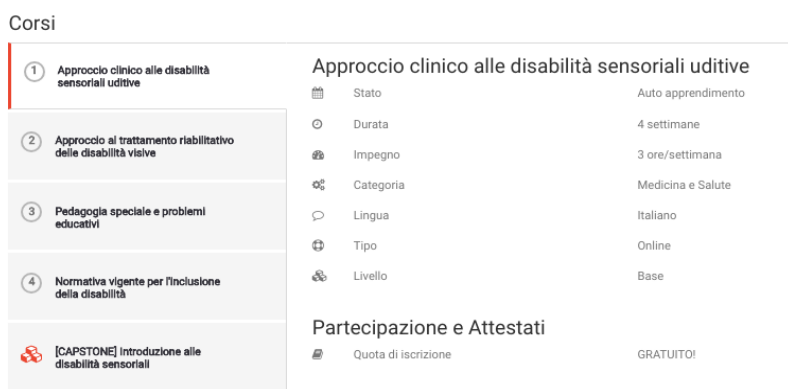


Figura 1. Struttura del I Percorso del Master attivo sul Portale EduOpen

Tabella 2: Numero di iscritti ai singoli MOOC (dati aggiornati a maggio 2018)

Titolo del MOOC	CFU	Numero di iscritti	Attestati rilasciati	% Completamento
Approccio clinico alle disabilità sensoriali uditive	3	230	35	15%
Approccio al trattamento riabilitativo delle disabilità visive	3	223	attività formative in corso	-
Pedagogia speciale e problemi educativi	4	332	32	10%
Normativa vigente	1	281	65	23%
[CAPSTONE] Introduzione alle disabilità sensoriali	-	154	attività formative in corso	-

I corsi [CAPSTONE], posti al termine di ciascun pathway, prevedono una prova finale conclusiva del percorso a cui è possibile accedere solo dopo aver concluso e superato con esito positivo le valutazioni previste nei singoli corsi che compongono il percorso stesso. Sempre sulla base delle suddette Linee Guida, per coloro che sono iscritti formalmente al Master i crediti

formativi sono rilasciati solo al termine di corsi/pathway per i quali sia specificata la quantità di CFU e a patto che siano erogati in modalità coerenti con le linee guida ANVUR e con la normativa in vigore. Il numero di utenti iscritti al corso [CAPSTONE] definisce il numero di learner iscritti all'intero modulo.

Il secondo percorso progettato e in fase di attivazione è relativo al Master di I livello in “Metodologie e Tecnologie per la Open e Digital Education (MET-ODE)”. I partecipanti, al termine del percorso formativo, “saranno in grado di conoscere e descrivere le caratteristiche educative, tecnologiche e didattiche degli ambienti di apprendimento digitali, con particolare riferimento a quelli che possiedono le caratteristiche open e on line. Inoltre i partecipanti al Master saranno in grado, mediante l'uso di specifici ambienti, di progettare e realizzare semplici percorsi formativi open e on line”. A partire dalla struttura del Master saranno attivati due Corsi di Perfezionamento in “Metodologie per l'Open e la Digital Education (M-ODE)” e in “Tecnologie per l'Open e la Digital Education (T-ODE)” entrambi da 21 CFU. Il Master e i Corsi di Perfezionamento condividono la struttura degli insegnamenti e gli obiettivi di apprendimento. Il percorso è realizzato in modalità interistituzionale con gli atenei di Bari, Foggia, Genova, Milano Bicocca che, sin dall'apertura della piattaforma EduOpen, hanno condiviso la filosofia dell'Open Education e contribuito attivamente alla produzione di Mooc e alla diffusione di tali modalità formative in contesti universitari e professionalizzanti.

A partire da queste prime esperienze e sperimentazioni sul Portale EduOpen è stato implementata una nuova area tematica dedicata ai Master ([master.eduopen.org](http://master.eduopen.org)). Si tratta di una sezione che sarà implementata e sviluppata maggiormente anche in relazione alle attività e necessità formative legate ai percorsi descritti (obiettivi di apprendimento, progettazione didattica dei corsi, formazione mirata ai docenti e tutor sulla progettazione di corsi MOOC).

## **Riflessioni conclusive**

A partire da questo complesso scenario, la riflessione sul ruolo e sugli obiettivi che ogni ateneo può e deve svolgere nel tessuto sociale di cui fa parte va arricchita attraverso l'analisi delle possibilità di sviluppo garantite dalla diffusione di risorse e strumenti tecnologici per la didattica, delle modalità di adeguamento dei processi amministrativi a pratiche che favoriscano l'accesso indifferenziato alla formazione universitaria, dei metodi innovativi per la revisione dei modelli di formazione. Le università come protagoniste della formazione devono garantire attenzione a tutte le fasce della popolazione, ciascuna con le proprie specificità legate all'età, allo stato civile e lavorativo, alle disponibilità economiche. E non solo. Per ciascuna fascia di popolazione è necessario proporre soluzioni adeguate che nascono dall'integrazione fra processi innovativi, bisogni formativi e tradizioni di pensiero.

Per quanto riguarda le azioni descritte nel contributo, al fine di perfezionare i servizi che l'ateneo modenese intende fornire agli utenti raggiunti tramite questo progetto di open education, verranno attivate attività di monitoraggio – legate a caratteristiche anagrafiche degli utenti, modalità di apprendimento dei partecipanti, livelli di soddisfazione e di partecipazione/completamento ai corsi – a partire dalla conclusione della prima edizione dei

percorsi presentati. È infatti in fase di sviluppo un questionario da somministrare ai partecipanti ai singoli corsi e che sarà inserito nei capstone dei percorsi che compongono i percorsi formativi. Le azioni di monitoraggio si rendono necessarie anche per orientare l'utente nella scelta del percorso, nella costruzione del proprio apprendimento e per favorire processi di inclusione (Nkuyubwatsi, 2014).

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## **ESPERIENZE FORMATIVE E PRODOTTI INNOVATIVI PRESSO L'UNIVERSITÀ DEGLI STUDI DI PAVIA NEL QUADRO STRATEGICO EUROPEO ET 2020**

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### **Abstract**

Con questo contributo intendiamo presentare alcune esperienze compiute all'Università degli Studi di Pavia, a vari livelli e dimensioni, nell'adozione di nuove tecnologie al servizio della didattica, in particolare nell'ambito della creazione di un portale interamente dedicato alla didattica, della videoregistrazione ed erogazione di lezioni universitarie online, della realizzazione di Learning Spaces, della creazione di MOOCs e infine della formazione professionale del personale d'Ateneo.

Per ciascuna esperienza vengono descritti le motivazioni che, nell'ambito del quadro strategico europeo ET 2020, hanno mosso il nostro Ateneo, i risultati qualitativi e quantitativi conseguiti, il riscontro tra gli utenti finali e i possibili scenari futuri.

### **Stato dell'arte**

L'espansione delle tecnologie informatiche è inarrestabile, pervade la nostra vita quotidiana ed è assodato che neppure il contesto educativo e formativo può essere esente da questa trasformazione. Le Università, sede privilegiata dell'istruzione, si stanno attrezzando al meglio per cogliere le opportunità che il digitale offre, con azioni formative che tengono conto della dimensione di apprendimento "micro", o individuale, e "meso", ovvero a livello di istituzione e azienda, ma sempre accogliendo le "macro" indicazioni che pervengono da tendenze sociali come pure da direttive europee, nazionali e di settore.

### **Digital Learning**

La capacità di formazione a distanza, anche per le università non telematiche, costituisce uno strumento fondamentale per il miglioramento della didattica e per un più profondo e rapido apprendimento da parte degli studenti. La diffusione del Web, l'esistenza di piattaforme di e-learning con alto livello di usabilità e l'accresciuta disponibilità di dispositivi di comunicazione telematica (smartphone, tablet e pc portatili) hanno portato anche l'Università di Pavia, storico Ateneo e pertanto con metodi di formazione perlopiù tradizionali, ad affrontare in modo sistematico lo sviluppo di strumenti di formazione a distanza che costituiscano al tempo stesso un ausilio alla didattica frontale e il supporto fondamentale per una didattica telematica.

Pavia si è mossa in questa direzione fin dal 2008 con un progetto sperimentale di portale didattico online, denominato Kiro (Figura 1), che ha visto inizialmente coinvolti 50 studenti e 7 insegnamenti universitari della Facoltà di Farmacia. Il successo di questa iniziativa ha suggerito di estendere a tutto l'Ateneo tale progetto e attualmente il servizio è supportato da 20 istanze del Learning Management Systems Open Source Moodle a cui hanno accesso circa 18.000 studenti e 650 docenti. Una formula così gradita agli studenti da collocarsi ormai nella tradizione dell'Ateneo Pavese.



Figura 1. Piattaforme KIRO (<http://idcd.unipv.it>)

All'inizio, Kiro è stato utilizzato prevalentemente per la distribuzione dei materiali didattici, ma nel tempo la piattaforma ha assunto anche una significativa valenza come punto di aggregazione per gli studenti (dove condividere esercitazioni ed esperienze, anche avvalendosi di tutor specifici per i singoli insegnamenti, richiedere chiarimenti ai docenti o ai pari tramite il forum) e come teatro di prove in itinere o esami finali per gli insegnamenti frequentati da numerosi studenti: ad esempio, sulla piattaforma "Test online" ogni anno vengono erogati circa 1.500 test di conoscenza della lingua per selezionare gli studenti che avranno diritto ad accedere al programma Erasmus.

Nell'ottica di ampliare la propria offerta formativa digitale tramite il portale Kiro, l'Università degli Studi di Pavia ha indirizzato un progetto verso corsi *blended* o ibridi, definiti nelle Linee Guida dell'Agenzia Nazionale per la Valutazione dell'Università e della Ricerca (ANVUR, 2014) come i Corsi di Studio (CdS) in cui l'attività didattica prevedesse il supporto delle tecnologie ICT per un numero di CFU non inferiore al 30% e non superiore al 75% dei CFU totali.

Il concetto di formazione erogata in modalità *blended* è oggi inteso come combinazione di lezioni in presenza (lezioni frontali in aula) e a distanza, fruite attraverso la rete Internet (Graham, 2006) e cerca di unire il meglio delle due metodologie per: incrementare il livello di partecipazione dei discenti al processo formativo trasformandolo da prevalentemente "trasmissivo" a "interattivo"; facilitare l'accesso alle risorse formative abbattendo le tradizionali barriere spazio-temporali e ampliando l'esperienza d'aula degli studenti; ottimizzare i costi di erogazione e di fruizione dei contenuti formativi consentendo di raggiungere rapidamente una utenza diffusa senza che questa debba spostarsi fisicamente; accelerare l'adozione della tecnologia e di conseguenza del Digital Learning nelle università italiane (NMC Report, 2017).



Nel Decreto del MIUR relativo alla programmazione universitaria per gli anni 2013-2015, tra le possibili azioni di miglioramento dei servizi agli studenti era esplicitamente citata la formazione a distanza erogata dalle Università non telematiche.

Raccogliendo questa indicazione, l'Università di Pavia ha presentato un progetto, valutato positivamente e finanziato dal Ministero, finalizzato alla predisposizione entro l'anno accademico 2015/16 di una offerta formativa comprendente cinque CdS offerti in modalità *mista*. È stato costituito un Gruppo di Lavoro (GdL) di cui hanno fatto parte il Prorettore alla Didattica, il Delegato all'ICT, il Dirigente dell'Area Sistemi Informativi e il Responsabile del Servizio Innovazione Didattica e Comunicazione Digitale, al quale è stata affidata la pianificazione e la gestione dell'intero progetto.

L'azione prevedeva, nel complesso, la registrazione "live" delle lezioni in aula tramite regia mobile, la loro post-produzione, il caricamento in appositi canali tematici di un gestore video streaming (VIMEO) e, infine, l'embedding del codice html di ogni filmato all'interno del corso già aperto dal docente sulla piattaforma KIRO, dove i video potevano essere integrati con risorse di approfondimento.

Il target è stato individuato nelle lauree biennali magistrali, la cui offerta formativa include contenuti specialistici e molto differenziati tra loro e i cui studenti già conoscevano l'esistenza e le modalità d'uso di Kiro. Sei CdS hanno manifestato il loro interesse: (a) Comunicazione Professionale e Multimedialità; (b) Economics, Finance and International Integration; (c) International Business and Economics; (d) Ingegneria Civile; (e) Musicologia; (f) Scienze Fisiche.

Per ognuno dei sei CdS, a partire da settembre 2015 si è proceduto alla registrazione di lezioni almeno per il 30% dei CFU del piano di studi, scegliendo un modello "verticale" che ha consentito di avere un numero consolidato di interi insegnamenti registrati.

Gli operatori audio-video, tramite le sette regie professionali all-in-one contestualmente acquistate, erano in grado di trattare: i flussi dei dati provenienti da una o più telecamere digitali esterne; i flussi dei dati provenienti dai PC utilizzati dai docenti per le lezioni; le sorgenti audio provenienti da uno o più microfoni. Le regie venivano di volta in volta trasportate e approntate nelle aule dove si tenevano le lezioni d'interesse secondo una puntuale programmazione. Una volta acquisiti, i materiali venivano automaticamente trasferiti via rete su un apposito e dedicato NAS (Network Attached Storage) presso la sede del Servizio IDCD per essere successivamente post-prodotti (in FinalCut) e infine pubblicati su Vimeo e sulle piattaforme Kiro di ciascun CdS. Ai docenti è stato proposto l'uso di Microsoft Surface, che, adeguatamente collegato alla regia, svolgeva la funzione sia di lavagna interattiva (su cui annotare le slide, comporre grafici, scrivere, ecc.) sia di computer per docente, oltre a inviare il segnale al proiettore dell'aula. Alcuni hanno accettato la proposta, sono stati preparati all'uso dal nostro team tecnico e il risultato finale è stato di grande impatto.

Le riprese delle lezioni hanno avuto inizio con il I semestre dell'anno accademico 2015/16 e da accordi iniziali sarebbero terminate alla fine del II semestre (maggio/giugno 2016), ma, pur non sussistendo più alcun obbligo di conseguimento dell'obiettivo ministeriale, i CdS coinvolti nel primo anno hanno chiesto di continuare la positiva esperienza, proponendo per le registrazioni 2016/2017 insegnamenti diversi dall'anno accademico precedente.



Figura 2. Esempio di cover di ogni video alla fine del processo di post-produzione

Il risultato finale di questa operazione è stato quello di produrre nel corso di due anni accademici circa 1.100 filmati per circa 2.000 ore di ripresa e per totali 320 CFU.

Per apprezzare alcuni esempi è possibile raggiungere l'indirizzo: <http://idcd.unipv.it/corsi-blended/>. Per l'intero piano del progetto, si legga la pagina sviluppata nel portale delle news di Ateneo (<http://news.unipv.it/?p=9880>, verificato il 23/02/18). Al momento la consultazione dei filmati è riservata soltanto a coloro che appartengono alla comunità accademica, ma non è escluso che in futuro i materiali possano essere disponibili per tutti.

L'iniziativa è sicuramente stata molto gradita agli studenti lavoratori, ma i dati ricavati dalle reportistiche di Moodle e Vimeo confermano che numerosi altri studenti hanno visionato i video prodotti, specie in vista dell'esame. Le visualizzazioni totali a febbraio 2017 ammontavano a 304.000, distribuite su più di 2.500 utenti fisici (persone diverse). Sul portale Vimeo sono inoltre indicati i dispositivi con cui i video sono stati visionati e precisamente: 199.000 con desktop, 77.000 con tablet e 28.000 con smartphone. Gli studenti UNIPV hanno dunque apprezzato la possibilità di poter accedere alle risorse anche in regime di mobilità. Questo fatto attesta la flessibilità di fruizione che le nuove tecnologie offrono all'apprendimento.

Il GdL sta discutendo come ri-orientare l'iniziativa per il prossimo anno, per migliorare l'efficienza del flusso di produzione, aumentare i benefici per tutti gli attori interessati e ridurre i problemi, oltre che naturalmente ottimizzare il modello. Sul lato dell'efficienza del processo si deve lavorare per automatizzare e velocizzare le procedure, pertanto a lungo termine si provvederà alla maggiore automazione possibile, con l'attivazione da remoto delle regie tramite programmazione con GoogleCalendar. Al fine di stendere opportuni progetti collaboreranno le strutture Dipartimentali, l'Area Tecnico Informatica e il servizio IDCD.

Dal punto di vista del modello didattico, l'anno accademico 2017/18 sarà impiegato per fare una riflessione organica di Ateneo a livello regolamentare e di ordinamenti didattici, in modo tale da poter offrire per l'anno accademico successivo anche percorsi *blended* "internamente

normati” non solo in modalità di affiancamento (lezione tradizionale e lezione filmata) ma anche in parziale arricchimento del modello tradizionale (modello erogativo + modello interattivo), secondo i suggerimenti espressi dall'ANVUR. Come prossimo obiettivo s'intende inoltre potenziare l'aspetto “social” ponendo particolare enfasi sul supporto alla comunità degli studenti.

## **Learning Spaces**

Consapevole della relazione fra processi educativi e società in cui essi hanno luogo, l'Università di Pavia ha da tempo avviato una riflessione sui cambiamenti che influenzano il sistema educativo (tecnologie, internazionalizzazione, ecc.), sulle nuove modalità, luoghi e strumenti che sono e saranno utilizzati nella trasmissione del sapere, fino ad analizzare il concetto di Learning Spaces (LS).

L'Università di Pavia dal 2008 ad oggi ha costruito “spazi” e “contesti” di apprendimento per la comunità accademica principalmente attraverso quattro progetti: Esperimenti di virtualizzazione dei laboratori informatici di Ateneo, Comunità online per la didattica (KIRO), Progetti UE per “Internationalization at Home”, e infine il più recente Laboratorio Didattico KiroLab, inaugurato dal Rettore dell'Ateneo Pavese il 15 marzo 2017 (<http://news.unipv.it/?p=19718>, verificato il 10/05/18).

L'Università di Pavia ha di fatto riconvertito una sala studio scarsamente frequentata dagli studenti in un Learning Space (denominato, per continuità con il portale online, KiroLab) in cui dare luogo ad una didattica aperta, flessibile, connessa e partecipata. Il risultato è illustrato sulla pagina del sito IDCD dedicata: <http://idcd.unipv.it/kiro-lab1/> e nella Figura 3.

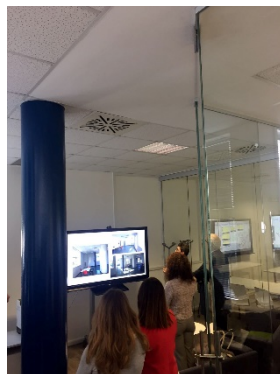


Figura 3. Inaugurazione del KiroLab da parte del Rettore

Grazie allo studio dei risultati di altri Atenei Europei e di documenti specifici prodotti in ambito universitario per la concezione di Learning Spaces da parte del GdL che si è occupato di questa ristrutturazione, l'Università di Pavia si è garantita un'esperienza del tutto replicabile e anche scalabile. Nei prossimi mesi, infatti, il Servizio IDCD sarà chiamato a realizzare un secondo KiroLab nelle strutture più antiche dell'Università, ancora più grande del primo. In particolare del Toolkit e delle risorse online sviluppate e liberamente rilasciate dalla NC State University:

The Learning Space Toolkit – A resource for designing and sustaining Technology-rich informal Learning Spaces (<https://learningspacetoolkit.org/index.html>).

### **Formazione professionale**

L'istruzione e la formazione professionale (IFP) sono oggetto del quadro strategico europeo ET 2020 che ha come obiettivo il conseguimento del 15% di partecipazione media di adulti (in età compresa fra i 25 e i 64 anni) nel campo dell'apprendimento permanente entro il 2020. Le aziende e, in generale, le istituzioni pubbliche e private, hanno un ruolo chiave nella formazione continua e nel conseguimento del risultato atteso.

Il Digital Learning, attraverso Internet e le tecnologie web, fornisce una valida alternativa ai metodi didattici tradizionali ed è ormai adottato da molte organizzazioni con un successo dovuto in gran parte agli strumenti di cooperazione sia sincroni (chat, videoconferenza) che asincroni (mail, forum, ecc.) (Inayat et al., 2013) inclusi nei Learning Management Systems (LMS) e nei Content Management Systems (CMS). Essi permettono infatti allo studente di vivere una esperienza simile a quella delle lezioni frontali, ma lasciandogli maggiore flessibilità. L'efficacia del Digital Learning in ambito IFP è inoltre condizionata dalla capacità dei docenti di trasformare l'azione formativa da un semplice trasferimento di conoscenze in un processo di apprendimento di competenze pratiche da applicare nella vita lavorativa quotidiana (Heuel & Feldmann, 2014).

In tale contesto anche l'Università di Pavia ha avviato da tempo (2007) varie esperienze di formazione per il proprio personale utilizzando le tecnologie ICT soprattutto per gestire corsi di ampio interesse o rientranti nella formazione obbligatoria e che quindi coinvolgono numerosi fruitori (Ferlini & Caldirola, 2010).

L'Ateneo ha adottato per l'erogazione dei corsi online l'LMS Open Source Moodle e si è assicurato che tutti i prodotti di nuova realizzazione siano pienamente *responsive*, siano cioè fruibili non solo da desktop ma anche da qualunque dispositivo mobile, per consentire a tutti gli utenti di accedere in modo autonomo e flessibile alle risorse disponibili e, a seguito del superamento di un test finale, ottenere il certificato di frequenza del corso.

Tutti i corsi sono stati realizzati sfruttando competenze tecnico-metodologiche interne all'Ateneo Pavese (Servizio Innovazione Didattica e Comunicazione Digitale), grazie alla sinergia con le Risorse Umane – per la selezione delle tematiche da trattare e del personale interessato – e con l'Area che si occupa dei sistemi informativi per la predisposizione delle infrastrutture ICT a supporto del servizio.

I corsi sono strutturati in unità didattiche che mettono a disposizione diverse tipologie di risorse e attività (materiali didattici in formato PDF, video che illustrano particolari attività pratiche, tutoriali per l'utilizzo di applicativi SW, video-seminari con la spiegazione del docente, unità di apprendimento in formato SCORM e collegamenti a risorse esterne ritenute di particolare rilevanza didattica). È sempre prevista la presenza di un tutor online che risponde ai quesiti dei

frequentanti e provvede anche a proporre stimoli per eventuali approfondimenti sugli argomenti trattati.

I risultati ottenuti sono molto positivi sia dal punto di vista del gradimento da parte dei fruitori, sia per i risparmi economici che ne sono derivati per l'Ateneo, sia per la certezza di un buon livello di controllo del processo di apprendimento grazie ai vincoli intermedi tra un argomento e l'altro. Su circa 4.000 questionari compilati dagli utenti dei corsi inerenti la formazione alla sicurezza e il training alle varie procedure amministrative, alla domanda: "Il corso si è caratterizzato per la sua forte connotazione tecnologica. Quale è il tuo giudizio in generale su questa iniziativa?" ha risposto con giudizio positivo ben il 90,8% delle persone che hanno compilato il questionario.

### **MOOCs**

L'acronimo Massive Open Online Courses fu utilizzato per la prima volta nel 2008 da D. Cormier per descrivere il corso di Siemens e Downes "Connectivism and Connective Knowledge" (<http://cck11.mooc.ca/>), un corso online inizialmente progettato per 25 studenti paganti ma che fu reso disponibile anche a coloro che si fossero semplicemente registrati, risultati poi 2300. Lo sviluppo dei MOOCs, diffusi anche grazie ad alcuni movimenti a livello internazionale quali Open Educational Resources (OER) e Open Education, è strettamente connesso agli ideali di apertura universale al mondo della cultura, al fatto che la conoscenza debba circolare liberamente e che il desiderio di apprendere non debba subire limitazioni da vincoli demografici, economici e geografici. I MOOCs infatti sono progettati per ospitare un numero elevato di partecipanti grazie a piattaforme con standard e prestazioni tecniche pensati appositamente per i grandi numeri; garantiscono accesso aperto e gratuito a chiunque voglia partecipare; hanno come obiettivo la personalizzazione dei percorsi formativi e la verifica degli obiettivi educativi raggiunti.

Accogliendo l'invito della Conferenza dei Rettori delle Università italiane (Paleari et al., 2015) e aderendo ai principi della Digital Agenda europea 2020, l'Università di Pavia ha prodotto fra il 2016 e il 2017 tre MOOCs con argomenti peculiari all'Ateneo pavese.

Da primo sono stati identificati docenti che offrirono le migliori garanzie in termini di competenza disciplinare sugli argomenti prescelti, oltre alla propensione e volontà di sperimentare nuove modalità didattiche, quindi si è organizzato un gruppo di lavoro formato da un coordinatore, un assistente di produzione e un regista. Infine sono stati progettati i tre corsi, rispettivamente, sulla storia di Alessandro Volta, la storia del Rinascimento Lombardo e del suo patrimonio bibliotecario e infine un corso di Matematica, disciplina in cui il Dipartimento pavese costituisce una eccellenza a livello internazionale. La struttura narrativa dei tre corsi è molto diversa:

- "L'eredità di Volta: dalla pila al fotovoltaico" (Prof. L. Fregonese) – in italiano – <https://iversity.org/en/courses/l-eredita-di-volta-dalla-pila-al-fotovoltaico>. Il corso illustra la storia di Volta, professore presso questo Ateneo, in cui compì tutte le sue

scoperte scientifiche. La narrazione si snoda all'interno del museo o nelle aule storiche a lui dedicate ed in cui aveva tenuto lezione, utilizzando gli strumenti originali dell'epoca per riprodurre gli esperimenti praticati dallo stesso Volta;

- “Livres enluminés à la cour des Sforza” (Prof. P. Mulas) – in francese – <https://iversity.org/en/courses/livres-enluminés-a-la-cour-des-sforza>. Il corso sui manoscritti intende gettare uno sguardo su preziosi ed unici esemplari di codici miniati rinascimentali appartenenti alla corte degli Sforza, duchi di Milano. Per questo motivo il contesto di riferimento sono le principali biblioteche del Nord e Centro Italia (Reale di Torino, Cini di Venezia, Centrale di Pavia, ecc.), nelle cui sale storiche il docente commenta le pregiate miniature;
- “Introduction to the Theory of Distributions and Applications” (Prof. U. P. Gianazza) – in inglese – <https://iversity.org/en/courses/introduction-to-the-theory-of-distributions-and-applications>. Si illustrano principi di matematica, in cui emerge il ruolo della scrittura della formula, commentata dal docente con le relative dimostrazioni, e appendici con ulteriori esercizi per gli studenti, a stimolare l'interazione.

Il lavoro, nel complesso, ha comportato la produzione di 80 videoclip (max. 15 minuti l'una) articolate in 20 capitoli a loro volta suddivisi in 85 paragrafi e, dopo attenta valutazione, il provider prescelto è stato Iversity (Iversity.org), con sede a Berlino.

Attualmente sono iscritti ai corsi – emessi in modalità self-paced – complessivamente 600 discenti. Un numero inferiore alle aspettative in parte condizionato dagli argomenti di nicchia (fortemente peculiari dell'Ateneo), dalla scelta della lingua veicolare e dal fatto che i corsi non siano associati a percorsi formativi curricolari. Nonostante ciò i docenti coinvolti hanno espresso grande soddisfazione professionale per il risultato conseguito e hanno ricevuto congratulazioni dai colleghi in ambito disciplinare per la qualità dei corsi offerti.

Il dato più rilevante di questa iniziativa è che essa ha generato nel personale interno al Servizio IDCD un know-how specifico e competenze professionali prima inesistenti, da cui sono scaturite la capacità di progettare e gestire uno studio di registrazione con attrezzature professionali, che durante il periodo di sviluppo dei MOOC non esisteva, nonché l'opportunità di attrarre cospicui finanziamenti esterni per la costruzione di percorsi formativi online.

Le prospettive future nell'ambito dei MOOCs sono state inoltre discusse anche nella recentissima Conferenza di Ateneo a Pavia dal titolo “La nuova didattica” (si veda <http://news.unipv.it/?p=27777>, verificato il 10/05/18), in cui, grazie anche alla presenza del responsabile del più importante provider MOOCs italiano, Federica.eu (Università Federico II di Napoli), l'Università di Pavia ha voluto analizzare un tema di grande valore strategico e culturale e rilanciare una proposta di collaborazione a medio termine tra i due Atenei.

## Conclusioni

Il filo conduttore delle esperienze condotte all'Università di Pavia e qui presentate sono sempre le tecnologie a supporto della didattica, ma declinate nelle loro varie accezioni e modalità di applicazione all'intervento formativo. Iniziative che hanno tutte riportato ottimi risultati e che hanno i presupposti per essere ripetute sia a Pavia che altrove, grazie alla loro replicabilità (si appoggiano a LMS open source e a tecnologie web-based disponibili in qualsiasi organizzazione) e scalabilità (Moodle consente più istanze e le piattaforme a Pavia sono passate da una a venti; i percorsi formativi erogati non hanno un limite di utenti; i Learning Spaces possono essere modulati in base alle proprie esigenze, e così via).

Assai interessante è poi notare, in tutti questi progetti, come le ICT non fungano solo da supporto alla didattica ma da vero e proprio traino: dopo aver sperimentato la versatilità del digitale, sono gli stessi utenti a rendersi disponibili a ulteriori implementazioni. Alcuni docenti, ad esempio, hanno già avanzato richieste su come poter procedere con azioni di "flipped classroom", mentre altri sono alla ricerca di modelli tecnologicamente supportati per fare in modo di contrastare il calo della frequenza al corso verso la fine delle lezioni. E il personale d'Ateneo, con i propri commenti sui forum dedicati, contribuisce a individuare le metodiche più gradite nella IFP, in una continua e proficua osmosi di conoscenza.

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## **SISTEMI E SOFTWARE OPEN SOURCE NELLA FORMAZIONE DEGLI INSEGNANTI PER UNA SCUOLA SENZA ESCLUSI**

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### **Abstract**

Il complesso tema dell'inclusione obbliga la scuola a riprogettare la propria organizzazione, adottando nuovi modelli, metodi e tecniche di insegnamento per assicurare ad ogni allievo la partecipazione al processo di apprendimento. Insegnanti competenti, formati ed aggiornati sulle nuove opportunità, anche di tipo tecnologico, sono indispensabili per rendere la scuola una casa della cultura capace di accogliere con competenza le singolarità, rimuovendo le differenze linguistiche, culturali, religiose, geografiche esistenti. Nell'ottica di un'inclusione possibile e doverosa, sistemi e strumenti Open Source permettono al docente moderno di realizzare percorsi didattici interattivi e collaborativi capaci di abbattere le barriere di accesso all'apprendimento, consentendo la pari partecipazione agli allievi con disabilità e difficoltà. Il contributo descrive l'esperienza del corso "Le Tecnologie Free, Open Source e multiplatforma per la Comunicazione Aumentativa Alternativa, la Didattica e l'Autonomia" organizzato dal CTS della provincia di Cosenza e riguardante il sistema So.Di.Linux ed il pacchetto Easy Dida 2.0, due progetti finalizzati alla diffusione di strumenti didattici inclusivi ed Open Source nel mondo della scuola.

### **Introduzione**

Nell'ambito delle attività del progetto "Facilito l'inclusione se collaboro, condivido e comunico" previste dal piano di formazione annuale, ed in riferimento al processo di riforma e innovazione della scuola avviato dalla Legge 107/2015, il Centro Territoriale di Supporto della provincia di Cosenza ha promosso ed organizzato il corso "Le Tecnologie Free, Open Source e multiplatforma per la Comunicazione Aumentativa Alternativa, la Didattica e l'Autonomia". Erogato in modalità blended learning, e tenuto per la parte in presenza presso l'Istituto Tecnico Economico Statale "Vincenzo Cosentino" di Rende, il corso è un esempio di formazione permanente messo in atto con l'intento di dotare gli individui di quelle competenze necessarie per vivere e lavorare come protagonisti nella società complessa. Il macroscenario di riferimento in cui si contestualizza è quello rappresentato dalla società della conoscenza (Drucker, 1959; Limone, 2012) nella quale il ruolo delle infrastrutture tecnologiche per la gestione ed il trattamento delle informazioni assume importanza strategica sia per le organizzazioni ed i professionisti, sia per le diverse agenzie educative sul territorio. Tra queste la scuola, che in seguito all'ingresso delle tecnologie al suo interno, diventa parente prossima della reticolarità e della multimedialità (Maragliano, 1998), ed ha l'obbligo di guidare in modo efficace gli allievi verso un uso corretto e pedagogicamente fondato degli strumenti messi a disposizione dal Web

2.0 (O'Reilly, 2005). L'esistenza del gap generazionale nell'utilizzo del computer tra nativi e immigranti digitali (Prenksy, 2001), concetti rispettivamente associati alla figura dello studente ed a quella dell'insegnante, rende indispensabile investire nella formazione della figura docente. Oggi più che mai, il concetto di formazione non coincide più con un determinato gruppo di contenuti, per di più acquisiti nella fase dell'infanzia e della giovinezza, ma è sempre più legato ai processi dinamici dei soggetti, ed è riferito alle dimensioni culturali dello sperimentare, del comprendere e del valutare, unite alla capacità di prendere ed assumere decisioni in modo consapevole ed autonomo (Piu, 2007). Formazione ed apprendimento continuo rappresentano gli elementi chiave che permettono di stare al passo con i cambiamenti della learning society, ovvero una società impegnata nel promuovere l'apprendimento quale processo presente lungo tutto il corso dell'esistenza degli individui, abbracciando i diversi ambiti di vita (Alberici, 2008). Nonostante diversi studi (Margaryan, 2009; Thinyane, 2010; Vaidhyanathan, 2008) mettano in evidenza come non tutti gli studenti possano essere considerati esperti tecnologici, va preso atto come nelle nuove generazioni si siano manifestati nuovi stili cognitivi e comportamenti di apprendimento non lineari. Apprendono attraverso schermi, icone, suoni, giochi, navigazioni virtuali (Veen & Vrakking, 2006). Sono in costante contatto telematico con i propri pari e sono caratterizzati dal multitasking, peculiarità che li rende capaci di processare in contemporanea una maggiore quantità di dati rispetto alla generazioni del passato. Tali dati sono presenti all'interno dei nuovi luoghi di incontro virtuali sorti con l'avvento delle tecnologie social. La scuola e gli insegnanti, pertanto, devono conoscere e praticare tali nuovi spazi e strumenti digitali. Ciò al fine di individuarne le potenzialità educative e piegarli alla didattica, in modo da essere in grado di suggerire gli utilizzi pedagogicamente più corretti, finalizzati all'accrescimento di competenze e conoscenze. Insegnanti formati sulle tecnologie saranno in grado di assumere il ruolo di mediatori nella transizione in corso tra passato e futuro, diventando parte attiva del processo di cambiamento. Potranno condurre con coscienza i discenti ad un uso consapevole e misurato degli ambienti online, non solo per svago o per esprimere la propria identità attraverso i social, come avviene adesso, ma soprattutto per costruire contenuti, collaborare, presentare le proprie idee con accuratezza, partecipare e scambiare conoscenza. Accanto a queste esigenze di natura generale, si affiancano quelle di natura speciale. Ciò si spiega in quanto la scuola, insieme alle diverse agenzie educative presenti sul territorio, ha, tra gli altri, anche il compito di favorire l'attiva e piena partecipazione ai processi di apprendimento dei soggetti con bisogni speciali, abbattendo ostacoli, barriere, pregiudizi, e sostenere la condivisione di esperienze ed apprendimenti con i propri pari. La tecnologia, pertanto, va considerata come occasione non solo per la formazione, ma anche come possibilità ed ausilio per garantire un'educazione aperta a tutti ed offrire a tutti le medesime opportunità, studiando e ricercando quali servizi, software e applicazioni possano meglio rispondere alle esigenze dei soggetti disabili. Nel progettare la propria azione didattica, il docente moderno, infatti, si troverà di fronte ad una realtà composita e variegata, e dovrà affrontare esigenze, situazioni e bisogni differenti, facendo ricorso alle diverse strategie metodologie e strumentazioni a disposizione. Il tema oggetto dell'intervento formativo descritto è in linea con gli orientamenti delle istituzioni europee ed internazionali e con i cambiamenti anche di tipo legislativo che mirano ad una scuola capace di padroneggiare gli strumenti del comunicare, di condividere dati, informazioni e contenuti, consentendo ad ogni

individuo di conquistare e sperimentare competenze (Carruba, 2014). In tale contesto le nuove tecnologie, sia quelle proprietarie con caratteristiche inclusive e multiplatforma, sia quelle Open Source, come So.Di.Linux ed Easy-Dida, possono offrire un considerevole sostegno ad una didattica pensata per l'intera classe e realmente inclusiva che sia in grado di raggiungere le diverse intelligenze presenti e creare nuove competenze dinamiche, laboratoriali, cooperative e collaborative.

### **So.Di.Linux Orizzonti**

“Orizzonti” è l'ultima versione di So.Di.Linux, un sistema operativo Open Source pensato ed allestito per una scuola inclusiva. Esso è nato da un progetto di ricerca del 2003, che ha visto la collaborazione fra l'Istituto Tecnologie Didattiche del CNR ed AICA (Associazione Italiana per il Calcolo Automatico), con l'obiettivo di realizzare e diffondere strumenti didattici liberi che potessero essere di aiuto per insegnanti, studenti, famiglie ed operatori della scuola in genere. La disponibilità delle risorse digitali a scuola sempre più spesso si scontra contro l'ostacolo rappresentato dai costi per l'acquisto di più licenze necessarie per attrezzare un laboratorio. In alcuni casi tale reticenza all'acquisto è motivata dal fatto che i software didattici, non venendo aggiornati parallelamente ai sistemi operativi, diventano obsoleti e nel giro di poco tempo possono presentare rilevanti problemi di compatibilità. Il software libero si propone come soluzione a tali problematiche, in quanto consente di attrezzare laboratori a costo zero, e di conseguenza ne allunga la vita utile grazie agli aggiornamenti messi a disposizione nel tempo dalla comunità di sviluppatori volontari. So.Di.Linux, pertanto, vuole rispondere alle esigenze di semplicità, praticità, stabilità, economicità e funzionalità, avvertite dagli attori che a vario titolo lavorano nel contesto scolastico, permettendo loro di: utilizzare e sperimentare un sistema operativo open source senza dover necessariamente installare Linux; disporre di un ambiente di lavoro identico sia a casa che a scuola; poterlo copiare e diffondere liberamente senza incorrere nella violazione del diritto di autore e allo stesso tempo di conoscere l'esistenza del software didattico libero. So.Di.Linux Orizzonti si basa su Linux Mint 18.2 MATE, garantisce aggiornamenti di sicurezza fino al 2021, ed è disponibile in due versioni: sia per PC a 32 bit sia per PC a 64 bit. Tale doppia versione è stata pensata con l'intento di poter utilizzare il pacchetto sul più ampio numero possibile di postazioni, sfruttando anche i PC più datati ed equipaggiati con sistemi operativi non più supportati. In tal modo si evita che la didattica basata realizzata con So.Di.Linux trovi ostacoli nel passaggio tra scuola e casa. Al suo interno è presente una selezione di software applicativi e didattici individuati seguendo i criteri dell'accessibilità, dell'usabilità e della possibilità di creare didattica inclusiva e multimodale, permettendo di sfruttare i nuovi linguaggi che arricchiscono la comunicazione e l'organizzazione dei saperi: software per creare mappe, navigare offline, gestire le lavagne interattive, ecc. Più nello specifico, sono stati inclusi nel sistema i software in grado di offrire un'interfaccia intuitiva in italiano e in subordine anche in lingua straniera; che risultassero essere multiplatforma (quindi anche per Windows e Mac OS); con un formato dati leggibile anche in altri sistemi quali Windows e Mac OS; con la possibilità di stampare il lavoro realizzato; con tutorial e manuali online oltre che con un sito di riferimento aggiornato. So.Di.Linux vede al suo interno diversi software utilizzabili come ausilio per alunni con disabilità (lettore di schermo, ingranditori,

gestione semplificata del click, login accessibile, supporto a dispositivi touch screen, barre braille, tavolette grafiche, LIM). Per ogni software didattico è messa a disposizione dell'utente una scheda tratta da Essediquadro, servizio per la documentazione e l'orientamento sul software didattico e altre risorse digitali per l'apprendimento realizzato dall'ITD del CNR in collaborazione con MIUR e INDIRE. L'immagine ISO di So.Di.Linux Orizzonti è liberamente scaricabile dal sito ufficiale (<https://sodilinux.itd.cnr.it/>). Al termine del download si può produrre il relativo DVD e lanciarlo in modalità "live", ovvero senza la necessità di installarlo immediatamente sul proprio elaboratore e senza sostituire il sistema operativo preesistente. Ciò consente a docenti e studenti, compresi quelli con basso livello di competenze tecniche, di sperimentarlo per valutarne le funzionalità prima di procedere alla classica installazione, permettendone un impiego anche in quei laboratori scolastici non aggiornati dal punto di vista hardware/software. In ogni caso rimane la possibilità di fare convivere So.Di.Linux con Windows o con altri sistemi già presenti sul PC, suddividendo lo spazio disco dedicato. Ogni utente può contare sul supporto tecnico rappresentato dal sito e dalla mailing list di So.Di.Linux Orizzonti, tramite la quale si possono porre quesiti e ricevere assistenza, suggerimenti e risposte riguardanti l'utilizzo della distribuzione. Grazie all'intensa attività di promozione e diffusione svolta da numerosi CTS la comunità è cresciuta, ed annovera al suo interno docenti, genitori, riabilitatori, studenti, tecnici ed altre figure che hanno contribuito al miglioramento del sistema, semplificando l'accesso a tutti gli applicativi attraverso un ambiente personalizzabile in funzione di esigenze specifiche di utilizzo.

### **Easy Dida 2.0 port**

Realizzato da Francesco Fusillo, Easy Dida 2.0 port è un pacchetto di strumenti per la didattica facilitata da portare sempre con sé, corredati da videotutorial e Webinar dedicati agli insegnanti in modo che possano accompagnare il cambiamento di azione in classe. Lo sguardo è rivolto a studenti con DSA, BES, borderline, con disabilità cognitive e neurosensoriali. Si tratta di una raccolta di applicativi Free ed Open Source molto conosciuti, documentati, gratuiti, funzionanti su tutti i sistemi operativi (da Windows Seven a Windows 10, Mac OS, Linux), con l'obiettivo di fornire agli insegnanti una via facilitata al cambiamento nel loro modo di offrire la conoscenza nella didattica scolastica. Inserendo la tecnologia nel "fare scuola" si possono utilizzare più linguaggi per trasmettere concetti e saperi e ciò si traduce in più possibilità di far apprendere, rispettando le irripetibili singolarità degli allievi, compresi quelli disabili. Una didattica così adottata è in grado di aprire nuovi scenari per gli allievi e avviare azioni di inclusione e accesso al sapere. Al centro della proposta c'è la didattica facilitata, vera sfida dell'inclusione, per consentire l'adozione nella quotidianità scolastica dei nuovi "linguaggi". Le esigenze educative così differenti tra di loro presenti all'interno della variegata scuola italiana di oggi richiedono la personalizzazione del programma formativo e degli strumenti utili come "mezzo per l'educazione". La tecnologia diventa strumento per l'integrazione in senso lato, per agevolare, alleviare, compensare, cercando di non cadere mai nel rischio che essa sostituisca la persona, ma, anzi, contribuendo all'innovazione globale per offrire a tutti le stesse opportunità. Easy Dida 2.0, pertanto, si collega ad un nuovo tipo di scuola: una scuola moderna, che non discrimina, non più esclusivamente frontale, ma una scuola dell'intraprendenza intellettuale,

nella quale la piccola idea diviene l'idea di tutti, dove l'insegnante coordina l'apprendimento cooperativo attraverso più linguaggi e l'ausilio delle tecnologie. All'interno del pacchetto sono presenti due diverse sezioni, contenenti le versioni dei software sia in modalità installazione sia in modalità portatile. La sezione portatile permette il completo utilizzo dei programmi direttamente dalla chiavetta. Ciò risulta particolarmente utile quando l'utente, sia esso docente o studente, si trova a lavorare su postazioni per le quali non possiede i privilegi di amministrazione per procedere all'installazione dei software. Tutti i programmi sono selezionati, documentati e divisi per funzione, invece che per nome, in modo da facilitare ancora di più l'utente nelle sue esigenze. Easy Dida è anche formazione certificata: per ogni applicativo è prevista una video guida didattica o un Webinar Essediquadro che stimolano e consigliano il docente sul suo utilizzo didattico in classe. Il pacchetto svincola l'utilizzatore anche dalle problematiche tipiche legate alla compatibilità tra formati di file e versioni di software differenti, problema ricorrente in ambito scolastico. Ciò permette all'insegnante anche di poter adottare setting e modelli didattici innovativi come la Flipped Classroom e il BYOD (Bring Your Own Device), considerato che gli allievi, dopo averlo scaricato dal sito ufficiale (<https://www.fusillo-francesco.it/>), possono utilizzare il pacchetto nel contesto classe sul proprio computer e continuare i compiti non completati successivamente, superando in tal modo gli ostacoli che possono sorgere nel transito didattico delle attività tra scuola e casa. La versione 2.0, oltre all'aggiornamento di tutti gli applicativi in modo da renderli compatibili con i più recenti sistemi operativi, vede la presenza in versione installabile e portatile del software OpenBoard per la gestione della LIM; contiene un nuovo ambiente per l'accesso alla formazione certificata MIUR su tecnologie ed inclusione, ed una raccolta di collegamenti verso utilità e risorse didattiche in rete adatti per proporre in maniera interattiva le proprie lezioni. Tra i software del pacchetto vi sono applicativi per realizzare video lezioni e piccoli clip video (CamStudio), audio lezioni (Audacity), Mappe concettuali (CMaps Tools), guardare, manipolare e catturare video (VLC), gestire la LIM (Lavagna Interattiva Multimediale) di qualsiasi produttore (OpenBoard), produrre documenti di testo, fogli elettronici, presentazioni, database, disegni (Libre Office), navigare in rete, scaricare e manipolare elementi multimediali incorporati nelle pagine Web (Mozilla Firefox), ecc. Easy Dida 2.0 intende incoraggiare gli insegnanti a passare da una didattica trasmissiva, frontale, fondata sull'atteggiamento passivo degli allievi ad una didattica partecipata, in cui l'insegnante acquisisce il ruolo di facilitatore e guida i ragazzi nella scoperta e nella creazione di conoscenza tramite strumenti che permettono di manipolare gli oggetti forniti dall'insegnante in un setting cooperativo e circolare che punta all'inclusione.

### **Il corso: organizzazione e caratteristiche**

Le attività formative, promosse dall'IIS "Cosentino - Todaro" di Rende e dal CTS della provincia di Cosenza, sono state destinate a 70 docenti delle scuole di ogni ordine e grado della Provincia di Cosenza, con priorità ai Docenti di sostegno, ai Referenti/Coordinatori per l'inclusione ed agli Animatori Digitali. Il percorso formativo unitario di 50 ore è stato strutturato in due unità formative di 25 ore, ciascuna articolata in 8 ore di lezioni interattive e laboratoriali, 8 ore di attività di condivisione e approfondimento in e-learning, 9 ore di sperimentazione pratica a scuola da documentare nella piattaforma che ha supportato le attività

a distanza. Relatore è stato Francesco Fusillo, docente, formatore e pubblicista, autore del pacchetto Easy Dida, nonché tra i curatori del Sistema So.Di.Linux insieme a Giovanni Caruso, Lucia Ferlino e Maurizio Marangoni. Obiettivi da raggiungere al termine del corso sono stati quelli di sviluppare conoscenze e competenze nell'uso delle tecnologie free e Open Source per la Comunicazione Aumentativa Alternativa, la didattica e l'autonomia. Oltre a So.Di.Linux Orizzonti e Easy Dida 2.0 Le tematiche hanno interessato anche l'utilizzo di strumenti per creare un sito di classe; l'allestimento di postazioni interattive per alunni con autismo, ADHD, sordità e sindrome di Down; la presentazione di buone prassi, la dimostrazione e la sperimentazione di applicazioni pratiche. Il corso, svoltosi tra i mesi di Novembre 2017 e Febbraio 2018, è stato erogato in modalità blended learning. Le attività in presenza tenute presso l'ITES "V. Cosentino", sono state affiancate da approfondimenti, discussioni, assistenza tutoriale e risorse in ambiente e-learning, capitalizzate in crediti che i corsisti hanno dovuto conseguire ai fini del raggiungimento della certificazione finale. All'interno dell'ambiente di apprendimento in rete sono stati erogati quattro laboratori tematici di approfondimento (Tab. 1)x, ciascuno caratterizzato da contenuti e attività rispondenti nell'insieme agli obiettivi del corso. Il corretto svolgimento delle attività previste per ciascuno dei quattro laboratori, debitamente validate dal docente/tutor, ha comportato la capitalizzazione di due crediti per modulo.

Tabella 1: Laboratori delle attività e-learning

Laboratorio	Strumento/i utilizzato/i	Crediti
Laboratorio 1: Didattica con la LIM	OpenBoard	2
Laboratorio 2: Videolezioni e Videotutorial	CamStudio, Apowersoft, Screencast-o-matic	2
Laboratorio 3: Comunicazione Aumentativa Alternativa	AraWord	2
Laboratorio 4: Creare un sito di Classe	Jimdo	2

Ognuno dei quattro laboratori ha previsto la produzione obbligatoria di un elaborato (oggetto didattico) le cui istruzioni, specifiche e vincolanti, sono state fornite in modo dettagliato. Ogni elaborato/prodotto è stato consegnato in piattaforma all'interno di un glossario appositamente costituito al fine di favorire la libera consultazione e la condivisione tra tutti i corsisti. Il CTS provinciale ha messo a disposizione strumentazione e sussidi, il laboratorio informatico e la piattaforma e-learning. Ai corsisti, secondo l'ottica del BYOD (Bring Your Own Device) è stato chiesto di avere a corredo i propri dispositivi portatili, in modo da poter fornire loro assistenza individuale nelle operazioni di sperimentazione e di installazione di So.Di.Linux Orizzonti e Easy Dida 2.0. Alla fine dell'intero percorso formativo è stato rilasciato un attestato finale ai corsisti che sono stati presenti a tutte le ore di attività in presenza ed hanno conseguito i crediti corrispondenti alle attività on-line.

## **I risultati del questionario di fine Corso**

Al termine delle attività è stato somministrato online un questionario finale, anonimo e non obbligatorio, al fine di rilevare il gradimento dei corsisti sottoponendo ad indagine le aree riguardanti i docenti, la didattica, i servizi di supporto e la piattaforma e-learning, l'orientamento verso l'adozione dell'Open Source, gli strumenti proposti durante le attività.

Dalle risposte ricevute, unite ai feedback raccolti dalle diverse fonti informative quali osservazioni ed interazioni in presenza, contributi postati nei forum, analisi dei report di navigazione nelle sessioni di lavoro on-line, è emerso un forte coinvolgimento che ha indotto i corsisti a discutere, riflettere, confrontare posizioni divergenti sia in presenza sia a distanza, mettersi in discussione per poi promuovere percorsi di conoscenza centrati sullo sviluppo di processi cognitivi superiori. I prodotti finali realizzati e consegnati sono stati numerosi, ed hanno confermato un alto livello di interesse e partecipazione sia verso le tematiche trattate, sia verso gli strumenti software proposti, che hanno rappresentato una vera e propria novità. Tali prodotti sono risultati utili soprattutto in ottica inclusiva, considerato che prima di essere consegnati sono stati testati ed utilizzati in situazioni didattiche reali da parte dei corsisti, gran parte di quali (54%) insegnanti di sostegno. Il 60% di essi è in possesso di certificazioni informatiche, e oltre i due terzi (70%) giudica adeguato il livello di competenze digitali posseduto. Il 50% ha indicato di non conoscere Easy Dida prima di iniziare il corso, il 37% ne aveva sentito parlare senza utilizzarlo praticamente, mentre un rimanente 13% aveva provveduto a farne il download per un primo utilizzo prima che iniziasse il corso (Figura 1).

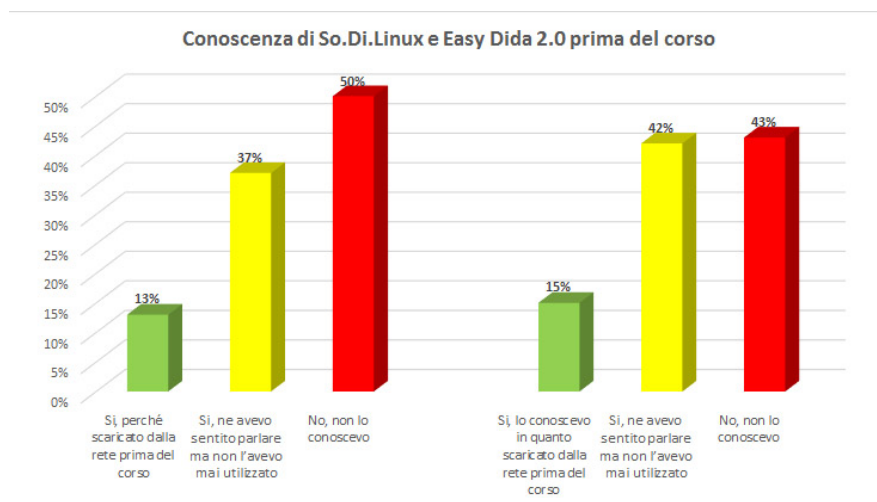


Figura 1. Conoscenza degli applicativi prima del corso

Un andamento simile fanno registrare le risposte riguardanti So.Di.Linux, per il quale la somma delle risposte di coloro che avevano un'idea sulle sue funzionalità (57%) supera coloro che non lo conoscevano affatto (43%). Il 37% dei corsisti ha iniziato ad utilizzare So.Di.Linux installandolo in un PC insieme ad un sistema operativo già esistente, un consistente numero di corsisti (57%) lo ha sperimentato grazie alla versione live da DVD che non prevede l'installazione, mentre una piccola parte (6%) ha deciso di installarlo in maniera esclusiva, eliminando il sistema esistente. Tra le categorie di programmi presenti in So.Di.Linux, quella che raggruppa i software per "compensare le difficoltà" è stata la più apprezzata dai corsisti (34%), seguita da quella "per lavorare alla LIM" (20%), e da quella che raggruppa i software disciplinari (15%). La possibilità di allestire nel proprio istituto un laboratorio basato esclusivamente su So.Di.Linux ha ricevuto una risposta positiva dal 33% dei corsisti, il 9% si è espresso negativamente, mentre la maggioranza (59%) pur non sapendo dare una risposta immediata si è mostrato disponibile nel suggerire tale soluzione ai vertici della propria realtà scolastica. I corsisti hanno apprezzato le caratteristiche inclusive (27%), di semplicità (40%),

etiche (23%), di interoperabilità (4%) e compatibilità operativa (4%) sulle quali si basa So.Di.Linux. Analoghi positivi riscontri si sono registrati per Easy Dida: il 46% dei corsisti lo ha giudicato molto utile nel proprio ambito didattico. Tra gli applicativi presenti, OpenBoard (39%), AraWord (18%), Cmap Tools (12%) e CamStudio (10%) sono stati quelli considerati più utili per favorire una didattica inclusiva in classe. Il 44% dei corsisti ha continuato ad usare Easy Dida anche dopo la fine del corso sia per le attività private che per quelle didattiche. Il 24% ha utilizzato gli applicativi del pacchetto solo a casa, mentre il 28% solo a scuola, nella quotidianità didattica. Il 91% dei partecipanti si è espresso favorevolmente all'impiego in ambito scolastico di software aperti al posto di quelli proprietari. Il motivo principale per cui essi vengono preferiti è il risparmio economico dovuto all'assenza di costi per licenze e aggiornamenti (26%), seguito dalle minori risorse richieste in termini hardware che favoriscono il riutilizzo di elaboratori datati (19%), la libertà di farne copie senza restrizioni (17%), la maggiore indipendenza rispetto dai produttori di software (14%), la maggiore sicurezza offerta in termini di protezione dei dati (10%), la possibilità di studiarne il funzionamento adattandoli alle esigenze dell'utente (8%), la presenza di supporto e documentazione in rete (6%). Alla domanda "nella scuola in cui lavori si utilizzano software e sistemi Open source?" 47% dei corsisti afferma che nella propria istituzione non vengono usati per nulla, il 39% ha risposto di lavorare in una scuola nella quale i sistemi Open Source sono usati in misura minima, mentre solo un residuo 14% opera in un contesto scolastico in cui software e sistemi Open vengono adottati in maniera paritaria insieme a quelli proprietari. Nel complesso, il campione di riferimento si è mostrato ottimista sulla possibilità di introdurre l'uso in maniera esclusiva di software Open Source nella propria realtà scolastica (Fig. 2): il 40% lo ritiene possibile per aule e laboratori dell'intera scuola, il 21% limitatamente ad un laboratorio "pilota", il 20% per una o alcune postazioni "pilota", mentre per il 19% è una configurazione impossibile. Nel complesso l'esperienza formativa vissuta è stata valutata ottima (57%) dalla maggioranza dei corsisti, ed il 68% di questi ha espresso la volontà di iniziare a produrre personalmente contenuti didattici digitali e distribuirli in classe al fine di supportare i processi di insegnamento-apprendimento.

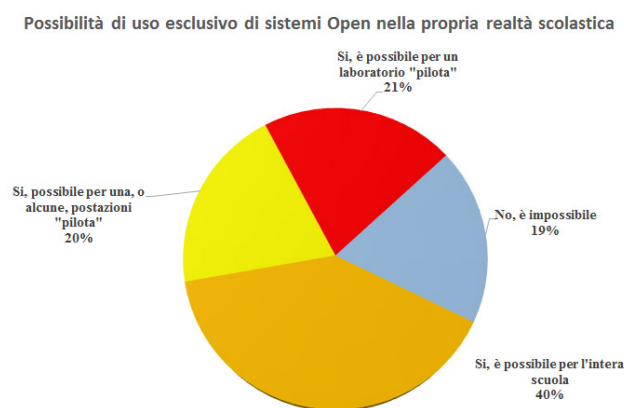


Figura 2. Possibilità di uso esclusivo di sistemi Open nella propria realtà scolastica

## Conclusioni

Le incertezze e la complessità che caratterizzano la nostra società, influenzata dai progressi e dalle innovazioni tecnologiche che condizionano la vita quotidiana, obbligano la scuola a



dotarsi di strumenti e competenze idonee per poter attuare una didattica realmente inclusiva, promuovendo un rinnovamento dal punto di vista metodologico, modificando tempi e spazi di apprendimento e mettendo a disposizione di tutti le tecnologie più opportune per supportare la didattica quotidiana. Il ruolo della scuola è decisivo, in quanto rimane l'unica agenzia educativa in grado di promuovere cultura e cittadinanza (D'Alonzo, 2017), creare sviluppo sociale e culturale in modo da fronteggiare le sfide di un mondo sempre più globalizzato. Per adempiere alla sua funzione educativa la scuola ha bisogno di rispondere in maniera efficace alla varietà di bisogni e di stili comunicativi nel rispetto di tutti e di ciascuno, garantendo il reale progresso degli apprendimenti attraverso la rimozione di tutte le barriere che ostacolano l'apprendimento e la partecipazione di tutti gli allievi alla vita scolastica. In tale quadro diventa sempre più importante il ruolo dell'insegnante, al quale viene chiesto un costante investimento formativo per poi essere in grado di attivare percorsi educativi e didattici idonei e mirati ai bisogni speciali di ciascun allievo, facendo emergere le potenzialità di tutti. Sistemi e strumenti Open Source, rispondenti ai criteri di accessibilità, usabilità, praticabilità, flessibilità e adattabilità, come Easy Dida e So.Di.Linux, sono in grado, da un lato, di garantire l'accessibilità economica al sapere digitale, dall'altro di coadiuvare l'insegnante moderno, aggiornato e competente, anche in campo tecnologico. Egli dovrà sapersi orientare nella scelta degli strumenti più adeguati alle diverse situazioni al fine di creare una vita di classe realmente inclusiva, nella quale ogni discente possa trovare un ambiente pieno di proposte efficaci, ricco di intenzionalità educativa ed esperienze formative, così da imboccare la strada della crescita migliorando le dimensioni della comunicazione e della relazionalità.

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## ZENBOT – AGENTE PER IL SUPPORTO DELLE ATTIVITÀ FORMATIVE IN AMBIENTE MOODLE

*Andrea Zappi, Roberto Beccari, Green Team Società Cooperativa, Italia*

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### Abstract

Nei sistemi e-learning complessi o comunque con un numero elevato di studenti, il supporto individuale personalizzato che è un elemento fondamentale per la riuscita dell'intervento, richiede risorse umane ed economiche elevate. In quest'ottica è stato sviluppato ZenBot, un'agente per il supporto delle attività formative in grado non solo di rispondere alle domande e fornire conoscenze di base, ma anche di interagire in maniera attiva con gli utenti del sistema e di tenere traccia dei progressi e dei risultati delle attività formative dei discenti.

### Introduzione

La nostra pluriennale esperienza nel fornire servizi ad alto valore aggiunto in sistemi e-learning ha evidenziato come l'help desk e il tutoraggio siano componenti fondamentali per facilitare l'utilizzo delle risorse (sia per i docenti che per i discenti) e "stimolare/supportare" il discente nel processo formativo al fine di diminuire la percentuale di abbandono e garantire il raggiungimento del successo formativo.

In particolare il nostro modello organizzativo prevede, per i servizi di contesto, essenzialmente due tipologie di ruoli che corrispondono ad altrettante modalità operative:

1. Il punto unico di accesso (supporto di primo livello) per i discenti e i gestori dei corsi a fine di risolvere tutte le problematiche di tipo tecnico/amministrativo.
2. I teacher/tutor gestori del corso (supporto di secondo livello) che organizzano le attività formative dei discenti al fine di garantire la personalizzazione del processo formativo, promuovere il dialogo costruttivo tra i discenti e, più in generale, risolvere tutte le problematiche legate alla didattica.

Il supporto di primo livello è quello che comporta un maggiore dispendio di risorse (umane ed economiche), ma anche il più facile, data la natura delle richieste, da poter essere affiancato e in gran parte sostituito da agenti come ZenBot.

La tabella seguente illustra il numero di ticket che abbiamo ricevuto nel 2017 e evidenzia quali, tra le tipologie elencate potranno essere soddisfatte da ZenBot:

Tabella 1:

Tipologia di richiesta	Numero annuo	Zenbot
Creazione corso	322	N

Iscrizione utenti	630	N
Manutenzione materiali corso	30	N
Recupero credenziali	5568	S
Richieste stato di avanzamento	2946	S
Richieste report	350	S
Anomalie Moodle	1200	S/N
Anomalie contenuti	2300	N
Problemi di fruizione	2764	S
Tutoraggio di processo	630	N
Richiesta di informazioni	3264	S
Richieste spiegazione funzionalità	1324	S
Telefono	4642	S/N
<b>Totale numero ticket anno</b>	<b>25970</b>	

Tabella 2:

Descrizione	Numero	%
Totale Ticket completamente trasferibili a ZenBot (stima)	16216	15,1
Totale Ticket parzialmente trasferibili a ZenBot (stima)	5842	62,4
22,5	3912	22,5

Come è possibile vedere la maggior parte delle richieste sono molto semplici, e facilmente risolvibili mediante ZenBot. Il problema maggiore non deriva, infatti, da problemi di tipo tecnico ma piuttosto dall'approccio che ad oggi l'utente ha nei confronti di questo tipo di servizi. Crediamo però che dato il tipo di servizio (basato necessariamente sull'uso di tecnologie) e il diffondersi di queste modalità min tempi, anche brevi questa barriera scomparirà.

Dal punto di vista procedurale, il servizio (senza ZenBot) è organizzato secondo lo schema seguente:

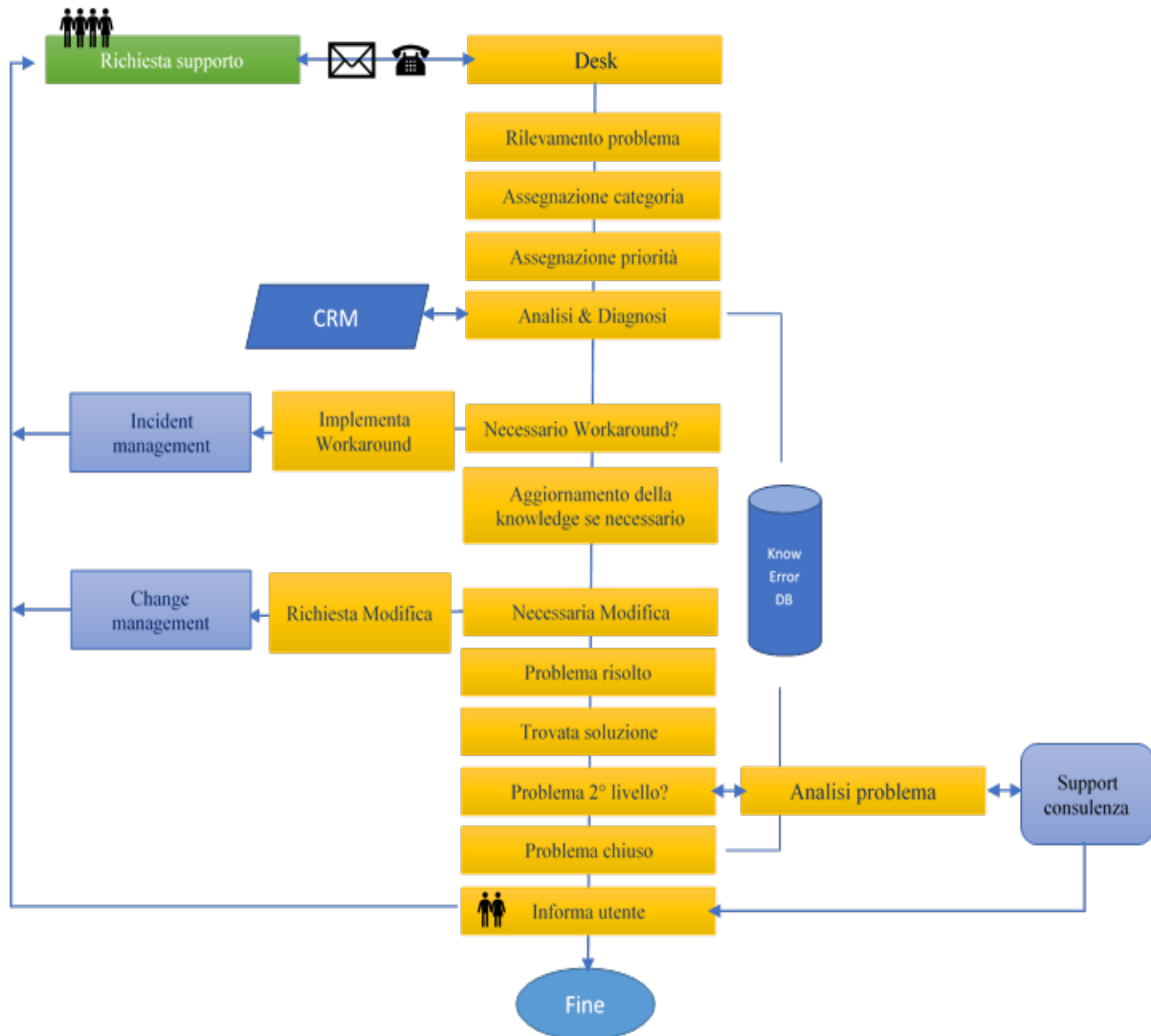


Figura 1. schema funzionale servizio di supporto all'utente

Con l'introduzione del bot lo schema, per circa l'80% delle richieste (sulla base di un campione di circa 26000 contatti/anno come evidenziato precedentemente), si modificherebbe nel modo seguente:

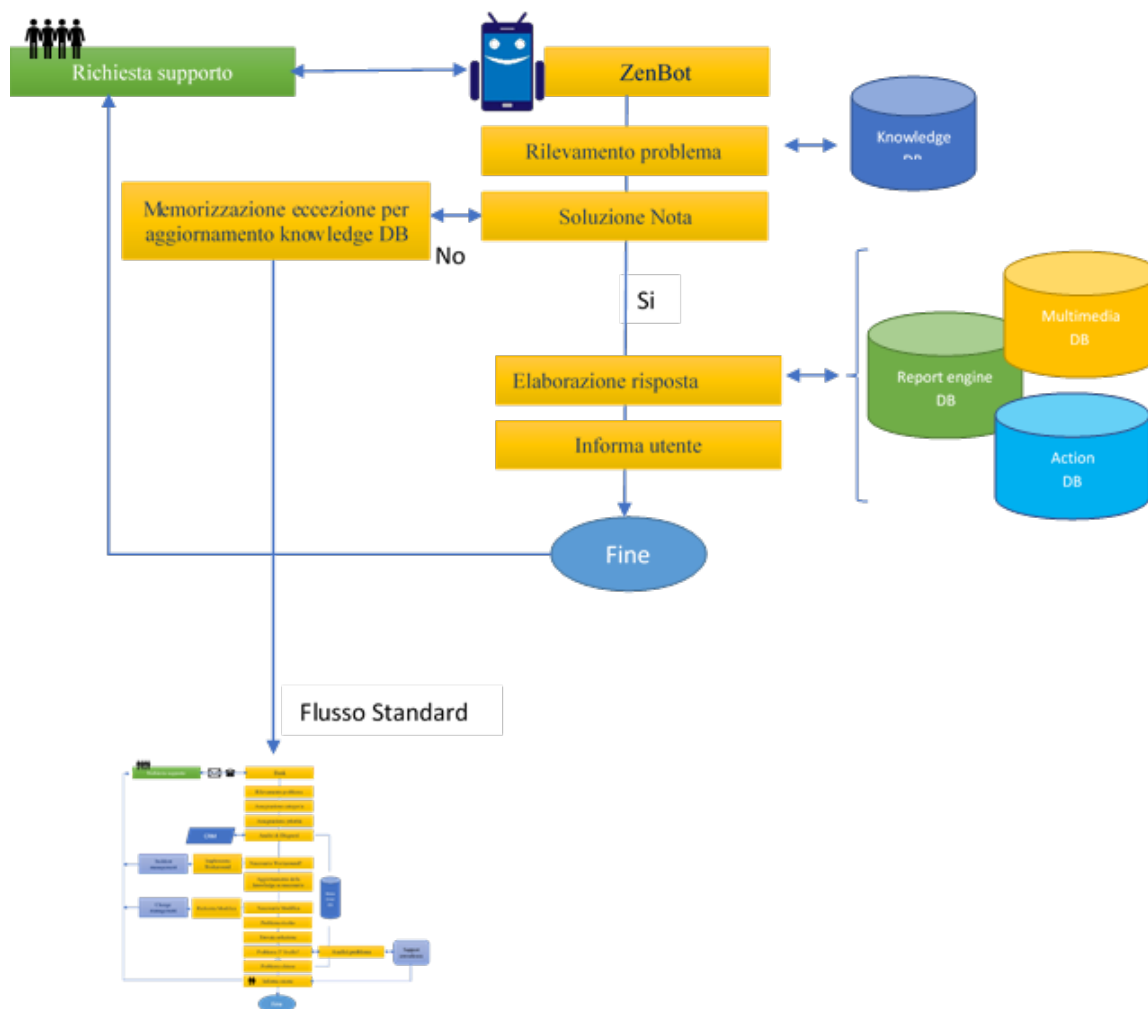


Figura 2. schema funzionale servizio di supporto all'utente con ZenBot

Partendo da queste considerazioni da dicembre 2016 è stato sviluppato ZenBot (e degli altri componenti necessari al suo funzionamento) con l'obiettivo di avere a disposizione servizi e strumenti in grado di rendere il più efficiente possibile il sistema di supporto di primo e secondo livello e di rendere automatico, per almeno l'80% delle richieste, il supporto di primo livello con conseguente riduzione dei costi e delle necessità di risorse umane e aumento della competitività della nostra offerta sul mercato.

ZenBot, inoltre è anche in grado di supportare i teacher/tutor nelle attività di secondo livello, potendo sia essere utilizzato, in modalità push per comunicare con l'utente messaggi di "stimolo", che anche sostituirsi al teacher/tutor per tutte quelle richieste a carattere routinario (come sto andando?), In quest'ultimo caso occorre prima dell'avvio del corso, arricchire la knowledge DB e il multimedia DB con informazioni/azioni peculiari di quell'attività formativa (lo facciamo ad esempio per Master o corsi con utenti molto numerosi o corsi ricorrenti, ecc.).

## ZenBot

ZenBot è un servizio online composto da elementi indipendenti (ovvero in grado di funzionare a prescindere da Moodle) e elementi integrati in Moodle. L'architettura, modulare, è stata

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progettata per poter essere riutilizzata in tutti i contesti dove si attua un'attività di supporto all'utente.

Per lo sviluppo è stato utilizzato DialogFlow (<https://dialogflow.com/docs/dialogs>) che fornisce un servizio Machine Learning mediante il quale ZenBot è in grado di comprendere le richieste di un utente (testuali o verbali), in linguaggio naturale e convertirle in dati strutturati. Dialogflow, utilizza algoritmi di apprendimento automatico per abbinare le richieste degli utenti a intenti specifici e per estrarre da loro i dati rilevanti al fine di poter fornire una risposta coerente.

### **Elementi indipendenti (funzionanti a prescindere da Moodle)**

#### *Front end*

Chat che permette l'interazione scritta o verbale con gli utenti.

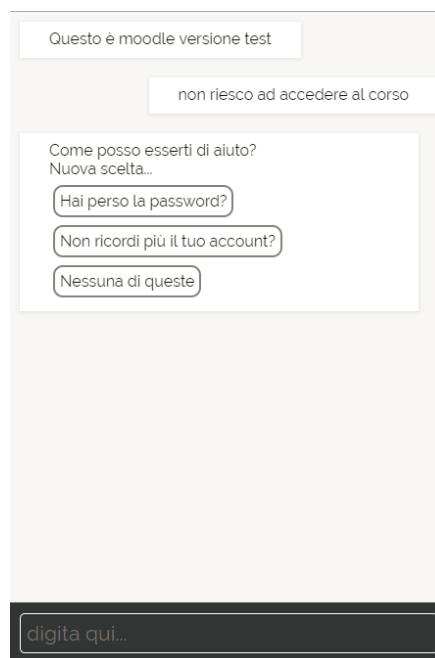


Figura 3. Esempio di front end

#### *Back office*

Interfaccia visuale che permette la gestione della base di conoscenza (testuale e multimediale) e dei flussi operativi di ZenBot. Il risultato di questa attività è il knowledge DB ovvero l'insieme delle possibili domande (e conseguenti risposte) e dei flussi informativo/operativi.

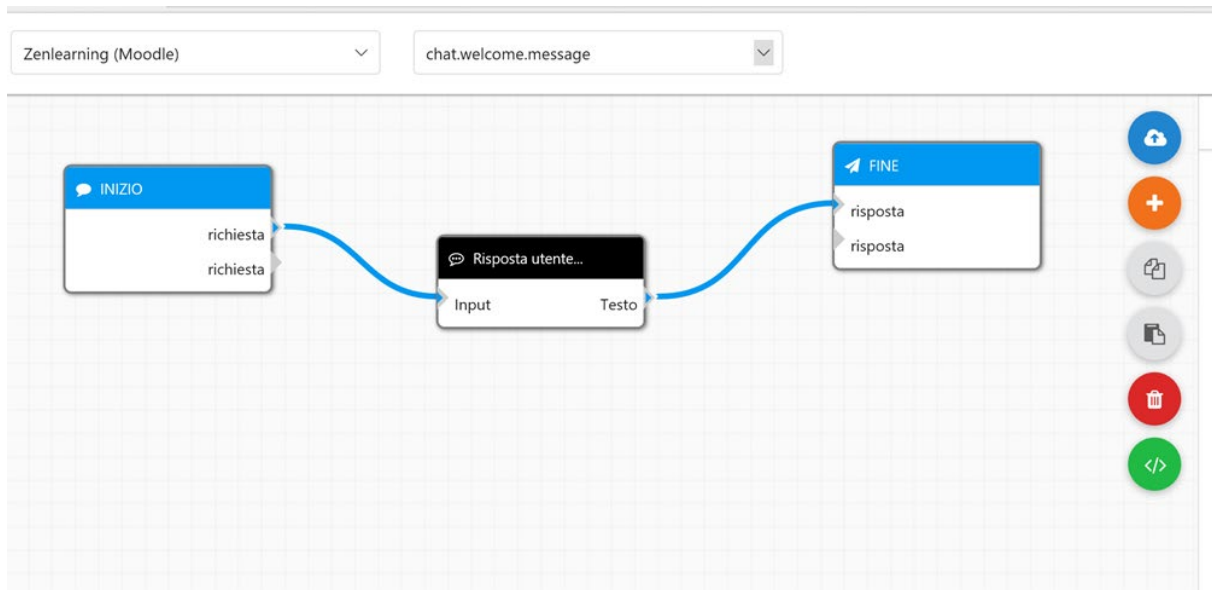


Figura 4. schema dell'interfaccia di back office di ZenBot

## Elementi integrati

### Report Engine

Servizio online che accede al database di Moodle e mette a disposizione (mediante web services) di ZenBot i dati necessari per le attività di supporto all'utente (tracciamento attività, iscrizione ai corsi, ecc.).

### Dashboard amministrativa

Servizio basato principalmente sul Report Engine che mette a disposizione del teacher/tutor le informazioni necessarie a monitorare le attività formative e a interagire con il discente. Il teacher/tutor può in modo automatico per singolo o gruppo, comunicare in diversi modi con il discente. Tra questi c'è anche ZenBot che al momento dell'accesso dell'utente in piattaforma gli comunicherà i messaggi del tutor.

Dal punto di vista applicativo ZenBot il flusso operativo di un'interazione *Utente->ZenBot* può essere schematizzato nel modo seguente:

Il discente o il tutor/teacher inizia una conversazione verbale/testuale con ZenBot. Le richieste avvengono in linguaggio naturale oppure mediante una serie di opzioni che ZenBot propone. Il riconoscimento avviene mediante il motore di machine learning messo a disposizione da Dialogflow e le risposte/azioni sono proposte sulla base della knowledge DB creata con lo strumento di backoffice. ZenBot, in funzione dello stato del l'utente (autenticato in Moodle o no) fornisce due tipi di supporti:

1. Se l'utente non è autenticato in Moodle gli sono presentate una serie di opzioni principalmente di tipo informativo (come si fa ad iscriversi, quali corsi sono disponibili, i costi, ecc.)
2. Se l'utente è autenticato in Moodle viene riconosciuto e può:



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- chiedere di avere informazioni sulle sue attività formative (come sto andando?)
- ricevere messaggi dal tutor/teacher (Stimolo alla fruizione)
- chiedere come fare determinate azioni (come faccio a fare?) e ricevere3 indicazioni testuali e/o multimediali (tutorial)
- chiedere a Zenbot di compiere determinate azioni (puoi fare?) come ad es. Cambiami la password, aprimi il menu, ecc.

Le risposte sono elaborate sia sulla base della knowledge DB che sui dati forniti dal Report Engine, che dal multimedia repository. Le azioni invece sono attuate in genere utilizzando le funzioni di Moodle.

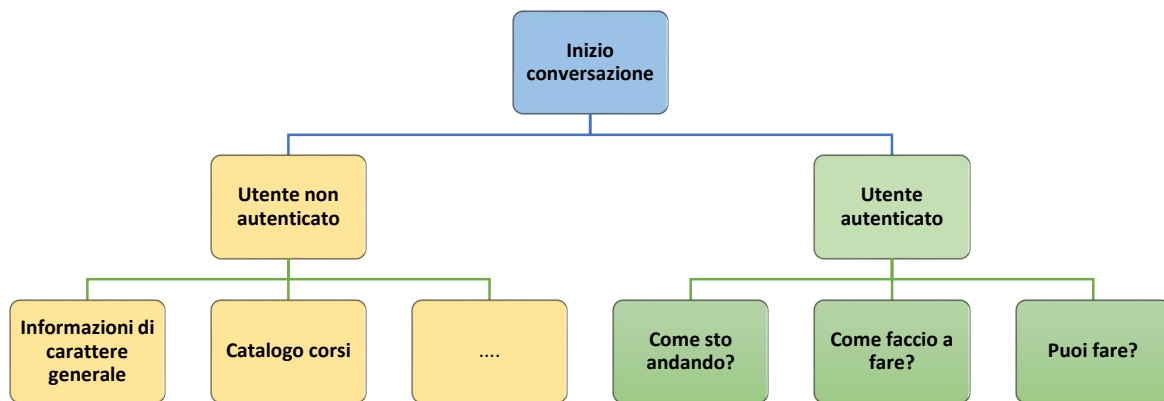


Figura 5. Interazione ZenBot – Utente

## Conclusioni

La sperimentazione applicativa avviata all’inizio del 2018 sta evidenziando come l’utente utilizzi volentieri questi servizi mostrando un grado di soddisfazione medio alto e una conseguente riduzione delle attività di supporto di primo livello. La capacità poi di crescita nel tempo della knowledge DB permetterà una sempre maggiore efficienza, precisione, e “naturalità” nelle risposte e nelle azioni.

Nel prosieguo della sperimentazione oltre ad arricchire costantemente la knowledge DB e il multimedia repository con nuovi tutorial, stiamo anche esplorando nuove forme di utilizzo quali l’utilizzo di ZenBot per la realizzazione di corsi.

Riteniamo che i bot “helpers” ovvero quelli la cui mission sia quella, come scritto nel “Bot rulebook (<https://medium.com/slack-developer-blog/the-bot-rulebook-a442d9fb21cb>)”, di aiutare l’uomo rappresentino una grande opportunità per l’e-learning per la realizzazione di quelle nuove modalità di formazione che sono in corso di applicazione o che si svilupperanno in un futuro ormai non così lontano.

## **Contatto**

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## COMPrensione TESTUALE E SUCCESSO ACCADEMICO DEGLI STUDENTI A DISTANZA

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### **Abstract**

La capacità di comprendere testi scritti è stata studiata approfonditamente da ricerche comparative internazionali ed è associata a successo scolastico e accademico. Lo studio prende in considerazione 72 studenti universitari di un corso a distanza, una tipologia di studente difficile da indagare in una competenza così specifica, ne valuta la comprensione testuale e le convinzioni di autoefficacia nel problem solving all'inizio del corso, rilevando la media degli esami sostenuti dopo un anno. Le analisi sul test somministrato a distanza rivelano, con un certo grado di accuratezza, la presenza di una correlazione positiva tra la capacità di comprensione e l'autoefficacia nel problem solving da un lato e il successo accademico dall'altro, tenendo conto anche delle differenze nelle caratteristiche socio-demografiche.

### **Introduzione**

#### ***Reading literacy***

La capacità di comprensione dei testi scritti è un prerequisito fondamentale per gli studenti universitari, anche in un'epoca in cui la parola scritta non è più prerogativa esclusiva del libro cartaceo. Infatti la digitalizzazione pervasiva ha spostato gran parte del processo di lettura dal libro stampato agli schermi illuminati, e la pratica della lettura è cambiata non solo per la molteplicità dei supporti, ma anche per la varietà delle condizioni di fruizione. Sebbene leggere su carta e leggere su schermo sviluppino modi diversi di approcciare la conoscenza (Nardi, 2015), la capacità di comprendere un testo è un passaggio che resta determinante nello studio accademico.

La lettura, insieme a scrittura e far di conto, è una delle abilità di base dell'alfabetizzazione tradizionale, per questo molto studiata. L'evoluzione del pensiero psicologico ha di volta in volta aggiunto nuovi elementi sulle condizioni e i fattori che possono favorire il saper leggere (Boschi, 1977). Se il comportamentismo ha ricercato le evidenze dei livelli di abilità nell'ampiezza del vocabolario, la psico-linguistica si è focalizzata sulla struttura superficiale e profonda del linguaggio quale strumento trasversale e generativo della conoscenza (Chomsky, 1970). Il cognitivismo ha inserito le capacità di lettura all'interno di un più generale processo di acquisizione della conoscenza, per cui le conoscenze pregresse, organizzate in schemi interpretativi, giocano un ruolo determinante nella comprensione dei significati (Alexander & Fox, 2004).

Secondo Kintsch e van Dick (1983) il lettore tende ad individuare una macrostruttura che contiene gli elementi portanti del significato testuale. Per cui la sua competenza è data dalla capacità di stabilire una gerarchia tra le proposizioni principali e quelle a supporto del contenuto principale. È fondamentale, per una piena comprensione, il processo di negoziazione tra i concetti posseduti e quelli nuovi che il testo sollecita. Il lettore procede quindi per continui confronti tra gli schemi proposizionali che ha in mente e le frasi che via via legge nel testo. Quest'ultimo può sia confermare le conoscenze già in atto che dar luogo alla generazione di nuove conoscenze, in questa fase possono sorgere eventuali errori interpretativi o comprensioni parziali. Sempre secondo Kintsch e van Dick l'inferenza è un vero e proprio processo di problem solving che necessita di specifiche strategie.

A partire degli anni '60 le grandi ricerche comparative internazionali condotte dall'IEA e dall'OCSE hanno dato un impulso significativo alle competenze di lettura, sollecitando i ricercatori a definire un paradigma condiviso. Nel PIRLS 2006 la IEA conferma che saper leggere e saper capire sono attività complesse che possono essere sintetizzate nel termine "reading literacy". La definizione di literacy comprende una competenza ad ampio spettro che si proietta sulla vita sociale, nonché nella dimensione multimediale e ludica: "Per il PIRLS, la reading literacy è l'abilità di capire e usare le forme di linguaggio scritto necessarie alla vita sociale e/o apprezzate dagli individui. I giovani lettori possono costruire i significati da una varietà di testi. Essi leggono per imparare, per partecipare alle comunità dei lettori a scuola, nella vita di tutti i giorni, e nel divertimento" (PIRLS, 2006; p.2).

Appare evidente l'influenza del costruttivismo sociale che si è andato affermando a partire degli ultimi anni del secolo scorso. Ogni competenza è l'insieme di situazioni individuali e sociali, formali ed informali.

### ***Il test di accertamento della lettura in studenti di corsi a distanza***

La valutazione delle competenze di lettura è stata affrontata dalle indagini IEA e OCSE PISA a più riprese a partire dagli anni '50, attraverso test oggettivi a lungo sperimentati. La necessità di renderli il più possibile aperti a diverse culture ha reso necessario lo svuotamento dei testi da riferimenti di contesto che li avrebbero resi poco confrontabili, una condizione che non consente di indagare il livello situazionale del brano di lettura. Per questa caratteristica essi sono stati considerati non utilizzabili per una popolazione fortemente connotata come quella degli studenti universitari, non sempre di età omogenea e con obiettivi finalizzati allo studio. Per questi ultimi è pertanto necessaria la scelta di brani con linguaggio e contenuti simili a quelli del corso degli studi.

Ci sono altri vincoli per gli studenti dei corsi accademici a distanza ai quali deve essere somministrata una prova mentre sono al computer in un setting personale non controllabile. Le prove a risposta multipla o le prove cloze, generalmente usate per la competenza testuale, devono essere verificate con cautela in termini di affidabilità.

## **Autoefficacia e problem solving**

L'autoefficacia percepita nella risoluzione di problemi misura le convinzioni circa le capacità di affrontare e risolvere problemi in modo creativo, critico e innovativo (Caprara, 2001). Il problem solving è riferibile alle life skills e presiede tutte le condizioni in cui si affronta qualcosa di nuovo e inaspettato. È una competenza trasversale e generale che si attua in diverse situazioni, da quelle più operative a quelle intellettuali. Il problem solving è correlato al successo scolastico e accademico, ma se nella scuola secondaria ha una incidenza minore perché gli studenti sono stimolati ad uno studio più meccanico (McCalla et al., 2002), in ambito universitario, dove la componente progettuale è maggiore rispetto allo studio mnemonico, si associa ad esiti accademici più positivi (Stadler et al., 2017). Tuttavia anche la lettura, una attività universitaria piuttosto diffusa e non più guidata come negli ordini di studio precedente, invita lo studente ad affrontare conoscenze nuove per la prima volta. La competenza testuale è pertanto assimilabile alla più generale competenza di problem solving (Kintsch & van Dick, 1983): entrambe danno esiti positivi nel profitto accademico.

## **Obiettivo della ricerca**

La ricerca ha l'obiettivo di verificare se le prove di valutazione della competenza testuale di studenti universitari possano essere somministrate a distanza con esiti affidabili. Il successo accademico è considerato come variabile dipendente dai livelli di competenza e dalle convinzioni di autoefficacia nella capacità di risolvere problemi.

## **Metodo**

### **Campione**

Hanno partecipato volontariamente alla ricerca studenti immatricolati presso la facoltà di Psicologia dell'Università Telematica Internazionale Uninettuno nel periodo compreso tra novembre e dicembre 2016 (periodo di tempo che indicheremo con  $t_0$ ). In particolare, partendo da 110 studenti, è stato selezionato un sottoinsieme di 72 studenti (65.5%) in base al criterio del superamento di almeno un esame a distanza di un anno, ovvero alla fine di gennaio 2018 (istante di tempo che indicheremo con  $t_1$ ), per i quali è stato quindi possibile calcolare la media del voto degli esami all'istante  $t_1$  come indicatore di successo accademico.

Il campione oggetto del presente studio è costituito quindi da  $N = 72$  studenti (21 uomini e 51 donne), di età compresa tra 21 e 65 anni (media = 34.5, deviazione standard 11.94), principalmente studenti lavoratori (48.6% full time e 15.3% part time), con un livello formativo medio-alto (80.6% diploma di scuola superiore, 11.1% laurea triennale, 8.3% laurea magistrale o vecchio ordinamento). La media dei voti degli esami degli studenti è stata osservata prendendo come riferimento il database ufficiale dell'Università al tempo  $t_1$ .

### **Procedura**

Gli studenti immatricolati presso il corso di laurea in Discipline Psicosociali della facoltà di Psicologia dell'Università Uninettuno sono stati invitati a partecipare alla ricerca, dopo essere stati adeguatamente informati delle sue finalità. 110 studenti hanno accettato di partecipare,

fornendo tutte le informazioni richieste. In particolare è stato somministrato un questionario online per la raccolta dei dati socio-demografici, la misurazione della prestazione nella comprensione testuale di un brano tratto da un testo di psicologia e la misurazione delle convinzioni di autoefficacia. La media dei voti degli esami è stata ricavata dal database ufficiale dell'Università alla data del 31 gennaio 2018 e il campione della ricerca è costituito da 72 studenti che hanno superato almeno un esame a tale data, escludendo quindi 38 studenti (tasso di abbandono del 34.5%).

### **Misure**

Il questionario somministrato agli studenti ha avuto lo scopo di raccogliere informazioni socio-demografiche e di misurare in particolare due dimensioni che si ritiene possano essere correlate ai risultati accademici degli studenti.

La prima dimensione riguarda la prestazione nella comprensione testuale di un brano. Per la sua valutazione è stato scelto un brano di Guido Amoretti (Università degli Studi di Genova) relativo alle ricerche psicologiche sull'invecchiamento. Il brano è stato tratto dal testo "Psicologo: verso la professione" a cura di Paolo Moderato e Francesco Rovetto (2007), nel capitolo "Cambiamenti biologici e psicologici dei processi cognitivi nell'invecchiamento normale e patologico". La prestazione nella comprensione testuale è stata misurata utilizzando 5 item, ognuno con una sola risposta corretta, con calcolo del punteggio finale dato dalla somma delle risposte corrette: il primo item relativo alla scelta di un grafico rappresentante delle curve che avessero un andamento coerente con il contenuto del brano, e i rimanenti item consistenti in frasi a completamento in base al contenuto del brano.

La seconda dimensione riguarda le convinzioni di autoefficacia degli studenti nel problem solving (es. trovare soluzioni alternative ai problemi, svolgere più attività contemporaneamente, ricercare informazioni quando si hanno dei dubbi). La dimensione è stata misurata utilizzando una scala ad-hoc di 5 item, con domande nella forma "Quanto ti senti capace di..." e risposte valutate su una scala Likert a 5 punti (da "per niente capace" a "del tutto capace"). La scala ha mostrato sul campione buoni valori di attendibilità in termini di consistenza interna, misurata attraverso il coefficiente Alfa di Cronbach:  $\alpha = 0.72$ .

Infine, per quanto riguarda le seguenti variabili socio-demografiche, sono stati rilevati sui soggetti appartenenti al campione:

1. Età: variabile quantitativa discreta;
2. Livello formativo – variabile qualitativa misurata su tre livelli: (a) diploma di scuola superiore, (b) laurea triennale, (c) laurea magistrale o Vecchio ordinamento;
3. Situazione occupazionale – variabile qualitativa misurata su tre livelli: (a) occupato full-time, (b) occupato part-time, (c) non occupato (non ancora occupato, disoccupato, pensionato).

## **Analisi**

È stata anzitutto condotta un'analisi descrittiva del campione, considerando anche le differenze in base a genere e fasce d'età, utilizzando l'ANOVA (Analisi della Varianza) ad una via. Relativamente all'età sono stati definiti cinque raggruppamenti: (a) 18-25 anni; (b) 26-35 anni; (c) 36-45 anni; (d) 46-55 anni; (e) oltre 55 anni. Queste fasce sono state scelte con la finalità di confrontare i risultati con quelli di altri studi su studenti di università tradizionali in fase di avviamento del percorso formativo, generalmente compresi tra 18 e 25 anni d'età, tenendo quindi conto di una differenza con altre ricerche demografiche che usano un periodo corrispondente più ampio (ad esempio fino a 29 anni).

È stato quindi definito un modello di regressione lineare gerarchica, utilizzando la media degli esami al tempo  $t_1$  come variabile dipendente e le seguenti variabili indipendenti introdotte in sequenza: la prestazione nella comprensione testuale misurata al tempo  $t_0$  (primo step); l'autoefficacia nel problem solving misurata al tempo  $t_0$  (secondo step); l'età, il livello formativo e la condizione occupazionale (terzo step).

## **Risultati**

### **Analisi preliminare su genere ed età**

È stata condotta preliminarmente un'analisi descrittiva delle principali variabili utilizzate nello studio sul campione:

1. comprensione testuale (tempo  $t_0$ );
2. autoefficacia nel problem solving (tempo  $t_0$ );
3. media dei voti degli esami (tempo  $t_1$ ).

In Tabella 1 sono riportati i valori di media e deviazione standard per le variabili analizzate.

Tabella 4: Valori di media e deviazione standard sul campione delle dimensioni: prestazione nella comprensione testuale (tempo  $t_0$ ), autoefficacia nel problem solving (tempo  $t_0$ ) e media dei voti degli esami (tempo  $t_1$ ).

Prestazione nella comprensione testuale ( $t_0$ )		Autoefficacia nel problem solving ( $t_0$ )		Media esami ( $t_1$ )	
Media	DS	Media	DS	Media	DS
3.14	1.12	3.87	.59	26.44	2.05

Successivamente è stata realizzata un'ANOVA (Analisi della Varianza) ad una via utilizzando il genere come fattore e non sono state riscontrate sul campione differenze significative in relazione alle dimensioni analizzate. I valori di media e deviazione standard delle variabili con suddivisione tra uomini e donne sono riportate in Tabella 2.

Tabella 5: Valori di media e deviazione standard sul campione in base al genere delle dimensioni: prestazione nella comprensione testuale (tempo  $t_0$ ), autoefficacia nel problem solving (tempo  $t_0$ ) e media dei voti degli esami (tempo  $t_1$ ).

	Prestazione nella comprensione testuale ( $t_0$ )		Autoefficacia nel problem solving ( $t_0$ )		Media esami ( $t_1$ )	
	Media	DS	Media	DS	Media	DS
Uomini	3.19	1.29	3.96	.59	26.13	1.69
Donne	3.12	1.05	3.83	.59	26.57	2.19

Infine si è implementata un'ANOVA (Analisi della Varianza) ad una via utilizzando la fascia d'età come fattore e sono state riscontrate sul campione differenze significative in relazione alle dimensioni analizzate. In particolare i valori di media e deviazione standard delle variabili con suddivisione per fasce d'età sono riportate in Tabella 3 e si evidenzia che:

- i valori relativi alle convinzioni di autoefficacia per la fascia degli studenti di 18-25 anni sono significativamente inferiori rispetto alla fascia degli studenti di 36-45 anni, con  $p < .01$
- i valori relativi alla media dei voti degli esami per la fascia degli studenti di 18-25 anni sono significativamente inferiori rispetto alla fascia degli studenti di 36-45 anni, con  $p < .05$ .

Il risultato non va inteso nel senso di variazione delle dimensioni rispetto alla variabile età, in quanto non si possono escludere effetti di coorte.

Tabella 6: Valori di media e deviazione standard sul campione in base alle fasce d'età delle dimensioni: prestazione nella comprensione testuale (tempo  $t_0$ ), autoefficacia nel problem solving (tempo  $t_0$ ) e media dei voti degli esami (tempo  $t_1$ ). Sono evidenziate le casistiche per cui si è rilevata una differenza significativa.

	Prestazione nella comprensione testuale ( $t_0$ )		Autoefficacia nel problem solving ( $t_0$ )		Media esami ( $t_1$ )	
	Media	DS	Media	DS	Media	DS
18-25 anni	3.00	1.22	3.52**	.59	25.43*	1.82
26-35 anni	3.05	1.12	3.93	.57	26.18	1.85
36-45 anni	3.12	1.15	4.16**	.47	27.75*	1.69
46-55 anni	3.11	.78	4.00	.51	27.03	2.43
Oltre 55 anni	4.20	.84	3.88	.59	26.49	2.25

\* $p < .05$ ; \*\* $p < .01$

### **Contributo di comprensione testuale e autoefficacia alla prestazione accademica**

Ci si è chiesto se prestazione nella comprensione testuale del brano e convinzioni di autoefficacia nel problem solving, misurate in fase di immatricolazione degli studenti, siano legate alla prestazione accademica (media degli esami) misurata a distanza di un anno di tempo, a parità di condizioni socio-demografiche. A tale scopo è stato creato un modello di regressione



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lineare gerarchica, utilizzando la media degli esami al tempo  $t_1$  come variabile dipendente e inserendo nel modello sequenzialmente le seguenti dimensioni come variabili indipendenti:

- al primo step la prestazione nella comprensione testuale del brano misurata al tempo  $t_0$ ;
- al secondo step le convinzioni di autoefficacia nel problem solving misurate al tempo  $t_0$ ;
- al terzo step le variabili socio-demografiche: l'età, il livello formativo e la condizione occupazionale.

Tabella 7: Influenza incrementale delle dimensioni oggetto della ricerca sulla media degli esami al tempo  $t_1$ : prestazione nella comprensione testuale misurata al tempo  $t_0$  (step 1), autoefficacia nel problem solving misurata al tempo  $t_0$  (step 2), variabili socio-demografiche (step 3).

	Step 1 Media esami a $t_1$ $\beta$	Step 2 Media esami a $t_1$ $\beta$	Step 3 Media esami a $t_1$ $\beta$
Prestazione nella comprensione testuale a $t_0$	.41***	.36***	.31***
Autoefficacia nel problem solving a $t_0$		.32***	.29**
Età			.11 (ns)
Livello formativo			.14 (ns)
Situazione occupazionale			.02 (ns)
R <sup>2</sup>	.17***	.27***	.30***

\*\* $p < .05$ , \*\*\* $p < .01$

I risultati sono mostrati in Tabella 4. Si evidenzia quanto segue:

- la prestazione accademica degli studenti al termine del primo anno di studi è legata alla prestazione nella comprensione testuale ( $\beta = .41$ ) misurata nel periodo dell'immatricolazione, con varianza spiegata del 17% e livello di significatività pari a .01;
- se consideriamo anche le convinzioni di autoefficacia come variabile esplicativa, la prestazione accademica è legata sia alla prestazione nella comprensione testuale ( $\beta = .36$ ) sia alle convinzioni di autoefficacia ( $\beta = .32$ ) misurate nel periodo dell'immatricolazione, con varianza spiegata del 27% e livello di significatività pari a .01;
- l'esito di cui al punto precedente è confermato sia per la prestazione nella comprensione testuale ( $\beta = .31$ ) sia per le convinzioni di autoefficacia ( $\beta = .29$ ) quando si aggiungono al modello come esplicative le variabili età, livello formativo e situazione occupazionale (secondo step), con varianza spiegata del 30% e livello di significatività pari a .01.

Pertanto capacità di comprensione testuale e autoefficacia nella risoluzione di problemi sono dimensioni che si mostrano legate alla riuscita della carriera accademica degli studenti a distanza di un anno dall'immatricolazione, anche quando si tengono in considerazione le variabili socio-demografiche.

## Conclusioni

Le prove di comprensione della lettura negli studenti universitari a distanza hanno trovato una sostanziale correlazione con gli esiti accademici, nonostante il setting personale in cui si è somministrato il questionario a distanza non fosse controllabile. Questo risultato è avvalorato

dal fatto che anche l'autoefficacia nel problem solving, misurata nelle medesime condizioni, si conferma correlata al successo universitario. Questo dato può essere una base sufficiente per continuare la validazione del test in modo che possa avere valore predittivo del successo universitario. I risultati delle prove sono anche indicatori utili per rilevare difficoltà di comprensione in alcuni studenti per i quali attivare programmi di integrazione.

Infine c'è da considerare che la comprensione testuale può variare in base al tipo di testo; la chiarezza, la coerenza sintattica e causale dei contenuti favoriscono una migliore comprensione anche a studenti meno esperti (Moravcsik & Kintsch, 1993). Uno degli sviluppi dell'esperimento potrebbe essere la valutazione da parte dei docenti di testi adatti a una maggiore comprensione. La verifica delle differenze di comprensione tra testi più o meno chiari potrebbe dare utili indicazioni sia al valore predittivo della verifica che ai docenti stessi nella scelta dei materiali del corso.

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## TEACHING DIGITAL SKILLS TO FUTURE TEACHERS: A BLENDED-LEARNING WORKSHOP EXPERIENCE

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### Abstract

This paper deals with the topic of the Initial Teacher Education (ITE) students in order to develop their own digital competences. After a beginning reflection in a European view on what digital skills are and their importance at school, they are illustrated an academic activity and a project which aim is to teach university students the pedagogical use of ICTs.

The first one is a workshop on computational thinking and Scratch that took place at the Università degli Studi di Perugia from October to November both 2017 and 2016: it is described the methodology of the workshop and the results of a satisfaction questionnaire presented at the end of the course.

The second one is the European IteLab Project, which Università degli Studi di Perugia join in and that involves some voluntary students.

### Introduction

The development of digital skills and their application in didactics is a focal topic discussed in Europe, which means that even the training of future teachers must re-evaluate didactics so that the latter can be integrated with the use of new technologies. The direct application of ICTs (Information and Communication Technologies) is of utmost relevance within technology courses in education.

In the recent work of the European Commission *Survey of Schools: ICT in Education. Benchmarking Access, Use and Attitudes to Technology in Europe's Schools* (2013, p. 89) it is stated:

*“Although ICT training is included in initial teacher education in over half of all EU countries, implementation varies according to the higher education institutions providing the training, and a large portion of EU countries still have complete institutional autonomy in this area. In view of today’s digital society and consequently teachers’ need to integrate ICT into their daily teaching practice, countries might be wise to ensure that the ICT training is made a compulsory component of all initial teacher education programmes.”*

Amongst the qualifying key points considered by the European Commission, Directorate-General for Education and Culture in *Common European Principles for Teacher Competences and Qualifications* (2005, p.3) we can read:

*“Work with knowledge, technology and information: they need to be able to work with a variety of types of knowledge. Their education and professional development should equip them to access, analyse, validate, reflect on and transmit knowledge, making effective use of technology where this is appropriate. Their pedagogical skills should allow them to build and manage learning environments and retain the intellectual freedom to make choices over the delivery of education. Their confidence in the use of ICT should allow them to integrate it effectively into learning and teaching. They should be able to guide and support learners in the networks in which information can be found and built.”*

However, it is an undeniable fact that the potential implementation of ICTs within the school environment is still for many, too many, teachers only viewed as mere support for the traditional teaching methodologies instead of a resource to actively and collaboratively transform the didactic approach (Biondi, 2007).

### **An integrated teaching approach to theory and practice: the importance of a workshop**

Therefore, to solve the problem in question, it is necessary to modify the teachers' cultural attitudes by means of making them part of a new vision of the school of the future, which must be centred around new learning environments, contents, languages, and the new approaches to reality that ICTs provide. Within this frame of thought, teacher training should start off within the context of basic-level university course classes and transcend into their in-service training as well. In particular, within the university curricula and along with computer courses, there should be some specific subjects of a pedagogical and didactic nature, i.e. Teaching and Learning Technologies, Multimedia Didactics, that will allow future teachers to view ICTs as part of a complex system where diverse media are integrated so as to allow the development of new and interesting approaches to knowledge and communicative didactics. That is why it is pertinent to talk about a more complex training pathway in which, by integrating different pieces of knowledge, it will be possible to promote within future teachers a more mature approach, one that is aware of the complex world of multimedia and of the technologies that characterize knowledge society. Such an education includes multimedia proficiency, digital proficiency, a critical approach to technological knowledge and culture, creative didactics innovation capabilities, and pedagogical sensibility towards the individual as a whole.

The adopted methodology encompasses a particular level of importance: it is in fact important for future teachers to be able to experience first-hand the learning of these new technologies, exploring them actively and directly, working with them, and confronting their own discoveries, collaborating with others within a path to the learning and understanding of ICTs

based on discovery and research and by means of integrating theory, workshop activities and practice. Therefore, small group workshop activities are preferred, and they should allow future teachers to experience the use of diverse media, design and create different products with different languages and technological tools, and be able to elaborate and conquer the fears, anxiety and the resistance they might have as graduate adults in an academic environment which has got them used to a traditional learning culture.

Such workshops can be face-to-face and organized in appropriately equipped contexts, as well as online, sharing a learning environment implemented by an LCMS, where it would be possible to experience different approaches to the net and produce multimedia and hypertext materials to share with others. So we could think of a blended-methodology class that includes active, interpersonal and cooperative learning and online discussion and analysis environments, professional networking, and research-action and self-evaluation of the work done.

### **Educational technology workshop**

In the Primary Education programme at the *Università degli Studi di Perugia* since the academic year 2016-2017 a Workshop on Technology Didactics has been started for students in their fifth and last year of the programme, which focuses on coding and computational thinking, as a blended-methodology class that offers half face-to-face time at the computer lab of the Department of Humanities and half online time through the Ateneo Unistudium's Moodle platform. The workshop consists of a total of 16 hours.

The students enrolled in the online course (data verified on 05.01.2018) are 83 for the academic year 2017-2018 and 89 for the previous one. Some of the students, registered for the previous year, dropped out after having taken the exam. Therefore, the number of answers to the questionnaire is higher than the number of enrolled students.

The online course page is divided into six sections:

1. general information on the organization of the course;
2. introductory slide with follow-up documents;
3. the Hour of code: a theoretical slide and a tutorial on access procedures and enrolment, certification requirements, Forum;
4. Scratch: a slide on Logo and constructionism, activities to carry out, qualitative assessment tools prepared by the Department of Education at Harvard;
5. a tutorial on the use of Scratch;
6. the course's final evaluation survey.

During the face-to-face activities, the main initiatives promoted nationally (*Programma il Futuro*) and internationally (The Hour of Code) were first illustrated, which even had legislative references (MIUR, Law 107/2015 and *Piano Nazionale Scuola Digitale*, 2015), and later Papert's constructionism and Wing's (2006) concept of computational thinking were discussed.

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The theoretical premises were the necessary basis to consciously tackle the three practical activities: *The Hour of code* by code.org, the product *About me* with Scratch, created for one of the proposed activities in the guide for *Creative Computing* (Brennan, Balch, & Chung, *s.d.*), and a second product with Scratch accompanied by a learning and assessment unit based on the criteria collected from two tools created by the Department of Education at Harvard: the assessment rubric and the Practices Journal. This rubric, which is to be used by the teachers in their schools, consists of four areas: *Experimenting and Iterating*, *Testing and Debugging*, *Reusing and Remixing*, *Abstracting and Modularizing* that at the same time include indicators to show the students the activities they are meant to perform. For each of these, three descriptions are provided to align to the “low, medium, and high” levels respectively. Students were asked to complete the first two activities individually. For the third activity, students were given the opportunity to complete it individually, in pairs, or in groups. The Practices Journal also consists of the same four areas but it varies, if compared to the first, in that it is a student assessment tool meant to be completed by giving descriptions and graphic representations without the need for the students to place themselves in any particular level.

All activities were integrated into the face-to-face and online modes. As a matter of fact, the students carried out the proposed activities both at the computer lab and home.

Homework, once finished, was uploaded into the corresponding sections of the course’s online page.

For the Hour of code in particular, each student selected one of the classes proposed on Code.org and was asked the upload into the platform the obtained certificate given by that same site once all of the selected course’s proposed activities had been completed, and also participation in the Forum was required based on the guiding questions posed by the instructor.

The product *About me* had the students elaborate a code using the visual block programming language Scratch, which was then uploaded into the platform. The instructor provided each student with feedback about their strengths and any potential changes to be made to their work, which included the reasons to support the required changes. By doing this, the students, despite having completed some class activities at home, were able to make any necessary corrections without having to meet up at the next face-to-face session in the lab.

The last assignment was completed in pairs or groups mostly. In this particular case students had to develop a learning unit (UDA which is the Italian acronym) following the requirements listed on the platform. Then they had to design a Scratch product related to the topic in the learning unit, and write a reflection paper on it using Harvard’s qualitative analysis tools.

All in all, midterm self-assessments as well as final self-assessments were performed, both external and subjective. In the lab, subjective assessment was put into practice primarily by means of a reflection, aimed at answering some specific guiding questions that would stimulate and work as scaffolding for the students on the students’ achievement discussed on the Forum. Secondly, individually or in groups with the completion of an evaluation rubric or Harvard’s

Department of Education's Practices Journal on computational thinking, and lastly an individual satisfaction evaluation questionnaire.

At the end of the course, for both school years, a course satisfaction questionnaire was designed and presented, and 101 responses were gathered from it for the academic year 2016/2017 and 72 for the following year. The questionnaire consists of five value judgement questions using the Likert scale, 1 (not at all) to 5 (very highly).

And now the questions: Was the prior learning on new technologies acquired in previous courses and workshops adequate for understanding the topics discussed in this workshop? Were the topics presented during the workshop interesting? Was the work methodology relevant? Do you think the blended environment (online-face-to-face) was relevant? As a future teacher, how useful were the contents?

In question number 1, most answers were at the 3<sup>rd</sup> and 4<sup>th</sup> levels (medium and medium-high scores), showing an overall average of 35.63% of the responses. This result suggests that if on the one hand the recently acquired knowledge was useful to understand some topics of the course, on the other hand the lab-workshop also required students to work on new areas, which demanded of them a much different commitment.

Question number 2 deals with the workshop's proposed contents. In this case no one selects "not at all" regarding their interest in the topics, and we find an average of 86.5% for "highly-very highly".

The same can be said about the answers regarding the adopted work methodology (lab typology preceded by a frontal introduction, question number 3), where the score "highly-very highly" regarding relevance was given by 75.21% of the students.

Question number 4 is certainly related to question number 3 (relevance of methodology), and it refers to the relevance of the course's blended environment. The "highly-very highly" score given to the relevance of blended learning was selected by 79.38% of the students: thus it is possible to hypothesize that selecting blended learning was highly appreciated since it allowed the students, some of them working students, to complete the tasks from their own computers on days and at times when there was no class, by means of uploading their homework into the platform even at night or during holidays.

The score "highly-very highly" regarding the usefulness as future teachers was given by 79.56% of the students.

### **Future developments: The IteLab project**

After the start of the academic year 2017-2018 with the Blended-learning Technology Didactics Workshop for graduate students in their fifth year of the Primary Education programme, the third year students of the Programme will be offered an Instructional Technologies class and lab.



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What is novel about this year's Instructional Technologies class is the participation of 12 students of the same course and two doctoral students in the Initial/pre-service Teacher Education (IteLab) Project.

IteLab is a three-year programme organized by European Schoolnet (EUN) and funded by Erasmus+ intended to run from January 2017 to December 2019, and it involves European universities (University College Dublin, University of Newcastle, Institute of Santarém, University of Agder, Università degli Studi di Perugia, University of Wurzburg) and some industrial partners.

The scope of the project, which *Università di Perugia* will be part of, is to develop digital competence applied to didactics in the future teachers by means of delivering an online module on "Teaching, Learning & Professional Development in the Digital World" and a Massive Open Online Course (MOOC) "The networked teacher – teaching in the 21<sup>st</sup> century" currently available only to students, being in its pilot phase, and demanding to spend from 2.5 to 5 hours weekly, for four weeks plus an extra week for the conclusion of the tasks.

IteLab's innovative proposal consists of training students in an active use of technologies through a new shared pedagogy. Instead of a self-centred one, within a socio-constructivist paradigm of reference at the European level aiming at participating in a face-to-face focus group in Brussels for two students from each university involved so as to go beyond the screen and directly interact: turning digital learning into a channel and promoter of face-to-face encounters.

The exchange of expertise, knowledge and opinions takes place both face-to-face within the course's small students' group and on a common platform amongst the students of the other five European universities involved in the project, with asynchronous and synchronous activities, which will in return allow the students' more autonomous management of time, space and work modes. Such an environment will help them develop a common social competence, broadening the horizon towards a European perspective, consisting of having every European Member State bring in its contribution and its load of experiences to share with the other participants.

In terms of the theoretical framework of reference, ITELab embraces the EUN's experience in the organization of MOOCs and particularly its important theoretical models: TPCK (AACTE Committee on Innovation and Technology, 2008), Conole's 7C's (Conole, 2014), ShareTEC project (Stefanova et al., 2011), and DigCompEDU (Redecker, 2017).

The training of future teachers in the conscious use of new technologies certainly is also in line with Universal Design for Learning's (CAST, 2011) principles that bring into light the importance of creating activities and materials capable of multiple means of representation, expression, action, and involvement.

## Conclusions

The workshop experiences herein underline the need to create goals aimed at allowing future teachers to acquire a deep understanding of ICTs, their diverse languages and specific technical support, the critical interpretation of the ICTs' proposed messages, and to have the possibility to actively utilize them to make didactic communication more efficient, and especially to help students to become more aware of their technological experience, increasingly present but also fragmented and superficial.

Undoubtedly, the development of any digital competence in the future teachers must walk hand in hand (as it is evident in TPACK) with an adequate pedagogical training since "technology alone does not facilitate new forms of learning" (OECD, 2016). Therefore, the need of training on how to teach the use of new technologies during the didactic practice. The Recommendations of the European Parliament and of the Council (2008) clearly state that competence is a construct that involves notions and skills not from a summative perspective but in a more synergetic context. In the domestic context, the "Piano Nazionale Scuola Digitale" (PNSD. MIUR, 2015) insists on the close relationship between technological innovation in schools and teacher training on the use of ICTs and their understanding in a more pedagogical sense: for this reason, redesigning the physical space (action) and training teachers is of utmost importance, in order to foster a harmonious and integral development of pedagogical-didactic-methodological skills, psychosocial skills, assessment skills, and didactic innovation and experimentation skills.

What matters is not so much teaching the instructors how to use the different techniques as is activating, through a lab or workshop methodology, a process of joyful discovery of these technologies, a process of cooperative research between teachers and students to acquire their potential formative qualities and build a new pedagogical culture capable of cleverly integrating the diverse available technologies in an inclusive and innovative didactic practice.

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## **INNOVAZIONE E ICT NELL'INSEGNAMENTO DI INFORMATICA DEL CORSO DI LAUREA IN MEDICINA E CHIRURGIA**

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### **Abstract**

L'insegnamento di Informatica del Corso di Laurea in Medicina e Chirurgia dell'Università di Firenze presenta alcune criticità legate all'elevato numero di studenti iscritti al I anno e alla loro erronea percezione che gli argomenti trattati siano di scarso interesse per la futura professione medica.

Il contributo descrive una sperimentazione condotta nell'a.a. 2015/16 avente il duplice obiettivo di: (a) introdurre nell'insegnamento tematiche di studio maggiormente consone alla formazione dei futuri medici; (b) sperimentare l'uso di diverse metodologie didattiche basate sull'utilizzo delle ICT, al fine di introdurre nuovi approcci pedagogici capaci di migliorare i processi di apprendimento e nel contempo consentire un'agile gestione dell'elevato numero di studenti iscritti.

L'alta percentuale di studenti che ha frequentato le lezioni e svolto le attività a distanza, nonché i dati raccolti con il questionario anonimo di gradimento, hanno evidenziato come gli argomenti trattati siano stati apprezzati e le metodologie didattiche siano risultate efficaci.

I risultati ottenuti hanno indotto a riproporre tale insegnamento nel Corso di Laurea in Medicina e Chirurgia negli a.a. successivi. Inoltre lo stesso percorso didattico è stato adottato nel Corso di Laurea in Odontoiatria e Protesi Dentaria e in altri Corsi di Laurea sanitari dell'Ateneo fiorentino.

### **Introduzione**

Il continuo progresso diagnostico e terapeutico determina, con il trascorrere del tempo, un inevitabile e progressivo disallineamento del patrimonio conoscitivo del medico rispetto al livello ottimale delle conoscenze e competenze relative ai diversi settori. Ciò implica che il medico debba svolgere la professione in uno stato di carenza informativa con cui deve confrontarsi costantemente.

Di fronte a un simile scenario le ICT rappresentano uno strumento essenziale per l'aggiornamento di qualsiasi operatore sanitario in un'ottica di lifelong learning. Una competenza che quest'ultimo deve acquisire è sapere gestire l'informazione, un processo

complesso che comprende varie fasi. La prima è la capacità di riconoscere le incertezze informative che possono sorgere nello svolgimento della professione e di trasformarle in un quesito clinico efficace. A ciò deve seguire la interrogazione di appropriati database e una valutazione critica delle informazioni recuperate, con una loro successiva applicazione ai processi di diagnosi e cura.

Il ruolo del medico diventa quindi simile a quello di un information manager, che, a partire dal riconoscimento di una problematica clinica, consente di recuperare e valutare le informazioni per assumere decisioni in un particolare dominio di applicazione. (Guelfi, 2010)

Un insegnamento di Informatica rivolto agli studenti del Corso di Laurea in Medicina in cui vengono trattati temi quali l'hardware del computer, i sistemi operativi e l'utilizzo di software quali Excel sembra quindi essere non adeguato al profilo professionale del futuro medico.

Per tale motivo il programma dell'insegnamento di Informatica del Corso di Laurea in Medicina e Chirurgia dell'Ateneo di Firenze è stato completamente rivisto al fine di introdurre argomenti che consentano ai futuri medici sia di acquisire le competenze atte a recuperare, gestire e analizzare l'informazione biomedica che gestire il rapporto medico-paziente con i nuovi media.

Questo contributo descrive una sperimentazione condotta nell'a.a. 2015/16 nell'insegnamento di Informatica (3 CFU) del I anno del Corso di Laurea in Medicina e Chirurgia dell'Università di Firenze. Obiettivo del lavoro è duplice: (a) introdurre nell'insegnamento tematiche di studio maggiormente consone alla formazione dei futuri medici; (b) sperimentare l'uso di un mix di metodologie didattiche basate sull'utilizzo delle ICT al fine di introdurre nuovi approcci pedagogici capaci di migliorare i processi di apprendimento e nel contempo consentire un'agile gestione dell'elevato numero di studenti iscritti al I anno. Verranno inoltre mostrati i dati relativi al tracciamento delle attività svolte dagli studenti in piattaforma e analizzati i dati raccolti mediante un questionario anonimo di gradimento.

## **Materiali e metodi**

L'insegnamento di Informatica del Corso di Laurea di Medicina e Chirurgia assegna 3 CFU e si svolge nel II Semestre del I anno. Tale insegnamento è stato erogato nell'arco di sei settimane in modalità blended learning, con almeno un terzo delle attività didattiche svolte a distanza tramite l'uso di una piattaforma e-learning. Le attività in presenza consistevano in lezioni frontali a elevata interattività. Tali lezioni si svolgevano un giorno alla settimana e prevedevano 4 ore d'aula. Tra un incontro in presenza e il successivo erano previste una serie di attività formative a distanza da svolgere utilizzando Moodle, un Learning Management System open source. Le attività didattiche a distanza, che non erano opzionali ma parte integrante del corso, sono state tracciate in piattaforma e rese obbligatorie al fine del superamento dell'esame finale.

Nella prima parte del corso gli studenti hanno acquisito le conoscenze e le abilità necessarie per utilizzare con perizia le tecnologie della comunicazione e dell'informazione, la cui fusione si sta rivelando uno strumento sempre più importante nell'esercizio della pratica medica. Nella

seconda parte i discenti hanno appreso i fondamenti concettuali e metodologici della Evidence Based Medicine, come strumento di medical decision making.

I macro argomenti correlati all'acquisizione delle suddette competenze sono stati: (a) Internet, WWW e il Web 2.0; (b) ricerca di informazioni sanitarie in rete; (c) variabile qualità dell'informazione in rete; (d) processo di generazione dell'informazione scientifica; (e) editoria digitale, Licenze Creative Commons e Open Access; (f) principali database sanitari: Medline. Il thesaurus MeSH; (g) Evidence Based Medicine: concetti di base. Cochrane Collaboration.

All'interno del Corso è stato sperimentato un mix di metodologie didattiche al fine di coinvolgere un elevato numero di studenti iscritti al corso, a fronte di uno scarso numero di frequentanti, essendo Informatica un insegnamento sussidiario nel percorso di studio di Medicina e Chirurgia. Le strategie didattiche utilizzate sono state:

- flip teaching;
- interattività d'aula attraverso l'uso di smartphone;
- peer assessment e self assessment.

### ***Flip teaching***

La metodologia blended maggiormente utilizzata è stata il flip teaching.

A partire dal programma del Corso sono stati individuati gli argomenti più adatti per essere fruiti in autoapprendimento e predisposte le attività valutative formative da assegnare a distanza, quali: questionari di (auto-)valutazione; produzione di elaborati; partecipazione a forum tematici; revisione tra pari; ecc..

Tali attività sono state considerate obbligatorie e non opzionali. Numerosi studi dimostrano infatti che nel caso in cui le attività a distanza siano proposte come attività opzionali la percentuale degli studenti che le svolgono è piuttosto bassa (Hege, 2007).

Per quanto riguarda i materiali didattici da far fruire a distanza sono stati utilizzati due diversi approcci: (a) riuso di materiali reperibili online rilasciati con licenze aperte (ad es. CC – Licenze Creative Commons); (b) produzione autonoma di risorse didattiche.

Data l'ampia disponibilità in rete di risorse didattiche di ottima qualità rilasciate con licenze aperte, è stata privilegiata l'applicazione di un'ottica di riuso di materiali prodotti da terzi. Tra i materiali di studio proposti agli studenti sono infatti presenti numerose Open Educational Resources. [3] Quando non è stato possibile reperire risorse didattiche adatte agli obiettivi e agli argomenti trattati sono stati sviluppati specifici materiali, quali ad esempio pacchetti SCORM. Va sottolineato che la produzione autonoma di materiali didattici digitali richiede lunghi tempi di sviluppo e costi considerevoli.

Grande attenzione è stata posta nel calcolare adeguatamente il carico di lavoro assegnato a distanza agli studenti.

L'erogazione del Corso in modalità flip teaching ha comportato una riprogettazione delle lezioni frontali con un diverso utilizzo del tempo d'aula rispetto ad un insegnamento tradizionale.

### **Interattività d'aula e uso di smartphone**

Nonostante la numerosità degli studenti (350 studenti divisi in 2 canali), le lezioni sono state condotte in modo interattivo con ampia partecipazione della classe. Ciò è stato possibile tramite l'uso di un software che consente di porre un quesito alla classe e a ciascun studente di rispondere tramite il proprio smartphone (student response system). I risultati vengono raccolti e discussi in tempo reale.

Questo metodo ha consentito di impostare diversamente la lezione frontale passando da una didattica erogativa ad una maggiormente partecipativa anche in situazioni non favorevoli in cui la numerosità degli studenti è molto elevata.

### **Peer Assessment e self assessment**

Per superare l'esame lo studente, oltre ad avere svolto tutte le attività a distanza proposte durante lo svolgimento del Corso, doveva svolgere altre due attività tramite piattaforma *e-learning*:

- produrre un elaborato individuale, scegliendo da un elenco di argomenti proposti dal docente;
- revisionare e valutare gli elaborati prodotti da altri 3 studenti (*peer assessment*) e, applicando gli stessi criteri, valutare il proprio (*self assessment*).

Per lo svolgimento di tali attività è stato utilizzato il modulo Workshop di Moodle, che consente agli studenti di consegnare i propri elaborati e successivamente li distribuisce in modo casuale e anonimo assegnando a ciascun studente gli elaborati da revisionare.

I docenti hanno individuato alcuni argomenti di informatica biomedica che hanno ritenuto di particolare interesse per la formazione dei futuri medici. Alcune delle tematiche proposte sono state: danni alla salute derivanti da Internet, cyberpharmacies, la qualità delle mobile health apps, il movimento antivaccinazione in rete, promozione della salute in Internet e nei social media.

Agli studenti è stato richiesto di produrre un elaborato scegliendo un argomento tra quelli proposti. Per ragioni di uniformità di produzione dell'elaborato sono state fornite istruzioni dettagliate simili a quelle utilizzate per la scrittura di articoli scientifici, oltre ad un esempio di elaborato.

Terminata la fase di consegna, gli elaborati sono stati distribuiti in modo casuale e anonimo assegnando a ciascun studente 3 articoli da revisionare e valutare (*peer assessment*). Ad ogni studente è stato inoltre richiesto di valutare con gli stessi criteri il proprio elaborato (*self assessment*). (Luckner, 2015)

Per eliminare il rischio di coinvolgimento emotivo, la revisione è avvenuta in modalità “double blind” (doppio anonimato), ovvero lo studente non conosceva l'identità né degli autori degli elaborati da revisionare né di coloro che avrebbero revisionato il suo elaborato.

Rimandiamo il lettore interessato a una trattazione dettagliata della sperimentazione del peer assessment in questo insegnamento a (Guelfi, 2017).

Il voto finale acquisito da ciascun studente si componeva di tre parti:

- somma dei punteggi acquisiti nelle prove a distanza somministrate tramite piattaforma e-learning durante lo svolgimento del corso (max 11 punti);
- punteggio attribuito dal docente all'elaborato prodotto (max 10 punti);
- punteggio che misura la capacità dello studente di revisionare gli elaborati prodotti dai pari oltre al proprio. Il punteggio è stato tanto maggiore quanto più le valutazioni fornite dallo studente nei singoli criteri si sono avvicinate a quelle attribuite dal docente (max 10 punti).

Dopo avere acquisito il voto finale, allo studente è stato richiesto di compilare un questionario anonimo di gradimento degli argomenti trattati e delle metodologie didattiche utilizzate.

## **Risultati e discussione**

Gli studenti iscritti al I anno del Corso di Laurea in Medicina e Chirurgia dell'Università di Firenze nell'a.a. 2015/2016 erano 357; di questi, 350 si sono iscritti in piattaforma al Corso di Informatica.

Il corso si è svolto in sei settimane. Ciascuna delle sei lezioni d'aula è stata seguita da una serie di attività didattiche a distanza, alcune di queste valutative.

Nella prima lezione sono stati introdotti gli argomenti del corso attraverso l'uso di scenari. Questo ha consentito di presentare gli argomenti contestualizzandoli nell'esercizio della professione medica.

Per incrementare la partecipazione attiva degli studenti, nonostante la loro numerosità, nelle lezioni frontali è stato spesso utilizzato un software che consente ai docenti di porre quesiti alla classe e agli studenti di rispondere utilizzando gli smartphone. I risultati venivano raccolti e discussi in tempo reale; ciò ha reso possibile feedback immediati relativamente alla comprensione di un argomento e/o avviare riflessioni su specifici temi.

Nella Figura 1 e 2 sono mostrati i dati raccolti all'inizio e alla fine del Corso, sottoponendo alla classe il seguente scenario “Un medico ha la necessità di conoscere i più recenti aggiornamenti terapeutici nel trattamento del diabete. Quale strumento legato alle ICT utilizzeresti?”. Dal confronto tra le figure si evince come inizialmente gli studenti tendano a identificare Internet con il motore di ricerca Google e non siano in grado di scegliere lo strumento più idoneo per la risoluzione del quesito.





Figura 1. Nella figura sono mostrate le risposte degli studenti con il tag cloud a inizio corso



Figura 2. Nella figura sono mostrate le risposte degli studenti con il tag cloud raccolte a fine corso

Tutte le attività formative proposte a distanza sono state tracciate in piattaforma e rese obbligatorie al fine del superamento dell’esame finale.

Sette delle undici attività valutative prevedevano inoltre l’attribuzione di un punteggio agli studenti che avevano risposto correttamente al 60% delle domande; in tal modo il corretto svolgimento delle attività a distanza ha consentito agli studenti di acquisire sino ad un massimo di 11 punti che hanno contribuito alla formulazione del voto finale.

L’assegnazione di un punteggio alle attività da svolgere a distanza ha garantito un continuo impegno da parte degli studenti e consentito di condurre lezioni maggiormente interattive con un’alta partecipazione degli studenti.

La tabella seguente mostra il numero di studenti che hanno fruito del Corso in piattaforma e quanti di loro hanno svolto le attività proposte a distanza tra una lezione frontale e la successiva.

Tabella 1: Tracciamento delle attività a distanza

	ATTIVITA' A DISTANZA	Numero studenti		ATTIVITA' A DISTANZA	Numero studenti
Lezione 1	Partecipanti al corso in piattaforma	327		Partecipanti al corso in piattaforma	346
	Fruizione pacchetto "Strumenti per la ricerca di informazione in rete"	315	Lezione 4	Consegne elaborato "Ricerca in Medline"	310

	Consegne Questionario "Internet e WWW"	321			
Lezione 2	Partecipanti al corso in piattaforma	340	Lezione 5	Partecipanti al corso in piattaforma	347
				Consegne Questionario "Letteratura scientifica"	310
	Consegne elaborato "Segnalazione di un strumento di ricerca in rete"	314		Fruizione pacchetto "Open Access e Licenze Creative Commons"	307
Lezione 3	Partecipanti al corso in piattaforma	345	Lezione 6	Partecipanti al corso in piattaforma	348
	Consegne Questionario "Ricerca dell'informazione in rete"	323		Consegne Questionario "Licenze CC, Open Access, OER e MOOC"	305
	Consegne Questionario "Qualità dell'informazione in rete"	319			

Osservando i dati riportati nella tabella si osserva come con il passare delle settimane sia aumentato il numero degli studenti che hanno attivamente partecipato al corso.

Molto elevata è stata la percentuale di studenti che hanno svolto le attività proposte a distanza nei tempi stabiliti: oltre il 90% degli iscritti ha svolto regolarmente tutte le attività. Anche in aula si è registrata la presenza costante di oltre l'80% degli studenti.

Il questionario anonimo di gradimento dei temi trattati e della metodologia didattica utilizzata è stato compilato da 249 studenti, pari al 71% di coloro che hanno seguito il corso in piattaforma. Sui dati raccolti sono state effettuate valutazioni qualitative riguardanti l'analisi dei commenti contenuti nei questionari di gradimento.

### **Valutazione qualitativa sui questionari di gradimento anonimi**

Analizzando i contenuti dei commenti dei 249 questionari anonimi sono emersi dati qualitativi di interesse, che sono stati classificati in 4 macro-aree.

#### *Impatto positivo del blended learning*

Numerosi studenti hanno evidenziato l'impatto positivo che il blended learning ha avuto nel loro percorso di studio. "Ritengo che il Corso di Informatica sia fatto molto bene, principalmente perché mantiene un'attenzione e una partecipazione continua da parte degli studenti. In questo corso si vede effettivamente cosa significa seguire lezioni frontali e lezioni interattive, un'idea ben riuscita e ottimale per lo studente che può gestire al meglio il suo tempo per lo studio." Un altro studente ha scritto "Un corso sicuramente utile e molto stimolante, organizzato con attività e modalità di apprendimento innovative."

### *Innovazione didattica e interattività d'aula*

Alcuni studenti hanno sottolineato il gradimento verso le metodologie didattiche adottate. Uno studente esprime molto chiaramente il concetto “Credo che il corso sia molto ben strutturato e soprattutto innovativo dal punto di vista dei metodi di insegnamento. Ho notato una scarsa partecipazione da parte degli studenti e ciò credo sia dovuto al fatto che non siamo abituati a questo genere di “strumenti pedagogici” per i quali la partecipazione attiva è essenziale; il che è un peccato e demarca fortemente le grosse lacune che ha ancora il sistema scolastico italiano (soprattutto quello liceale) il quale, a mio parere, dovrebbe educarci alla partecipazione attiva nell'atto dell'apprendimento, ma fa esattamente il contrario. L'idea di prepararsi e arrivare a lezione già con una base di nozioni apprese mi è piaciuta molto.”

### *Peer assessment*

Molti studenti hanno evidenziato come l'esperienza del valutazione tra pari sia stata utile dal punto di vista dell'apprendimento e nello sviluppare una capacità di giudizio critico. Per maggiori dettagli sulla sperimentazione del peer assessment rimandiamo a (Guelfi, 2017).

### *Argomenti oggetto dell'insegnamento*

Molti studenti hanno espresso interesse verso gli argomenti trattati nel Corso. “Il corso è stato utile per apprendere nuove informazioni e conoscenze riguardo al rapporto tra l'informatica (e in particolare internet) e la medicina”. Un altro studente scrive “Il corso è ben organizzato e tratta di argomenti che non possono non essere conosciuti. La presenza di tale corso nell'ambito della formazione di uno studente di medicina, è fondamentale.” Un altro studente commenta: “Ho trovato il corso di Informatica estremamente utile per apprendere informazioni e padroneggiare strumenti che certamente mi saranno utili in futuro. Inoltre il corso è stato molto importante per permettermi di maturare idee e opinioni più solide a proposito di questioni delicate come “la qualità dell'informazione in rete” e “il rapporto medico-paziente in internet” “Nonostante qualche perplessità iniziale, il corso si è rivelato utile e stimolante, considerando che si è incentrato molto sul rapporto medico-internet, cosa che sarà sempre di maggiore importanza in futuro e su cui non si concentrano molti altri corsi di Informatica di altre Università di Medicina. Nel complesso sono soddisfatto dell'insegnamento avuto.” Alcuni studenti sottolineano nei loro commenti di aver preso consapevolezza del ruolo che giocherà Internet nel rapporto medico-paziente. “Un corso utile per comprendere come comportarsi, in futuro, con pazienti che si presenteranno da me con ricerche eseguite da loro stessi online. Devo infatti valutare le fonti della ricerca, approfondendola ulteriormente nell'eventualità in cui sia attendibile”.

## **Conclusioni**

Nell'insegnamento di Informatica del I anno del Corso di Laurea in Medicina e Chirurgia è stato adottato un approccio sperimentale sia per quanto riguarda la stesura di un programma contenente tematiche legate all'utilizzo delle ICT in ambito medico che per quanto riguarda l'utilizzo di un mix di metodologie didattiche atte a introdurre nuovi approcci pedagogici. L'obiettivo correlato all'uso di diverse strategie didattiche era quello di aumentare il numero di

studenti del Corso di Laurea in Medicina che seguissero e partecipassero attivamente alle lezioni.

L'elevata percentuale di studenti che ha frequentato le lezioni e svolto le attività a distanza, nonché i dati raccolti con il questionario anonimo di gradimento, hanno evidenziato come gli argomenti trattati siano stati apprezzati e le metodologie didattiche siano risultate efficaci. Inoltre le diverse strategie didattiche utilizzate hanno consentito la partecipazione attiva degli studenti, nonostante la loro numerosità.

Gli studenti hanno dimostrato un grande interesse verso un corso di Informatica rivolto non solo ai computer e alla tecnologia ma soprattutto a sviluppare le conoscenze e le abilità necessarie per svolgere la futura professione medica in una realtà fortemente correlata alle ICT.

I risultati ottenuti hanno indotto a riproporre tale insegnamento nel Corso di Laurea in Medicina e Chirurgia negli a.a. successivi. Inoltre lo stesso percorso didattico è stato adottato nel Corso di Laurea in Odontoiatria e Protesi Dentaria e in altri Corsi di Laurea sanitari dell'Ateneo fiorentino.

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## VALUTAZIONE E CERTIFICAZIONE DELLE COMPETENZE NEGLI AMBIENTI DI APPRENDIMENTO DIGITALI

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### Abstract

La valutazione e la certificazione delle competenze negli ambienti di apprendimento digitali può dar vita ad un processo di rinnovamento del “cosa” e del “come” valutare, superando così i limiti mostrati nel recente passato dalla valutazione tradizionale, soprattutto davanti ai nuovi approcci pedagogici sviluppatosi nei corsi *blended* e *online*. In questa prospettiva possono dare un contributo significativo i sistemi di *e-assessment*, i *Learning Analytics*, la *Content Analysis*, gli *Open Badges*. In tutti questi casi diventa fondamentale progettare un uso pedagogicamente intelligente di questi nuovi sistemi, come stanno dimostrando le esperienze dei MOOCs a livello universitario, in particolare il *network* EduOpen.

### Processi e contesti, partire dalla complessità

La valutazione e la certificazione delle competenze costituiscono due azioni distinte di un processo che, per diverse ragioni, è considerato molto complesso. La prima di queste ragioni risiede nella pluralità delle dimensioni, delle azioni, degli oggetti, degli strumenti e degli attori che connotano il processo valutativo. Gli oggetti a cui può riferirsi la valutazione sono molteplici, nel nostro caso l'oggetto è costituito dagli apprendimenti conseguiti dagli individui in contesti educativi formali, non formali e informali.

Il processo di valutazione degli apprendimenti si articola in diverse fasi, tra le quali le principali sono: (a) la descrizione dei risultati di apprendimento attesi (o obiettivi), in altre parole ciò che un individuo dovrebbe conoscere, sapere e/o essere in grado di fare alla fine di un processo di apprendimento, (b) la raccolta sistematica, durante il processo di apprendimento e alla sua conclusione, di informazioni riguardanti i risultati di apprendimento effettivamente conseguiti, (c) la misurazione, quando possibile, di tali risultati, (d) la comparazione dei risultati conseguiti con quelli attesi, cioè descritti in precedenza (obiettivi), infine e) l'espressione di un giudizio di valore su tali risultati.

La seconda ragione sta nel significato che si attribuisce alla parola “competenza”, un significato su cui dopo anni di elaborazioni teoriche, di esperienze pratiche e di azioni normative, non si è ancora raggiunta una definizione univoca. Di conseguenza esistono più definizioni, a seconda del contesto, della cultura, della disciplina cui ci si riferisce. Poiché in questa sede ci riferiremo ai contesti educativi, in particolare agli ambienti di apprendimento digitali, adottiamo una

definizione che recupera dalle altre quegli elementi comuni che si dimostrano più coerenti con il nostro contesto.

Dimostra di possedere una competenza la persona che manifesta la capacità di mobilitare, combinare e integrare le sue conoscenze e le sue abilità, in modo appropriato allo specifico contesto in cui agisce, allo scopo di risolvere un problema, svolgere un compito, conseguire un obiettivo.

Così intese le competenze possono essere definite come risultati di apprendimento complessi, cioè di un ordine superiore a quello delle singole conoscenze e abilità che le sostanziano. Di certificazione delle competenze si è iniziato a parlare sin dagli anni Novanta del secolo scorso e soprattutto nel mondo della formazione professionale, dove più significativi sono stati i progressi sia sul piano della elaborazione teorica sia su quello della costruzione di un vero e proprio sistema nazionale di certificazione delle competenze. Anche se in termini molto diversi, forse più approssimativi, la certificazione delle competenze ha fatto il suo ingresso anche nel sistema formale, cioè nel sistema di istruzione (2010). Da alcuni anni anche il mondo accademico, seppure in via sperimentale, è stato interessato al problema soprattutto per quanto riguarda la didattica. A questo proposito è di grande interesse la sperimentazione che Unimore sta conducendo dal 2016 sulla didattica per competenze con circa 2000 studenti e 16 docenti.

La terza ragione per considerare molto complesso il processo valutativo e certificativo, certamente non l'ultima, sta nel nell'intreccio esistente tra le dimensioni che caratterizzano la certificazione: politica, istituzionale, tecnica e normativa. Infatti, certificare significa rilasciare un documento, attestante il possesso di determinate competenze da parte di un soggetto, documento che ha un valore riconosciuto all'interno di una comunità più o meno vasta. Soltanto alcuni soggetti, la cui autorità è riconosciuta da tutti i membri della comunità di riferimento (in genere tali soggetti coincidono con le istituzioni o con enti accreditati), hanno il potere di rilasciare la certificazione e solo dopo aver seguito una procedura condivisa e codificata che coinvolge a diverso titolo più attori e a diversi livelli.

Quanto descritto è ciò che accade, o potrebbe accadere, quando si parla di valutazione e certificazione delle competenze in un contesto formativo convenzionale, cioè un contesto dove lo studente e il docente si trovano in una condizione di contiguità spazio-temporale, in altre parole quando sono entrambi presenti nello stesso spazio (aula) e nello stesso tempo (orario della lezione). Infatti, in questa condizione il docente (valutatore e/o certificatore) è perfettamente in grado di osservare una determinata prestazione e di associarla ad una certa persona (identificazione), sia durante il processo di insegnamento-apprendimento (valutazione formativa) sia al termine dello stesso processo (valutazione sommativa), e documentarla ai fini del rilascio di un documento che attesta e certifica il possesso di quelle competenze.

Quando a questo quadro, già di per sé articolato e complesso, si sovrappone quello degli ambienti di apprendimento digitali, come i Learning Management Systems (LMS), la complessità aumenta notevolmente. In questo caso, infatti, alla complessità del processo

valutativo e certificativo si aggiunge quella tipica dei contesti in cui la didattica è, nelle forme più diverse, basata sulla rottura della contiguità spazio-temporale tra chi insegna e chi apprende.

### Rinnovare la valutazione

Riflettere sulla valutazione oggi ha un'importanza strategica. Indipendentemente dalla specificità degli ambienti digitali, la valutazione è infatti uno dei tre pilastri su cui si basa qualsiasi sistema educativo, insieme al curriculum e al processo di insegnamento-apprendimento (Hill & Barber, 2014). Dei tre quello della valutazione è quello che forse più degli altri è rimasto al riparo dai grandi cambiamenti. In Italia l'innovazione in campo educativo ha riguardato soprattutto gli altri due pilastri. Progettazione, programmazione, metodologie didattiche attive, tecnologie didattiche, disabilità, inclusione, formazione dei docenti, sono questi i temi su cui più frequentemente si è sviluppata sia la ricerca che l'innovazione educativa e didattica. Il tema della valutazione è esploso in Italia soltanto in conseguenza della nascita dell'INVALSI e del Sistema Nazionale di Valutazione. A causa di una scarsa familiarità con le teorie, i metodi e gli strumenti della valutazione il mondo della scuola italiana in questi ultimi anni si è confrontato, purtroppo, con una sola delle dimensioni valutative, quella della valutazione di sistema e delle prove standardizzate. Il confronto è stato in buona parte conflittuale perché il nuovo sistema è stato introdotto senza una preliminare sensibilizzazione e formazione del personale, in altre parole senza la formazione di una solida cultura della valutazione. Il risultato è che la valutazione viene attualmente percepita da molti docenti come uno strumento per il controllo e la limitazione della libertà di insegnamento. Non si coglie la complessità e la ricchezza del processo valutativo ma soltanto un suo specifico aspetto (le prove standardizzate, la valutazione esterna) e, scambiando la parte con il tutto, si respinge la valutazione in toto. Questo vale sia per la scuola sia per l'università (vedi le complesse procedure dell'ANVUR). Naturalmente la responsabilità di questo rigetto sono da addebitare in gran parte a chi non ha colto la necessità di colmare innanzitutto la debolezza della cultura valutativa, che non è solo dei docenti ma dell'intera cultura nazionale, prima di introdurre sistemi ideati e attuati in altre culture più pragmatiche della nostra, come quella anglosassone.

Tuttavia, anche nei paesi dove i sistemi e le pratiche valutative si sono sviluppati prima e più intensamente, e forse proprio per questo motivo, è emersa da tempo la necessità di riformare il delicato mondo della valutazione. In particolare, Hill e Barber (2014) individuano per la valutazione 5 grandi trasformazioni e per ciascuna di queste indicano come il digitale e un nuovo modo di pensare possono contribuire al cambiamento: (a) una valutazione che possa misurare l'intera gamma delle abilità degli studenti; (b) una valutazione che fornisca informazioni significative sui risultati dell'apprendimento; (c) una valutazione in grado di produrre risultati diversi; (d) una valutazione che produca dati eticamente integri, che motivi gli sforzi di miglioramento degli studenti e riduca al minimo le opportunità di barare; (e) una valutazione che supporti studenti e insegnanti nell'utilizzare *feedback* continui per migliorare l'apprendimento e l'insegnamento e personalizzare le proposte formative.

## La valutazione e il digitale

Un aiuto nella direzione del rinnovamento può venire dalle nuove opportunità offerte dalle tecnologie digitali. Infatti, la diffusione delle tecnologie digitali negli ambienti di apprendimento, non necessariamente complica le cose e rende più difficile la gestione dei processi di apprendimento e di valutazione. Tra la valutazione degli apprendimenti e il mondo digitale esiste ormai una relazione multiforme. Da una parte essa rende evidenti alcuni limiti degli ambienti di apprendimento digitali, per esempio la difficoltà (in alcuni casi l'impossibilità) di effettuare accertamenti validi e affidabili, soprattutto a causa della non contiguità spazio-temporale che caratterizza tali ambienti. Dall'altra parte però la diffusione del digitale negli ambienti di apprendimento fa intravedere, grazie a opportunità informative e comunicative prima non disponibili, la possibilità di riformare in modo significativo la valutazione superando, per esempio, uno dei suoi limiti più importanti, soprattutto nelle sue forme standardizzate, e cioè l'essere uno strumento più adatto a misurare il prodotto (le conoscenze e le competenze acquisite, le prime più delle seconde) che non il processo (Benvenuto, 2002), dove per processo in questa sede si intende l'insieme delle interazioni, prolungate nel tempo, con le risorse e le attività che portano ai risultati dell'apprendimento (*learning outcomes*). Un altro filone di ricerca interessante è quello che riguarda la possibilità, grazie alle tecnologie digitali, di costruire ambienti adattivi per la formazione in rete, cioè ambienti che siano in grado di individualizzare la proposta formativa sulla base delle caratteristiche rilevate dagli studenti. Il progetto *am-learning* (MIUR – FIRB) è un esempio di ricerca che va in questa direzione. Il progetto, realizzato dall'Università di Roma Tre, l'Università di Roma La Sapienza e l'Università di Modena e Reggio Emilia, ha avuto come obiettivo principale quello di predisporre un ambiente adattivo per l'istruzione in rete, in grado di individualizzare il messaggio di apprendimento sulla base delle competenze linguistiche dei destinatari, con particolare riferimento ai lessici specialistici (Poce, 2015).

Storicamente la valutazione, soprattutto quella finale e certificativa, nella *Distance Education* è stata affrontata in modo piuttosto tradizionale (esami rigorosamente in presenza, tutt'al più decentrati in sedi locali). Va detto che questo approccio è largamente condiviso ancora oggi e, forse, almeno per quanto riguarda la valutazione sommativa e certificativa, continuerà ad esserlo ancora a lungo. Nel corso del tempo, tuttavia, la diffusione delle tecnologie digitali ha consentito di innovare i processi formativi su diversi piani: produzione ed erogazione di risorse educative sempre più versatili, accesso sempre più ampio e libero alle risorse conoscitive, modalità comunicative sempre più efficaci e interattive tra studenti e docenti, tra studenti e studenti, tra studenti e comunità di esperti. In alcuni casi queste innovazioni hanno anche contribuito al cambiamento o al consolidamento di alcuni paradigmi, basti pensare all'approccio costruttivista e all'apprendimento collaborativo. Su un piano, però, il digitale ha stentato a produrre innovazioni, quello della valutazione. Se guardiamo al passato il più grande contributo che il digitale ha dato alla valutazione è quello relativo agli strumenti che consentono di costruire, somministrare e amministrare prove strutturate (quesiti a scelta multipla, corrispondenze, vero/falso, completamenti) in modo automatico. Tuttavia, a parte questa notevole ottimizzazione delle risorse, in Italia poco è cambiato nel modo di concepire e praticare la valutazione sia nei contesti educativi formali (scuola e università) sia all'interno degli



ambienti di apprendimento digitali. È necessario però segnalare due ambiti di ricerca e di sviluppo molto interessanti perché, oltre a migliorare le potenzialità degli ambienti di apprendimento digitali, possono mettere in discussione il modo tradizionale di concepire e di praticare la valutazione, soprattutto per quanto riguarda il “cosa” e il “come” valutare: l'Analisi del contenuto (*Content Analysis*) e i *Learning Analytics* (LA). La prima è nata a metà del secolo scorso nell'ambito delle scienze sociali e può essere definita come una tecnica di ricerca per una descrizione oggettiva, sistematica e quantitativa del contenuto manifesto della comunicazione (Berelson, 1952; Kerelson, 1983). Il secondo è un filone di ricerca che ha iniziato a svilupparsi piuttosto recentemente, nell'ambito più vasto dell'*educational data mining*, che consiste nella misurazione, la raccolta, l'analisi e la segnalazione di dati relativi agli studenti e ai loro contesti, ai fini della comprensione e dell'ottimizzazione dell'apprendimento e degli ambienti in cui questo si sviluppa (Siemens, 2010a; Brown, 2012). I due ambiti di ricerca sono strettamente connessi poiché tra i principali metodi di analisi dei LA figura proprio la *Content Analysis*.

### **Learning Analytics (LA)**

I sistemi LMS, (*Learning Management Systems*) che gestiscono i corsi accademici *online* o *blended* e i MOOCs rilevano automaticamente e continuamente enormi quantità e varietà di dati sulle azioni compiute nel corso del tempo dagli studenti. È così possibile, in qualsiasi momento, estrarre, analizzare e interpretare dall'insieme dei dati prodotti dagli studenti quelli che possono contribuire a descrivere gli aspetti più significativi dei processi formativi, soprattutto quelli che più di altri sono in grado di orientare le azioni di miglioramento sia dell'apprendimento dei partecipanti sia della qualità degli ambienti digitali in cui tale apprendimento si sviluppa. La peculiarità dei dati relativi ai processi di apprendimento sta sia nella quantità sia nella qualità. Visto che in genere si raccolgono i dati che si decide di raccogliere la qualità di questi dati (tipo, validità e attendibilità) dipende dal processo decisionale che su questo tema si attiva e si sviluppa in sede progettuale. Progettare un uso *pedagogicamente intelligente* dei LA è quindi fondamentale soprattutto per supportare i processi di monitoraggio e di valutazione dei percorsi formativi. Inoltre, la natura processuale delle rilevazioni di dati (nei LMS i dati sono rilevati in continuazione) costituisce una grande opportunità per la valutazione. Essa infatti può contare su dati che, per continuità, per qualità e quantità, consentono di monitorare e valutare soprattutto i processi, rispetto ai quali la valutazione tradizionale (prove strutturate e standardizzate) ha mostrato di non essere il migliore strumento tra quelli disponibili. Un altro aspetto interessante dei LA, dal punto di vista valutativo, è la possibilità di usarli non solo con una funzione descrittiva (descrivere uno stato) ma anche con una funzione predittiva (prevedere uno sviluppo) (Siemens, 2010b; Dietz-Uhler & Hurn, 2013; Olmos & Corrin, 2012). I dati raccolti, analizzati e interpretati, consentono di costruire per ogni studente un profilo da cui possono emergere interessi, lacune, ritardi, successi e insuccessi, che prefigurano sviluppi futuri. Si tratta di tecniche di *data mining* già ampiamente utilizzate nella rete, come per esempio Google Analytics che consente di costruire un profilo di ogni utente sulla base delle scelte da lui fatte sulla rete (ricerche tematiche, acquisti, visite di siti, social networks ecc.) e, sulla base di questo profilo, raccomandargli temi, pubblicazioni, prodotti ecc., coerenti con i suoi interessi. Naturalmente si tratta di utilizzare queste tecniche di

analisi in campo educativo (*educational data mining*), cioè mettendo i dati prodotti dagli studenti durante il loro percorso formativo in relazione con altri dati esterni, come per esempio quelli riguardanti il curriculum, e usarli come base per la predizione, l'intervento, la personalizzazione e l'adattamento (Siemens, 2010b), sempre con lo scopo di aiutare lo studente a migliorare il suo apprendimento.

### *Open badges*

In una prospettiva di *lifelong learning* e di *open education* queste potenzialità dei LA fanno intravedere una molteplicità di usi di tipo valutativo, soprattutto nel campo della certificazione delle competenze nei contesti non formali e informali. Basti pensare alla certificazione delle competenze acquisite dall'esperienza (*Accreditation of Prior Learning*), cioè degli apprendimenti acquisiti in contesti informali che l'individuo si propone di vedere riconosciuti e certificati anche allo scopo di utilizzarli all'interno dei contesti formali (per esempio con il riconoscimento di crediti formativi). I LA, nella forma di *open badges* (Gibson et al., 2015; Goligosky, 2012), possono contribuire alla costruzione di un portfolio individuale dove automaticamente e sistematicamente vengono raccolte le evidenze di apprendimenti e di esperienze acquisite in diversi contesti in rete. Il network EduOpen, che progetta ed eroga MOOCs per 17 atenei italiani, attraverso la piattaforma BESTR del CINECA ha adottato lo standard degli Open Badges definito dalla Mozilla Foundation (Bertazzo et al., 2017). Gli *open badges* si presentano come immagini che però contengono metadata relativi alla persona titolare del *badge* e alle sue competenze. In altre parole il *badge* racconta la storia del titolare: dati anagrafici, competenze acquisite, modalità di acquisizione, modalità di verifica e soggetto che l'ha condotta, validità temporale. In Italia, al momento, si possono contare circa 14.000 istituzioni che hanno rilasciato *open badge*. Le Linee guida di EduOpen prevedono il rilascio di tre tipi di certificazione per i suoi MOOCs: (a) Attestato di partecipazione (*Attendance Certificate*), il rilascio è a discrezione del docente, può essere gratuito o con contributo, è conseguito *online* e senza alcun controllo sull'identità, il *badge* viene pubblicato sulla piattaforma Bestr del CINECA; (b) Certificato di completamento (*Verified Certificate*), rilasciato a seguito di una prova Proctored presso la sede dell'Ateneo o presso un centro NICE della rete CINECA, prevede il versamento di un contributo (almeno 50 €), il *badge* viene pubblicato sulla piattaforma Bestr del CINECA; (c) CFU (*Examination*), vengono rilasciati CFU/ECTS a seguito di un regolare esame e con regolare iscrizione all'università.

All'interno dei corsi EduOpen (per esempio, Metodologia della ricerca educativa e Docimologia) il sistema si è dimostrato particolarmente efficace proprio per gli utenti non immatricolati all'università (gli studenti certificano con l'esame e l'acquisizione dei CFU). È il caso dei docenti delle scuole primarie e secondarie di primo grado che hanno partecipato ai due corsi citati come forma di aggiornamento professionale, grazie al rilascio dell'Attestato di partecipazione hanno visto riconosciuta la loro partecipazione e grazie all'*open badge* hanno potuto arricchire il loro curriculum.

### *Dashboards*

Infine, sempre nella prospettiva *open e lifelong learning*, un altro contributo importante che i LA possono dare al rinnovamento della valutazione è quello che riguarda il ruolo che i dati possono esercitare nel facilitare e promuovere un ruolo più attivo, consapevole e autonomo dei partecipanti ai corsi *online* o *blended*, soprattutto dei soggetti adulti. I LA possono essere resi visibili agli utenti in una forma sintetica e significativa, come quella offerta dagli indicatori. Si tratta di quell'insieme di soluzioni logiche, tecniche e grafiche che va sotto il nome di *dashboards* (cruscotti), cioè soluzioni che consentono di avere una rappresentazione grafica dei principali indicatori relativi al processo formativo (tanto di tipo oggettivo quanto di tipo soggettivo). Esempio classico di questo tipo di rappresentazioni grafiche è la barra di avanzamento (*Progress bar*) che segnala costantemente allo studente il suo stato di avanzamento nella progressione degli studi (numero di video-lezioni, auto-valutazioni, compiti ecc. fatti e consegnati sul numero totale). Molti altri esempi, anche più sofisticati di questo, possono essere fatti a proposito del grado di partecipazione alle attività collaborative, ai gruppi di discussione ecc. Tale visibilità degli indicatori può produrre benefici, generalmente in campo valutativo e auto-valutativo ma anche a fini di ricerca, per una molteplicità di soggetti: studenti/partecipanti, docenti, istituzioni, ricercatori. In questa prospettiva, considerata l'età degli studenti universitari e del pubblico adulto coinvolto nei corsi MOOCs, assumono un grande rilievo sia il controllo del soggetto che apprende sul processo valutativo (auto-valutazione, valutazione tra pari) sia la possibilità di aumentare il suo grado di consapevolezza e di autonomia nella gestione del processo di apprendimento nel suo complesso, cosa che come è noto è particolarmente problematica nei corsi a distanza dove gli studenti si trovano spesso da soli e con servizi di supporto e guida poco efficienti. In entrambi i casi la visibilità e la disponibilità, all'interno degli ambienti digitali, di dati, indicatori e strumenti valutativi a disposizione del soggetto che apprende costituiscono condizioni indispensabili di progresso.

### **Analisi del contenuto**

Si tratta di un metodo di ricerca che è nato a metà del secolo scorso nell'ambito delle scienze sociali, in particolare degli approcci di ricerca qualitativa, dove è piuttosto comune accumulare grandi quantità di documenti, o artefatti, di varia natura (orali, scritti, iconici, audio-visuali ecc.). Nel corso del tempo si è formato un settore specifico in cui l'analisi del contenuto si è concentrata sui documenti di tipo scritto (interviste, documenti, verbali di osservazione ecc.), documenti e fonti di informazione molto importanti rispetto ai quali è però difficile assicurare profondità e rilevanza delle interpretazioni (Della Ratta-Rinaldi, 2002). Proprio per l'attenzione rivolta esclusivamente ai testi scritti questo ambito di applicazione è noto come Analisi testuale. Questa tecnica si basa sull'uso di *software* specifici che utilizzando metodi statistici consentono di esplorare sistematicamente la struttura del testo.

La diffusione di uno degli strumenti più tipici della rete, i forum o gruppi di discussione, ha avuto una grande importanza dal punto di vista pedagogico. Infatti il forum è stato, e continua ad essere, uno strumento fondamentale per sollecitare la comunicazione a distanza tra gli studenti e i docenti ma anche tra studenti e studenti. Grazie ai gruppi di discussione, per esempio, è stato possibile avviare delle comunità di pratica e/o, molto più semplicemente, creare

delle occasioni di lavoro collaborativo in rete. Inoltre, al di là dei gruppi di discussione, è necessario considerare tutte quelle attività che nei corsi *online* o *blended* sollecitano gli allievi a produrre elaborati, autonomamente o in gruppo. L'aspetto rilevante sia dal punto di vista della ricerca sia da quello didattico è che tutte le attività svolte all'interno dei gruppi di discussione, dei *projectwork*, dei compiti (*assignments*), dei wiki, e di altri strumenti disponibili sulle piattaforme, hanno in comune una cosa: la produzione di testi. L'insieme di queste produzioni testuali, col passare del tempo, è diventato oggetto di studio e di analisi da parte di ricercatori, desiderosi di saperne di più su ciò che accade all'interno delle comunità più o meno grandi di studenti a distanza, ma anche da parte di docenti, desiderosi di sottoporre a valutazione anche le ampie e varie produzioni scritte dei loro allievi. Chi ne ha fatto esperienza sa che all'interno di un corso *online* o *blended* si producono grandi quantità di testi appartenenti sostanzialmente a due categorie: (a) i testi unitari, cioè testi concepiti e realizzati come un corpo unico (rapporti, saggi brevi, progetti, testimonianze, diari ecc.) anche se questo è il risultato di un lavoro collaborativo (wiki) e (b) i testi decentrati, cioè insiemi di testi, spesso brevi e interagenti tra loro, ciascuno dei quali ha però un suo centro e una sua struttura (ne sono un esempio tipico le conversazioni che avvengono all'interno dei gruppi di discussione). Il percorso formativo degli studenti dei corsi *online* o *blended* è generalmente punteggiato da queste produzioni testuali che danno vita ad un corpus dinamico che dal punto di vista valutativo è molto significativo, soprattutto per due ragioni: (a) non fotografa un momento (come accade con un test) ma riproduce un cammino, un processo; (b) rispecchia l'ampia gamma di conoscenze e di abilità del singolo individuo, anche a livelli cognitivi superiori. In ogni caso la produzione di questi testi, normalmente in formato digitale, determina la nascita di una base empirica rilevante, ancora una volta, sia per la ricerca sia per la didattica, e sulla quale l'analisi testuale può fornire un contributo importante. Dal punto di vista valutativo l'analisi di alcuni testi rappresentano una vera e propria sfida come per esempio i testi prodotti dagli studenti all'interno di lavori collaborativi (wiki) per i quali è necessario sperimentare nuove modalità valutative (Trentin, 2008).

### *Discourse Analysis*

La prospettiva socioculturale dell'apprendimento "highlights the possibility that educational success and failure may be explained by the quality of educational dialogue, rather than simply in terms of the capability of individual students or the skill of their teachers." (Mercer, 2004). Coerentemente con questa prospettiva è stato individuato un indicatore dell'apprendimento nella qualità del contributo che ogni studente può dare ad un discorso. Il modo in cui gli studenti si impegnano nel dialogo è un indicatore di come interagiscono con le idee degli altri studenti, come confrontano queste idee con la loro comprensione personale e infine come spiegano il loro punto di vista, che è un segno esplicito della loro posizione nella conversazione (De Liddo et al., 2011). Sulla base di questa convinzione si è sviluppata un'altra linea di ricerca, coerente sia con i LA sia con la *Content Analysis*: la *Discourse Analysis*, che può essere applicata, per esempio, alle conversazioni che si svolgono all'interno dei gruppi di discussione. "Discourse analysis focuses explicitly on language as social action, and in that, discourse and argumentation are the tools through which people can compare their thinking, explore ideas, shape agreement,

and identify or solve disagreements. We use discourse to co-evolve and think together.” (De Liddo et al., 2011).

### **Valutazione e sicurezza**

Come si è detto uno dei limiti della valutazione nei percorsi formativi *blended* e *online* è rappresentato dall'impossibilità di identificare con sicurezza lo studente che, a distanza, sta sostenendo una prova di valutazione. Questo limite diventa un ostacolo formalmente insormontabile quando la valutazione è di tipo sommativo e/o certificativo. Infatti, non si può “certificare” le competenze di un candidato “se non si è certi” della sua identità. Per questa ragione nel mondo della *Distance Education* la valutazione finale si è sempre svolta in presenza, faccia-a-faccia. Attualmente le nuove tecnologie consentono di sperimentare nuovi sistemi per identificare in modo sicuro gli studenti che si accingono a sostenere, da remoto, prove di valutazione nei corsi *blended* e *online*. L'esperienza più avanzata in questo settore è il progetto TeSLA, promosso dalla Commissione Europea, che riunisce in un consorzio 18 partner tra cui università, aziende e centri di ricerca (<http://tesla-project.eu/>). Scopo dichiarato del progetto è quello di reinventare la valutazione negli ambienti *online* fornendo alle istituzioni educative un sistema di *e-assessment* adattivo e sicuro (nel rispetto da quanto previsto dal General Data Protection Regulation (GDPR)). Di fatto TeSLA, che può essere ospitato all'interno della maggior parte delle piattaforme (Blackboard, Moodle), funziona utilizzando in modo integrato sistemi di riconoscimento facciale e vocale, sistemi per il controllo antiplagio dei testi prodotti e sistemi per il controllo degli schemi adottati dallo studente quando usa la tastiera.

In conclusione, diverse sono le ragioni per cui è conveniente integrare i sistemi di *e-assessment*, come TeSLA, all'interno dei LMS: (a) proponendo agli studenti attività di *e-assessment* insieme a materiali didattici e ai compiti essi consentono di organizzare efficacemente le attività di apprendimento in ambienti *online*; (b) inoltre, consentono di effettuare una valutazione diretta e rapida allo scopo di aumentare la motivazione degli studenti e migliorare il loro apprendimento; (c) lo studente può scegliere liberamente il tempo e il luogo in cui svolgere la valutazione coerentemente con gli obiettivi, le sue preferenze ecc.; (d) supportano il docente nel monitorare i progressi degli studenti e valutare i risultati intermedi e finali; (e) infine, migliorano la comunicazione tra studenti e docenti in diverse attività di valutazione, poiché vengono eseguiti in un ambiente di apprendimento integrato in cui esistono diversi canali di comunicazione (Kiennert et al., 2017).

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## **MLTV, RENDERE L'APPRENDIMENTO E IL PENSIERO VISIBILI NELLA SCUOLA SECONDARIA DI SECONDO GRADO**

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### **Introduzione**

Il progetto di ricerca Making Learning and Thinking Visible in Italian Secondary Schools (MLTV) prevede la collaborazione tra Indire, istituto di ricerca nazionale che si occupa di innovazione educativa, Project Zero (PZ, [www.pz.harvard.edu](http://www.pz.harvard.edu)), gruppo di ricerca in seno alla Harvard Graduate School of Education, e alcune scuole italiane (secondarie di secondo grado). L'obiettivo del progetto è la sperimentazione e la localizzazione di alcune proposte di innovazione di PZ da parte delle scuole, selezionate tra le capofila del Movimento Avanguardie Educative (AE). Le scuole non sono "oggetto" della ricerca ma partner e protagoniste nell'adattamento di strumenti e risorse, tra cui le Thinking Routine (TR), per supportare il pensiero e l'apprendimento degli studenti e degli adulti (docenti, dirigenti, ricercatori). La proposta MLTV, nel caso in cui la localizzazione riceva positivi riscontri, verrà inserita nella galleria di idee a disposizione della community AE per una più ampia diffusione nella scuola italiana. La durata della ricerca è di 18 mesi (luglio 2017-dicembre 2018). La lingua di lavoro è l'inglese (tra i criteri di selezione vi era anche una buona competenza linguistica in inglese) anche se i prodotti e i materiali che verranno realizzati saranno tradotti in lingua italiana. La fase iniziale della ricerca (luglio-settembre 2017) ha previsto l'individuazione ed il coinvolgimento di tre scuole secondarie di secondo grado, eterogenee come profilo e collocazione geografica (gli istituti selezionati si trovano nelle regioni: Friuli-Venezia Giulia, Marche, Campania) che potessero fungere da scuole pilota in Italia. Il processo di selezione si è basato sul possesso di una serie di criteri precisi. Il coordinamento del progetto è affidato a INDIRE, con la collaborazione di PZ. La fase intermedia (settembre 2017-giugno 2018), dedicata allo studio e alla sperimentazione a scuola della proposta MLTV, è in essere. La fase conclusiva (giugno-dicembre 2018) sarà invece dedicata all'analisi dei risultati, alla scrittura di materiali formativi e di ricerca, e alla presentazione della proposta alla community AE. Si renderà sicuramente necessaria una fase di follow-up (nel corso dell'a.s. 2018-19) che segua gli sviluppi del processo di allargamento alla comunità di AE (scaling-up).

### **Il contesto della sperimentazione**

Il contesto di riferimento per l'individuazione delle scuole di MLTV è rappresentato dal Movimento delle Avanguardie Educative (AE), uno dei principali laboratori di sperimentazione in corso, un progetto nato per portare a sistema le esperienze più significative di trasformazione del modello organizzativo e didattico della scuola. Promosso da Indire insieme a 22 scuole fondatrici (e capofila), il Movimento ha espresso la propria visione per il cambiamento in un

Manifesto dove viene descritto in sette punti il concetto di innovazione che si vuole promuovere: (a) trasformare il modello trasmissivo della scuola; (b) sfruttare le opportunità offerte dalle ICT e dai linguaggi digitali per supportare nuovi modi di insegnare, apprendere e valutare; (c) creare nuovi spazi per l'apprendimento; (d) riorganizzare il tempo del fare scuola; (e) riconnettere i saperi della scuola e i saperi della società della conoscenza; (f) investire sul "capitale umano" ripensando i rapporti (dentro/fuori, insegnamento frontale/apprendimento tra pari, scuola/azienda, ecc.); (g) promuovere l'innovazione perchè sia sostenibile e trasferibile. La ricerca e l'esperienza di Indire confermano che i processi di innovazione incontrano ostacoli e resistenze se vengono calati dall'alto ma, al contrario, "attecchiscono" e non vengono rigettati se si innescano dinamiche di contagio secondo le logiche di un approccio "bottom-up" (Kampylis et al., 2013). La strategia che è alla base del Movimento AE è proprio quella di fare sistema tra una rete di attori che, a volte facendo leva sulle possibilità offerte dall'autonomia scolastica, altre individuando soluzioni alternative, hanno già mosso i primi passi nel complesso cammino verso l'innovazione. Le istituzioni scolastiche italiane di ogni ordine e grado che si riconoscono nella visione del cambiamento espresso nel Manifesto possono aderire al Movimento entrando a far parte di una community di quasi 700 scuole, grazie alla quale vengono condivise esperienze, idee, difficoltà, riflessioni che richiedono nuove soluzioni e che, passo dopo passo, danno origine al cambiamento in un'ottica di ricerca-azione (Murray et al., 2010; Schön, 2006). In quanto tale, il Movimento è caratterizzato dalla dinamicità che prende forma nelle sue dimensioni di apertura alle scuole (è infatti possibile aderire all'iniziativa in qualsiasi momento dell'anno scolastico), di ascolto (le scuole possono proporre a Indire nuove esperienze di innovazione per incrementare la "galleria delle idee") e di community (da 22 scuole alla fine dell'anno 2014 AE ha quasi raggiunto le mille unità in poco più di tre anni di vita). In questo scenario le Avanguardie Educative mirano a creare i presupposti per mettere in atto un'innovazione trasferibile e sostenibile, attraverso strumenti progettati insieme alle scuole già impegnate in sperimentazioni di rilievo a livello nazionale (scuole capofila) e azioni di supporto sia in presenza sia in comunità di pratiche online. Il Movimento non si limita, infatti, alla sola declinazione degli orizzonti del cambiamento ma propone una serie di "idee per l'innovazione" (contenute nella "galleria delle idee") che provengono dalle scuole fondatrici e capofila e vengono proposte alle scuole "adottanti" per avviare un processo di sperimentazione nel proprio contesto. Prendendo le distanze da un "ricettario" per l'innovazione, le 15 idee del Movimento offrono un quadro teorico di riferimento, strumenti operativi e la narrazione del vissuto delle scuole capofila che prendono forma in altrettante linee guida pensate per rendere trasferibili e personalizzabili questi processi di innovazione.

## **I Framework teorici in MLTV**

Il framework Making Learning Visible pone l'enfasi sul fatto che l'apprendimento non può più essere un'attività individuale e guidata dal docente ma deve andare addirittura oltre le mura della classe per coinvolgere famiglie e membri della comunità. Purtroppo molte pratiche di classe semplicemente non sono pensate per supportare la profondità e la complessità dell'apprendere degli studenti e normalmente le uniche rappresentazioni pubbliche dell'apprendimento sono voti, promozioni, ranking. Le classi che lavorano rendendo visibile



l'apprendimento suggeriscono che un apprendimento forte e significativo è diretto a uno scopo, è sociale, è emotivo, è abilitante e basato su rappresentazione. David Perkins (2014) scrive che la prima decisione chiara che il docente deve prendere riguarda la scelta di che cosa vale la pena imparare. Liberandosi dalla pressione a svolgere tutti gli argomenti del curriculum, l'insegnante deve operare una attenta selezione che sia guidata da uno scopo rilevante per gli studenti, i docenti, la disciplina e anche per la comunità più vasta. PZ, adottando la visione di Lev Vygotskij (1978) e Albert Bandura (1997), sostiene che la creazione di contenuto non è un'attività individuale ma si sviluppa in un contesto sociale di scambio con altri, per cui apprendere comporta confrontarsi con diversi punti di vista ed interpretazioni e giungere ad un pensiero più complesso riguardo al materiale stimolo fornito dal docente. Il processo di apprendimento è marcato da esperienze di gioia e di meraviglia. L'apprendimento è abilitante e i docenti che lo rendono visibile incoraggiano gli studenti a diventare più autodiretti, prendendo in carico il proprio apprendimento e il compito di dividerlo con altri. Howard Gardner (2006) suggerisce, nella sua teoria delle intelligenze multiple, che l'evidenza dell'apprendimento può essere dimostrata in una varietà di sistemi simbolici che vanno ben oltre il tradizionale focus della scuola su parole e numeri. I prodotti e i processi dell'apprendimento diventano visibili attraverso citazioni, disegni, video, riflessioni, fotografie. Condividere questi artefatti con altri studenti, insegnanti e famiglie spesso provoca una nuova comprensione, curiosità, sorpresa, piacere. Le due pratiche principali per rendere visibile l'apprendimento sono l'apprendimento in gruppo e la documentazione. L'apprendimento in gruppo è promosso attraverso cinque strategie interconnesse: far crescere la capacità degli studenti di imparare insieme, progettare compiti coinvolgenti che beneficino di una prospettiva di gruppo, facilitare le conversazioni che approfondiscono l'apprendimento, formare i gruppi intenzionalmente, progettare un'efficace sinergia tra lavoro individuale, in piccolo gruppo e classe intera. Nell'accezione di PZ la documentazione è *la pratica di osservare, registrare, interpretare e condividere, attraverso una varietà di media, il processo ed i prodotti dell'apprendimento, allo scopo di approfondire l'apprendimento e renderlo visibile*. Più che essere una strategia tecnica per catturare immagini di studenti al lavoro, la documentazione crea una nuova relazione tra insegnanti e docenti nel processo di insegnamento – apprendimento. Essa non è soltanto un bel prodotto finale e non è solo retrospettiva, guarda anche al futuro e dà forma alla progettazione di futuri contesti di apprendimento. Il “Visible Thinking” è un Framework usato per rendere visibili i processi cognitivi con l'obiettivo di incoraggiare, nelle scuole, una cultura dell'esplorazione e la costruzione del pensiero critico. Il pensiero viene reso visibile attraverso delle routine cognitive specifiche, le Thinking Routines (TR), una sorta di struttura organizzativa per guidare i processi mentali degli studenti. Una caratteristica delle TR è che incoraggiano gli studenti a impegnarsi attivamente su un argomento, ponendo domande, facendo il punto sulle conoscenze pregresse, sondando la certezza delle loro idee e connettendo visibilmente nuove conoscenze a quelle precedenti. Si tratta di protocolli didattici composti da un set di domande e una breve sequenza di fasi che possono essere facilmente applicate a ogni materia ed in diversi contesti educativi. Derivano dalla lunga ricerca condotta ad Harvard finalizzata ad investigare le caratteristiche dell’”higher order thinking” (ossia le abilità di pensiero di livello superiore) e a costruire i presupposti per la realizzazione di una “thinking classroom”. Gli studenti imparano molto dalla cultura della classe intorno a sé che è portatrice

del “curriculum nascosto” delle convenzioni e delle aspettative e per questo va resa A fronte di una loro immediata “leggibilità”, l’esperienza di PZ dimostra ampi risultati in termini di coinvolgimento degli studenti, deep learning, autonomia di pensiero, prospettiva critica e motivazione allo studio. Per ottenere i risultati descritti è fondamentale che i docenti creino opportunità di pensiero in classe (Perkins & Tishman, 2001), tuttavia si tratta fondamentalmente di promuovere un processo interiore che è necessario rendere meno invisibile attraverso opportune domande e l’ascolto attento. Domande chiuse, pensate per testare se gli studenti ricordano cosa è stato insegnato loro, non servono a coinvolgere gli studenti e non li stimolano ad avere proprie idee ma solo a rivedere contenuti. Essi intuiscono che il docente si aspetta un’unica specifica risposta e giocano a indovinarla senza alcuno sforzo di elaborazione. Per contro, le domande autentiche, veramente generative, hanno una positiva influenza sull’engagement dello studente e sul pensiero critico (Boscolo, 2012). Altrettanto importante è la capacità dei docenti di ascoltare a fondo le domande degli studenti poiché esse fanno luce sul loro pensiero e forniscono elementi per rilanciare una domanda che li spinga più avanti nel loro apprendimento. Piuttosto che vedere le TR come pratiche separate, è importante vederle come strutture che originano dalla pratica continua di far domande e di saper ascoltare e che a loro volta amplificano tale pratica.

## **Metodologia della ricerca**

La ricerca si inserisce all’interno di quegli approcci di ricerca chiamati partecipativi in quanto l’indagine coinvolge attivamente diversi attori provenienti dal mondo della scuola (le tre scuole individuate) e della ricerca (ricercatori Indire e Project Zero) e intende valorizzare il processo di costruzione di conoscenza sinergico tra tali attori che si avvale di un dialogo tra teoria e pratica, tra ricerca e azione e tra ricerca ed esperienza (Magnoler, 2012). In particolare si ispira al modello della ricerca collaborativa (Desgagné, 1997; Magnoler, 2012) con attenzione alla valorizzazione del “Teachers’ Thinking” (Tochon, 2000; Damiano, 2006) e dell’analisi delle pratiche vista anche come dispositivo per lo sviluppo professionale (Altet et al., 2006; Altet, 2003; 2009; Damiano, 2006; Falcinelli, 2011; Laneve, 2005; Mortari, 2009). Il modello prevede una costruzione di una relazione con le scuole più che nei termini di “academic-practitioner-relationship”, in quelli di “co-equal-relationship”, dove gli attori della scuola non sono considerati fonti ma partner attivi della ricerca e dove “l’insegnante informa epistemicamente ed eticamente il dato alla pari del ricercatore” (Perla, 2015). Il modello di ricerca prevede una co-costruzione interattiva in tutte le fasi della ricerca: co-situare la ricerca, co-operare e co-produrre il risultato (Magnoler, 2012). In particolare per la prima fase il percorso ha previsto l’elaborazione dell’obiettivo e il suo posizionamento all’interno di un quadro teorico di riferimento, sono state quindi sviluppate le domande di ricerca e il relativo posizionamento all’interno dei due framework MLV e VT. La seconda fase ha previsto l’accordo sulla metodologia e sui dati da raccogliere ed ha consentito agli insegnanti di analizzare meglio e approfondire la tematica oggetto di indagine ed ai ricercatori di raccogliere le informazioni utili alla messa a punto della metodologia. In questa fase si è infatti collegialmente deciso che oltre alla localizzazione dei due framework per la quale l’analisi della documentazione è lo strumento privilegiato, si sarebbero anche analizzate alcune dimensioni del lavoro in classe con gli studenti

tramite osservazioni, focus group con gli studenti, interviste ai docenti per cogliere la ricaduta del percorso su alcune dimensioni legate ai processi di insegnamento-apprendimento. La terza fase, ovvero l'analisi dei dati e l'elaborazione di una sintesi dove si prevedono artefatti pensati sia per il mondo della scuola sia per il mondo della ricerca scientifica, vedrà ricercatori e scuole coinvolti nella stesura di documenti utili alle scuole (ad esempio le Linee guida per l'adozione di una nuova idea per il Movimento AE) e la produzione di articoli e di un volume da condividere con la comunità scientifica. In particolare, nello step iniziale della fase di co-produzione, si sta procedendo con un primo processo di interpretazione e restituzione dell'esperienza realizzata dagli insegnanti che stanno "mettendo in parola la pratica" (Altet, 2003) ovvero le esperienze realizzate con le TR ed i protocolli coerenti con i framework MLV e VT e documentate tramite videoriprese, registrazioni, testi digitali prodotti da insegnanti e studenti e condivisi nei padlet. La pratica è condivisa con il gruppo che, con il supporto dei ricercatori, approfondisce i significati, esplicita i processi, riflette e offre feedback su e per l'analisi della pratica stessa (Schön, 2006). In questa fase particolare importanza assume l'analisi della documentazione prodotta dall'insegnante e discussa in gruppo (Altet, 2009; Falcinelli, 2011) realizzata con il supporto di un protocollo tratto dal lavoro di PZ (Krechevsky et al., 2013; pp.125-126). Il secondo step della fase di co-produzione vedrà i ricercatori coinvolti nella lettura e analisi dei materiali prodotti dai docenti ma anche dalle osservazioni in classe e dai focus group con gli studenti e dalle interviste ai docenti e nella relativa restituzione al gruppo (tramite report ed incontri di discussione) dei passaggi e nodi concettuali principali, in modo da procedere ad una progressiva e negoziata co-costruzione di significati. Il prodotto finale sarà l'esito di un lavoro in cui il gruppo composto da ricercatori e attori della scuola avrà potuto mettere insieme due visioni provenienti da due culture differenti e dovrà rispondere al criterio della "doppia verosimiglianza" ovvero la possibilità di far diventare il risultato della ricerca come accettabile da tutti gli attori coinvolti (Magnoler, 2012; Dubet, 1994).

## **Gli attori del progetto**

I veri protagonisti del progetto di ricerca sono le scuole, i dirigenti scolastici, i docenti, gli studenti, chiamati a scoprire e sperimentare una nuova cultura, un nuovo modo di intendere la scuola, l'apprendimento e l'insegnamento, in collaborazione con il team di ricerca PZ-INDIRE. Si prevedeva il coinvolgimento dell'intera comunità scolastica (dirigente, docenti e studenti) e l'identificazione di un gruppo di lavoro formato da quattro o cinque docenti, tra cui un docente referente, che svolgesse il ruolo di punto di contatto con il team di ricerca, con gli altri colleghi e con il dirigente scolastico e che facilitasse il processo di localizzazione dei due Framework al sistema scolastico e alla cultura scolastica italiani. Il docente che partecipa a questa iniziativa è un docente orientato alla ricerca, che ama mettersi in gioco e che trova nel confronto con altri colleghi, occasioni importanti di crescita professionale e scambio umano. Un docente motivato a migliorare l'offerta formativa della propria scuola per garantire agli studenti opportunità di apprendimento più profonde e significative. Un docente che attribuisce un valore significativo alla pratica della documentazione educativa come elemento costitutivo dello sviluppo professionale e come restituzione (accountability) verso se stesso, gli studenti e la comunità scolastica. Alle scuole veniva inoltre richiesta la disponibilità a ospitare periodici incontri in

presenza con i ricercatori INDIRE e/o PZ, nonché a partecipare a periodici incontri online su una piattaforma dedicata al progetto. Al dirigente scolastico, inoltre, si chiedeva la disponibilità a coordinarsi con i dirigenti delle altre scuole coinvolte nel progetto MLTV, in modo da attivare proficui scambi e sinergie, in previsione della creazione di una nuova idea di Avanguardie Educative. La prospettiva dello scambio e del confronto reciproco all'interno di una comunità di pratiche ispirata al valore del group learning era presente sin dalla fase di progettazione iniziale e rappresenta il filo rosso di tutta l'iniziativa. La comunicazione tra il team di ricerca e le scuole si configura attraverso contatti molto frequenti soprattutto online, nonché attraverso tre meeting face-to-face, anche alla presenza dei ricercatori di PZ. Lo strumento principale per la comunicazione online in sincrono è il webinar, utilizzato sia come strumento di lavoro interno per i ricercatori, sia come mezzo di contatto "cross-schools", finalizzato a creare un ponte tra i ricercatori e le scuole e le scuole tra di loro, in modo da condividere le esperienze, lo stato dell'arte delle varie sperimentazioni, gli eventuali errori o le misconcezioni da valutare e discutere insieme, come momento di arricchimento e di crescita reciproca. Il webinar viene sempre registrato e reso disponibile a tutti gli stakeholder del progetto per una fruizione successiva. Ciò consente non solo la visione da parte degli assenti, ma anche una visione successiva attenta e scrupolosa da parte dei presenti, alla ricerca dei momenti più significativi o delle criticità sulle quali riflettere successivamente. Per quanto riguarda gli strumenti di condivisione e comunicazione asincrona, ai docenti è stata offerta l'opportunità di individuare lo strumento a loro più consono, anche in base alle loro preferenze e alle loro esperienze pregresse, in ottica di Personal Learning Environment (PLE) e Personal Learning Network (Chatti et al., 2010). Lo strumento immediatamente ritenuto da tutti più efficace è il padlet, una webapp multimediale che permette di apporre "post-it" digitali, con contenuti testuali, grafici, audio o video che possono essere inseriti e successivamente commentati da ciascun partecipante. Padlet si presta bene come memoria storica dei momenti più significativi di un percorso formativo, una sorta di portfolio digitale, che possa tenere traccia delle varie fasi, degli aspetti positivi, delle criticità. Il padlet inoltre si è rivelato sin da subito uno strumento molto flessibile e dinamico, in grado di essere utilizzato secondo la nuova concezione di documentazione proposta dal progetto MLTV: non come display dei prodotti, ma come testimonianza dei processi. Ogni scuola ha dunque creato un proprio padlet, talvolta anche più di uno, in quanto i docenti lo utilizzano costantemente come bacheca digitale del loro percorso di sperimentazione, raccogliendo testi, audio, video degli studenti e dei docenti in azione. Questa documentazione è oggetto di feedback continuo e costante da parte dei colleghi e da parte del team di ricerca: il valore del feedback strutturato e guidato sulla base di protocolli ben precisi rappresenta una delle conquiste del progetto MLTV. Gli incontri in presenza dell'intero gruppo di ricerca sono fondamentali ai fini dello sviluppo del progetto: dopo il Kick-off meeting all'inizio dell'anno scolastico, l'incontro intermedio e quello finale costituiscono i tre momenti collegiali, alla presenza delle scuole e dei ricercatori PZ-INDIRE, finalizzati a monitorare le varie fasi del progetto e seguirne direttamente "dal vivo" gli sviluppi. Oltre a questi momenti collegiali, il team di ricerca INDIRE è impegnato in visite mensili presso le singole scuole, volte a osservare le lezioni in classe, ascoltare la voce degli studenti, dei docenti e dei dirigenti, con l'obiettivo di triangolare i dati e comprendere come gli input forniti dal progetto MLTV possano generare una nuova cultura del pensiero e dei processi di insegnamento/apprendimento.

## **Strumenti di indagine e dimensioni di analisi**

Le domande di ricerca che muovono le attività sono articolate come segue: “Quale tipo di pensiero vogliamo rendere visibile per favorire un apprendimento profondo? Quali adattamenti devono essere apportati nelle pratiche di insegnamento e apprendimento per rispondere ai bisogni degli studenti? Cosa cambia (e come) nelle pratiche di insegnamento/apprendimento quando si utilizza la documentazione e la si discute con gli studenti?”. Ciascuna scuola ha poi formulato anche una riflessione personale e specifica rispetto all'individuazione dei bisogni dei propri studenti, in quanto i tre contesti (benché siano tutte scuole secondarie di secondo grado) sono molto diversi tra loro. Il liceo Savoia Benincasa di Ancona ha identificato come prioritario il bisogno di analizzare un contenuto da più punti di vista, sviluppando dunque capacità di ascolto reciproco, assunzione di prospettive altrui, approccio problematizzato ad un contenuto. L'Istituto Malignani di Udine ha invece identificato come bisogno prioritario quello di ingaggiare maggiormente gli studenti, mettendo al centro la problematica della motivazione e delle strategie di autoregolazione (Boscolo, 2012). Infine, l'ISIS Europa di Pomigliano, situato in una zona molto problematica dove il tasso di drop-out è altissimo (la scuola è riuscita a ridurlo notevolmente), ha individuato come priorità quella di educare i ragazzi al pensiero critico e all'analisi del contenuto, in quanto i ragazzi provengono dalla scuola secondaria di primo grado con scarsissime abilità di decodifica del testo e con moltissime misconcezioni (anche basilari). A partire dalle domande generali del progetto, che guardano alla trasferibilità dei Framework in ambito italiano, e da quelle delle scuole, i ricercatori INDIRE hanno chiesto a tutti i docenti di scrivere un piano individuale di ricerca fornendo un preciso schema che riprendeva le premesse generali e chiedeva di declinare a livello personale e disciplinare, se del caso, le domande, fornendo elementi sia di contesto (in quale classe si applica la sperimentazione, su quali contenuti, in quali tempi, ecc.) sia di ricerca (ipotesi, routine e protocollo impiegati, uso della documentazione per fare inferenze, discussione con i colleghi). Questo strumento, denominato Griglia per la descrizione del piano di ricerca individuale, è stato prima rivisto dal team di PZ e poi sottoposto ai docenti per un feedback. La versione 2.0 della Griglia è stata poi distribuita per la raccolta dei piani individuali (da compilare mensilmente). Al fine di identificare le dimensioni da analizzare, i ricercatori INDIRE hanno analizzato tutte le Griglie e hanno individuato alcune dimensioni che i docenti menzionavano come aspetti di possibile cambiamento. Durante il secondo incontro in presenza, avvenuto ad Ancona a gennaio 2018, era prevista una sessione per raggiungere un consenso rispetto alle aree da attenzionare nel corso dei mesi successivi. Si è partiti da una attività di scrittura individuale, in risposta ad una serie di domande stimolo per comprendere cosa è cambiato dall'inizio del progetto in termini di rappresentazioni legate all'apprendimento degli studenti e di loro stessi ed in termini di pratiche di insegnamento/apprendimento. Sulla base delle risposte date, i partecipanti sono stati divisi in piccoli gruppi per continuare un lavoro più profondo di analisi. Le dimensioni identificate nel microgruppo sono state votate per arrivare ad una rosa di tre dimensioni (veniva utilizzato lo strumento della Nominal Group Technique, Bezzi, 2014). Le tre dimensioni votate sono poi state ricondivise in plenaria e sottoposte ad un ulteriore passaggio di ri-analisi (Round Robin Discussion). Il processo prevedeva anche l'utilizzo delle dimensioni individuate dai ricercatori nella fase pre-protocollo in modo che la prospettiva di

tutti i componenti fosse tenuta presente anche se la persona non era fisicamente partecipe nel microgruppo. Questa fase di identificazione condivisa delle dimensioni del cambiamento e delle aree di impatto, in relazione all'utilizzo dei Framework MLTV, ha successivamente consentito al gruppo di ricercatori INDIRE di mettere a punto il protocollo delle visite di osservazione che vengono effettuate una volta al mese nella tre scuole. Il protocollo di visita si compone dei seguenti momenti:

1. Discussione guidata con utilizzo di un protocollo MLV (Krechevsky et al., 2013) specifico per l'analisi della documentazione di uno dei docenti (a turno).
2. Debriefing rispetto allo stato dell'arte.
3. Osservazione in classe a cura dei ricercatori.
4. Intervista semi-strutturata al Dirigente scolastico e al Docente referente.
5. Focus group con gli studenti (solo nella fase conclusiva).

## **Conclusioni e prospettive di sviluppo**

In questa fase della ricerca non è possibile fare un bilancio chiaro degli esiti della sperimentazione anche se, dalle discussioni con i docenti e i Dirigenti scolastici, dalle osservazioni effettuate e dall'analisi della documentazione, ci pare di poter rintracciare elementi positivi di crescita nella cultura scolastica e spunti importanti per lo sviluppo professionale. Una prima riflessione che proviene da tutte e tre le scuole è che questo approccio all'esplicitazione dei processi di pensiero e di apprendimento sia in linea con l'impostazione italiana della didattica per competenze (Guasti, 2012) e con la visione del Movimento di Avanguardie Educative che, nel suo Manifesto, guarda ad alcuni macro-obiettivi, in particolare per gli Orizzonti 1 (Trasformare il modello trasmissivo della scuola), 3 (creare nuovi spazi per l'apprendimento) e 6 (investire sul "capitale umano" ripensando i rapporti). I concetti del group learning (apprendimento di gruppo), della documentazione intesa come strumento per approfondire la comprensione dell'apprendere nostro e altrui, e l'uso di protocolli specifici per stimolare ed educare forme di pensiero e ragionamento profondo, centrali nei framework MLTV, sono assolutamente legati agli orizzonti strategici di Avanguardie, cui si faceva riferimento. Una prima conferma, dunque, rispetto all'operazione culturale che il progetto intende promuovere. La classe come "Cultures of thinking", come ambiente dove forte è l'accento sulla persona, sulla valorizzazione del suo apporto nella costruzione dei saperi e sul sostegno al processo di formazione e di pensiero, più che alla trattazione di tutti i contenuti curricolari, è sicuramente in linea con le proposte del Movimento. Un'altra osservazione, ancora emergente e superficiale, riguarda le implicazioni a livello di pratiche di insegnamento e di costruzione della comunità professionale, che grazie alla proposta MLTV si riappropria della ricerca educativa, della discussione e del confronto collegiale sui processi di apprendimento e del ruolo di docente-ricercatore (Alexakos, 2015) e di professionista riflessivo (Schön, 2006). Tuttavia, data la fase iniziale dei lavori, sarebbe prematuro esprimersi qui sui benefici rilevati sullo studente; riportiamo solo una generalizzata percezione, condivisa dai partecipanti alla ricerca, che le dinamiche favorite dalla sperimentazione siano di supporto alla creazione di un clima di classe sereno, accogliente, sicuro, fondamentale e correlato al successo

formativo (citare autori). Sarà necessario attendere la fine dell'anno scolastico per poter fare un primo, timido, bilancio.

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## TEACHERS' DIGITAL CULTURE: THE HORIZON OF ITALIAN PARTICIPANTS IN A TFA COURSE

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### Abstract

This paper focuses on the way Italian participants in a TFA course about Special Educational Needs shape their digital culture. The research was inspired to the Finnish Opeka project and was realized in November 2017 at the University of Foggia (IT). A 55 Likert-items questionnaire was administered by google module and several analyses were run through SPSS. Namely, a Principal Component Analysis was run by looking for four components structuring the participants' digital culture, according to literature. Then, the factors reliability and their correlation were calculated. Third, the differences among the four groups of participants composing the sample (Kindergarten, Primary school, Middle school, Secondary school) were analysed through MANOVA. Results show that the four factors differ from those proposed by literature, since they are shaped by a focus on rules and the support of the school community. All the factors have a high level of reliability and are correlated with one another, by characterizing a digital culture functioning as a system of reciprocally influencing components. Then, there are differences among groups especially on two factors, since participants get higher scores as the school levels go from the kindergarten to the secondary school.

### Theoretical approach

European policies about education move toward the integration of Information and Communication Technology (ICT) in several life contexts. This approach is the result of the hard path that the knowledge society is doing (Messina & De Rossi, 2015) to integrate educational models in the contemporary society. That is, an enlargement of the educational contexts is needed, by integrating both formal and traditional educational institutions with no formal and informal ones. In such a panorama, the Bronfenbrenner's approach (1979) has a paramount importance. The ecological idea of macro, meso and microlevels characterizing the contexts where people live and develop should be taken into account, indeed, to understand the changes of boundaries, practices, relations, use of tools in learning contexts. This understanding can, in turn, support the further and integrate change of these components. In this process of change and positioning of contexts, the role of the teacher must be rethought and new teaching skills have to be developed. At the same time, indeed, they have to restructure and manage new relations among the educational contexts (such as school, family, informal learning environments, etc.) pupils handle with and have to teach the skills required by the contemporary world (e.g. digital skills, key competences, specific abilities, etc.). In this ongoing

movement from tradition to innovation, there is, therefore, a re-definition of the students' identity, the teacher-student relationship, the learning activities, the tools mediating learning, etc. Many research questions can arise from the observation of these processes; however, in this proposal we ask how teachers' digital culture is composed and look at the possible dimensions composing it. Viteli, Sairanen, and Vuorinen (2013), elaborated a four-factors schema to describe how both teachers' and schools' digital culture is shaped. More specifically, authors suggest that the following four dimensions characterize such a culture: (a) Leadership and Management; (b) Resources and Access to resources; (c) Confidence and Competence; (d) Motivation and Time. "Leadership and Management" dimension refers to the way teachers arrange the digital tools for teaching, their perception of the cooperative relations with colleagues and technical experts, the pedagogical support they think to receive by expert colleagues. The factor "Resources and access to resources" involves the idea of having insufficient resources, technical problems and technical support at school. The factor "Confidence and competence" refers to the skill and experience teachers have about the use of digital devices in the teaching activities. Instead "Time and Motivation" factor mainly involves the motivational dimension which supports the teachers' use of ICT in education.

## **Aims**

The aims of this paper are:

- To analyse which factors are associated with the digital culture at school in Italian participants in a TFA course for burgeoning teachers of students with special educational needs;
- To analyse if and how those factors differentiate in relation to participants' level of schools they already teach or are specializing for (Kindergarten, Primary school, Middle school and Secondary school).

## **Context and participants**

This research was inspired by Opeka (Viteli, Sairanen, & Vuorinen, 2013), which is a Finnish project lead by the University of Tampere (FI). It was aimed at grasping the digital culture of schools by answering a self-report questionnaire exploring the dimensions shaping the teachers' perception of ICT at school. During Opeka project (since 2004 and still ongoing), more than 3000 Finnish teachers were involved. Through several statistical analysis, it emerged that four different factors shape the teachers' digital culture, which are "Leadership and Management", "Resources and access to resources", "Confidence and Competence", and "Time and Motivation" (already described in paragraph "Theoretical framework"). In October 2017, the administration of the questionnaire was repeated in Apulia, a Southern Italy region. 149 teachers participating in a TFA (Tirocinio Formativo Attivo, Active Formative Training) course were involved. In Italy, TFA is one of the learning paths teachers can attend to get the license as teachers. Namely, if you want to teach in the kindergarten or in the primary school, you need to take a five-years master degree in Education. If you want to teach in the middle or in the secondary school, you need to take a master degree on a specific topic (e.g. Math, Literature, Biology, and so on) plus the TFA specialization. However, if you want to teach student with

special educational needs, you need to attend a TFA course devoted to this issue whatever level of school you are going to work in (even if you want to teach in the kindergarten or the primary school). Therefore, since we involved participants in a TFA about special educational needs, the sample is composed by four groups of teachers. Graph 1 shows the percentage distribution of the groups in the sample.

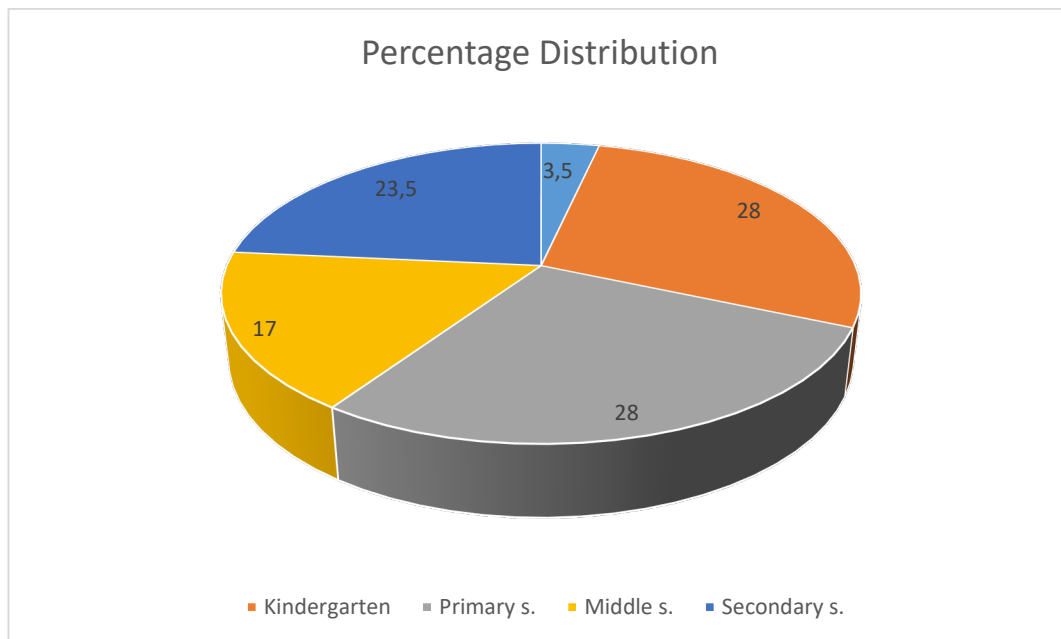


Figure 1. Percentage distribution of teachers in the four groups (Kindergarten, primary school, middle school and secondary school)

### Data collection

The original Finnish questionnaire was translated to Italian by two researchers who first made a literal translation. Then, a broader team of researchers (composed by four experts) checked the translation and rearranged the questionnaire by taking into account the Italian cultural aspects about the digital thinking of teachers and the idiomatic expressions in the items. During a third step, 10 teachers were involved to complete the questionnaire and indicate eventual unintelligible aspects. As a further step of the questionnaire's preparation, the team arranged the final questions according to the teachers' suggestions. The definitive tool was a 60-items self-report questionnaire (5 demographic questions and 55 questions about the perception teachers have about the use of ICT in education). Each of the 55 items was structured as a five-points Likert scale (0=completely disagree, 5=completely agree) and the questionnaire was administered during the first week of the course by an online google module.

### Data analysis methods

After collecting data, we used the following methods of analysis:

- Explorative factorial analysis through Principal Components Analysis (PCA);
- The calculation of the reliability of the factors emerged through the factorial analysis;
- The calculation of the correlation of the factors emerged through the factorial analysis;

- The creation of four sum variables corresponding to the reliable factors;
- The MANOVA test to detect differences among the four teachers' groups on the four factors.

All of the analysis was made through SPSS software.

## Results

PCA was conducted on the 55 items with orthogonal rotation varimax. According to literature, PCA was run by looking for four factors. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis,  $KMO=.813$  ("great" according to Field, 2009) and all KMO values for individual items were above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity  $\chi^2(1653) = 5,927$ ,  $p < .001$  showed that all the correlations between items were sufficiently large for PCA. By analysing the items composing each factor, we defined the components as follows. Component 1 represents the "Use of ICT and teaching", since it implies items exploring the reasons why teachers could use digital tools during their job week or their students should use them (e.g., to build collaborative knowledge, for interdisciplinary learning activities, to interpret information, and so on). Component 2 represents "Innovative teaching and evaluation", which implies items grasping if and how teachers can use new technology for innovative learning and assessment activities (e.g. I use e-portfolios to evaluate students, I use learning analytics to assess the students' activities, I use virtual reality activities, and so on). Component 3 represents "Rules and digital skills", which involves those items analysing how teachers perceive the rules related to the use of technology (e.g., When I use a new digital tool I always read the terms of use and conditions, I guide students to protect themselves from the common risks related to the use of new technology, I know how to use digital materials for teaching, etc.). Component 4 represents "Educational community", which implies items exploring the technical support in the use of digital tools by colleagues and specialists (e.g. I receive technical support for the digital tools at school). Furthermore, it is saturated by items analysing the relational dimension of the school community and the eventual support it gives to the teachers (e.g. We share suggestions and support each other about the use of new technology for education).

After running the PCA, we checked the correlation among the four factors through Persons'  $r$ . Results show that Component 1 has a significant positive relationship with Component 2,  $r=.61$ ,  $p$  (one-tailed)  $< .01$ ; Component 3,  $r=.72$ ,  $p$  (one-tailed)  $< .01$ ; Component 4,  $r=.31$ ,  $p$  (one-tailed)  $< .01$ . Component 3 has a positive significant relationship with Component 2,  $r=.74$ ,  $p$  (one-tailed)  $< .01$  and Component 4,  $r=.36$ ,  $p$  (one-tailed)  $< .01$ . Component 4 has a positive significant relationship with Component 2,  $r=.36$ ,  $p$  (one-tailed)  $< .01$  as well.

We also run MANOVA test to detect differences among the four Italian school levels (Kindergarten, Primary school, Middle school and Secondary school). It emerged that there is a significant difference between teachers belonging to the several levels of school when considered jointly on the Component 1 "Use of ICT and teaching" and the Component 2 "Innovative teaching and evaluation", Wilk's  $\Lambda=.673$ ,  $F(16, 431)=3.7$ ,  $p=.000$ , partial  $\eta=.997$ . A separate ANOVA was conducted for each dependent variable, with each ANOVA evaluated at

an alpha level of .025. There was a significant difference among the teachers' groups on Factor 1,  $F(4, 144)=11.85$ ,  $p=.000$ , partial  $\eta^2=.248$  with secondary school ( $M=52.08$ ) scoring higher than middle school ( $M=46.92$ ), primary school ( $M=42.71$ ) and kindergarten ( $M=35.42$ ). There was a significant difference among the teachers' groups on Factor 2,  $F(4,144)=3.299$ ,  $p=.013$ , partial  $\eta^2=.084$  with secondary school teachers ( $M=48.229$ ) scoring higher than middle school ( $M=40.28$ ), primary school ( $39.286$ ) and kindergarten ( $M=38.048$ ). For Component 3 "Rules and digital skills" the assumption of Levene's test  $>.05$  was not met. For Component 4 "Educational Community"  $p>.025$ .

## Conclusions

Several conclusions arise from this research. The first point is about the kind of components shaping the Italian teachers' digital culture. We find of interest the eventual difference of the factors when compared with the dimensions composing the Finnish digital culture. Indeed, it seems that the Italian ones are more rules-related (in terms of technical indications to be followed when using a new digital device and the rules to preserve students by eventual risks). Furthermore, the community of the school teachers refer to seems to be more stressed in the Italian factors. This is understood as the ensemble of both relational aspects of the community (e.g. the supporting relations among colleagues, the sharing of tools and so on) and technical support by the community itself. The last but not the least, "Leadership and Management" and "Time and Motivation" aspects appear less highlighted in the Italian sample. This interpretation of the overall results emerged through PCA can suggest that the Italian participants are less confident with the use of technology at school, since they need to look for the technical rules and the colleagues' or experts' support. At the same time, however, they perceive the community as a resource for handling with digital teaching tools and activities.

Of course, a strong comparison between the Finnish and the Italian participants cannot be realized, since the two samples are not standardized and the questionnaire is not yet validated. Furthermore, our interpretation of the results can be biased by the knowledge of the local context. However, we do think that the teachers' digital culture belonging to both contexts is very much culturally mediated. In fact, it is connected to both individual (each teacher) and school (the single school eventually the teacher works at) microlevel. In integration to this, it is related to the mesolevel of the system of schools from the Southern Italy area (or the Finnish one) where the research was realized. In turn, it is connected to the macrolevel of the policies, values, meanings a single country or the Europe have about digital processes at school.

We do claim that these aspects are in some ways suggested by the results and that can be furtherly explored through future studies.

The second point we find interesting is the correlation among all the factors, which means that the digital culture of teachers can be understood as a system of integrated and reciprocally influencing components. The third and final point we want to highlight is about the differences that we found among groups, significant for Component 1 (Use of ICT and teaching) and Component 2 (Innovative teaching and evaluation). On each of these factors, higher school's

teachers have scoring higher than the middle school's one. These last have higher scoring than the teachers from the primary school and these last have higher scores than the teachers belonging to the kindergarten group. It seems, therefore, that the teachers' scores on these two dimensions get higher and higher as you go ahead with the school levels (indeed, the teachers from the kindergarten have the lowest scores at all). This result can be culturally mediated as well, since in the lower levels of school, in Italy, teachers are supposed to use more and more the digital devices for teaching since the creation of relatively recent polices. The middle and the secondary schools' educational system, instead, is required to use them since longer.

At the end, we can say that these results can be understood just with a micro-meso-macro view and that, in turn, can give a stronger understanding of the way the entire educational system is nowadays changing.

Further analysis can be realized to in depth grasp the phenomena. However, we think that this research can already suggest some implications in terms of arrangement of the TFA course analysed. For example, participants can be supported in metacognition processes to gain awareness about the meaning they build on the several digital culture dimensions, the way they position themselves in respect to the components, the feelings they have about the group they belong to, and so on. Furthermore, learning activities mixing the groups of participants (kindergarten, primary, middle and secondary) can be realized in order to stimulate a migration of competencies across groups and to realize vertical digital mediated learning activities for students.

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## **PROMUOVERE L'INNOVAZIONE DIDATTICA E LO SVILUPPO PROFESSIONALE DELLA DOCENZA UNIVERSITARIA: PRIMI RISULTATI DELLO SPORTELLLO E-LEARNING DELL'UNIVERSITÀ' DI FIRENZE**

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### **Abstract**

Il contributo presenta i risultati di un servizio sperimentale attivato dall'Università di Firenze nell'a.a. 2016/2017 per supportare i docenti nella sperimentazione di approcci e-learning. Il servizio, denominato Sportello e-Learning (Se-L), rientrava nel più ampio progetto di sviluppo professionale DIDel (Didattica in e-learning), ed era basato su una metodologia di coaching individualizzato offerto ai docenti da parte di un instructional designer: attraverso la condivisione delle problematiche emergenti nella didattica, i docenti arrivavano a progettare possibili soluzioni, anche attraverso l'uso della piattaforma Moodle di ateneo. L'efficacia di questa prima fase di sperimentazione di Se-L è stata monitorata a medio e lungo termine, analizzando l'effettiva implementazione delle ipotesi progettuali negoziate e realizzando interviste in profondità ai docenti coinvolti per valutare le ricadute sulle loro visioni e pratiche didattiche. I dati quanti-qualitativi raccolti permettono di valutare positivamente la tecnica del coaching progettuale, e documentano anche alcuni cambiamenti nelle pratiche didattiche, anche se ci sono ancora alcuni ostacoli da superare nel contesto universitario per pervenire a una più duratura innovazione.

### **Introduzione**

Negli ultimi anni, si è diffusa sia nella comunità accademica che in quella istituzionale una attenzione crescente per l'innovazione del sistema universitario, che ha messo a fuoco anche la questione del rinnovamento della didattica, funzionale al miglioramento della qualità dell'insegnamento e delle performance degli studenti. Basterà qui ricordare, ad esempio, le raccomandazioni prodotte dall'OECD (Hénard & Roseveare, 2012) o dal High-Level Group on the Modernization of Higher Education (McAleese et al., 2013), che hanno sottolineato la necessità di iniziative sia di policy che di sviluppo professionale da parte delle istituzioni accademiche. In particolare, la conferenza dei Ministri europei tenutasi a Yerevan (EHEA, 2015) ha sottolineato come, nel quadro del rinnovamento delle pratiche di insegnamento, un

ruolo fondamentale possa essere rivestito anche dall'uso delle tecnologie dell'informazione e della comunicazione (ICT): per procedere in tale direzione, diventa quindi necessario immaginare percorsi di formazione rivolti al personale docente e finalizzati all'acquisizione di competenze nell'ambito delle tecnologie educative.

La letteratura esistente sullo sviluppo professionale in ambito accademico, tuttavia, ha finora messo in luce una limitata efficacia delle iniziative messe in campo, dovuta in particolare al tipo di metodologia adottata: si tende infatti ad adottare un formato di breve durata, basato sul laboratorio, anche se questo risulta meno efficace (Stes et al., 2010). Come noto, invece, il cambiamento delle pratiche di insegnamento richiede una evoluzione sia sul piano delle proprie convinzioni che su quello delle abitudini: il docente necessita di essere coinvolto per un periodo di tempo maggiore in modo da poter assumere “an active role in the development process through implementing strategies, observing other instructors, and receiving feedback” (Czajka & David McConnell, 2016; p.2). E ciò è ancora più evidente quando si intende ripensare le pratiche didattiche anche alla luce dell'introduzione di tecnologie educative: come sottolineato da Meyer (2014), è opportuno supportare lo sviluppo professionale per l'insegnamento online con approcci integrati e innovativi.

In questo contesto, nel 2016 l'Università di Firenze ha dato vita a un progetto finalizzato allo sviluppo professionale del personale accademico sui metodi e le tecnologie dell'e-learning come supporto della didattica tradizionale (Ranieri et al., 2017). Il progetto DIDE-L (“Didattica in e-learning”) si basa su un modello concettuale articolato su più livelli (individuale e community-oriented) e combina diversi approcci metodologici (i.e., studio in autoapprendimento, coaching tecnico e metodologico, PBL, comunità di apprendimento) e strumenti didattici (i.e., ambiente online e tutoriali, casi di studio, laboratori tecnici e sportello e-learning) (Catelani et al., 2017; Ranieri et al., 2018a; 2018b). Questo contributo si focalizza in particolare sul servizio di Sportello e-Learning (Se-L), che offre ai docenti un supporto individualizzato alla progettazione didattica dei propri insegnamenti all'interno della piattaforma Moodle-SIAF (Sistema Informatico dell'Ateneo Fiorentino) di Ateneo.

Il presente contributo descrive la sperimentazione del servizio Se-L, realizzata tra settembre 2016 e febbraio 2017, presentando i primi risultati in termini di impatto sulle pratiche didattiche e sulle capacità di progettazione della didattica online da parte dei docenti coinvolti. Dopo una sintetica descrizione della letteratura di riferimento, vengono illustrati il contesto, la metodologia e i partecipanti al servizio. Infine, vengono introdotti e discussi i primi risultati del monitoraggio sull'efficacia del servizio, nell'ottica di formulare alcune raccomandazioni per la ricerca futura nel settore.

## **Stato dell'arte**

I programmi di sviluppo professionale mirano a favorire l'innovazione didattica e a facilitare i docenti universitari nel superare gli ostacoli alla trasformazione delle pratiche didattiche. Diverse teorie del cambiamento sono state elaborate per evidenziare le complesse relazioni esistenti tra i diversi fattori che contribuiscono al cambiamento didattico e alla crescita



professionale. Alcune teorie sottolineano l'importanza di favorire il cambiamento delle credenze dei docenti, che a sua volta conduce a cambiamenti nella pratica e al raggiungimento dei risultati auspicati da parte degli studenti (Fullan, 1982). Guskey (1986) ha elaborato una spiegazione alternativa secondo cui il cambiamento delle credenze dei docenti dipende dagli esiti positivi degli studenti, che a loro volta dipendono dalle pratiche riformate. Anche se diverse, queste visioni condividono l'idea secondo cui la relazione tra credenze, pratiche e risultati degli studenti segua un percorso lineare.

L'ipotesi del cambiamento lineare è stata messa in discussione perché la relazione tra le variabili in gioco è più complessa (Clarke & Hollingsworth, 2002). In particolare, secondo Clarke e Hollingsworth (2002) che hanno sviluppato l'Interconnected Model of Teacher Professional Growth (IMTPG), il cambiamento dei docenti dipende dalle interazioni tra quattro diversi ambiti: (a) il dominio personale, che include le conoscenze, le credenze e gli atteggiamenti dei docenti, (b) il dominio esterno, che include fonti esterne di informazione o motivazione, (c) il dominio della pratica, che coinvolge la sperimentazione professionale e (d) il dominio della conseguenza, che comporta risultati importanti relativi all'attività in classe. In questo modello, i percorsi per il cambiamento si sviluppano attraverso processi di *enactment* e riflessione, che possono risultare in una "sequenza di cambiamento" o in una "rete di crescita": il primo è un cambiamento in un dominio che viene "tradotto" in un cambiamento in un altro dominio, ad esempio un insegnante che apprende un nuovo metodo didattico (dominio esterno) e lo implementa nella sua attività professionale (dominio della pratica); il secondo è un cambiamento più complesso in più di un dominio, che implica cambiamenti permanenti sia nella pratica che nelle credenze di insegnamento (Clarke & Hollingsworth, 2002). Il coaching viene proposto in questo contributo come strategia per facilitare il coinvolgimento dei docenti nei processi di innovazione attraverso l'enactment e la riflessione.

In generale, il coaching è definito come un processo uno-ad-uno volto a supportare il miglioramento e la crescita del coachee attraverso feedback mirati e incoraggiamento (Pousa & Mathieu, 2010; p.34). Al di là di questa ampia definizione, ci sono diversi modelli di coaching (Stefaniak, 2017). Nella loro revisione sistematica, Carey et al. (2011) documentano come i modelli di coaching più efficaci facciano leva sulla relazione tra coach e coachee, sulla risoluzione dei problemi, sulla definizione degli obiettivi e sulla consapevolezza situazionale. Nel modello di Giglio et al. (1998), il focus cade sulla definizione degli obiettivi e il coaching si sviluppa lungo tre step: (a) favorire l'impegno e la trasformazione personale attraverso lo scambio di informazioni tra coach e coachee e la definizione di chiari obiettivi, (b) supportare il coachee nell'identificazione del problema attraverso la raccolta di dati appropriati e anche sul piano emotivo attraverso la condivisione dell'esperienza dello stesso coach e (c) preparare un piano d'azione da monitorare nel tempo e fornire un feedback al coachee. In letteratura si trovano riferimenti anche al *peer coaching* nei termini di un approccio efficace allo sviluppo professionale della docenza universitaria (Czajka & McConnell, 2016). In questo caso gli elementi chiave sono: identificazione degli obiettivi di apprendimento individuali (ad esempio

migliorare le capacità di progettazione dell'apprendimento), osservazione dell'insegnamento da parte dei colleghi, feedback, analisi e supporto.

In questo studio abbiamo adottato un approccio al coaching di carattere situato per favorire la trasformazione delle pratiche di insegnamento attraverso un processo di revisione della progettazione didattica, trasferendo progressivamente la responsabilità progettuale dal coach al docente. In particolare, abbiamo posto l'enfasi sui seguenti elementi: la costruzione di una relazione tra coach e coachee, un focus sulla progettazione intesa come processo ciclico di problem-posing/problem-solving e il monitoraggio del processo complessivo per fornire feedback e valutare l'impatto.

## **Contesto e metodologia**

Il Progetto DIDE-L nasce nel 2016 all'interno dell'Università di Firenze dalla collaborazione tra SIAF e il Dipartimento di Scienze della Formazione e Psicologia, con l'intento di promuovere il miglioramento della qualità della didattica tradizionale attraverso forme di apprendimento supportate dalle tecnologie, e in particolare attraverso l'utilizzo della piattaforma Moodle di Ateneo come ambiente di apprendimento online. Come anticipato, il progetto DIDE-L si basa su un approccio a più livelli, in cui sono integrati diversi strumenti e metodologie: in questo contributo esploreremo in particolare lo sportello di progettazione e-learning (Se-L), che si configura come un'iniziativa di coaching individualizzato rivolta ai docenti.

Diversamente da quanto avviene tradizionalmente nelle iniziative di formazione sulle tecnologie educative, in cui prima ci si accosta alle tecnologie per poi sperimentarne concretamente l'utilizzo, il servizio Se-L propone di contestualizzare da subito l'impiego delle tecnologie nei contenuti disciplinari e nelle pratiche didattiche, accompagnando la sperimentazione con un processo costante di riflessione supportato dal confronto con un coach esperto (Clarke & Hollingsworth, 2002). Coerentemente con i principi del design-thinking (Burdick & Willis, 2011), il servizio di coaching individualizzato si articola nei seguenti momenti: creazione di una relazione di fiducia e condivisione delle motivazioni del docente, analisi delle problematiche didattiche, co-progettazione di possibili soluzioni attraverso l'uso delle tecnologie, monitoraggio a breve e lungo termine.

Per poter raccogliere dati significativi sull'efficacia del servizio, è stato adottato un metodo misto quanti-qualitativo, volto a comprendere il processo di apprendimento e cambiamento e i suoi effetti. I momenti di raccolta dei dati sono stati due: nella prima fase, durante lo svolgimento degli incontri dello sportello, sono stati acquisiti dati quantitativi attraverso un form strutturato che veniva compilato dall'esperto; in un secondo momento, invece, è stato effettuato un monitoraggio dell'implementazione della soluzione tecnologica progettata, che è stata oggetto di una intervista in profondità con il docente. I dati quantitativi sono stati analizzati applicando semplici statistiche descrittive, mentre il corpus delle interviste è stata analizzato applicando l'analisi tematica.

Il servizio Se-L è stato realizzato in via sperimentale nell'anno accademico 2016/2017 presso la Scuola di Studi Umanistici e della Formazione nell'ottica di migliorare la qualità dell'insegnamento con le tecnologie: tutti i docenti afferenti alla struttura (N=427) hanno ricevuto un invito a partecipare all'iniziativa, e 24 sono quelli che hanno volontariamente deciso di aderirvi. La maggior parte dei partecipanti apparteneva all'area degli Studi Linguistici e Letteratura (9), Pedagogia (6) e Antropologia Culturale (4), mentre il resto dei partecipanti si distribuiva tra gli ambiti di Filosofia (2), Storia (1) e Design (2). Pur trovandoci davanti a un campione auto-selezionato – vista la natura volontaria dell'adesione al servizio – è opportuno sottolineare che questa distribuzione riflette, anche se non statisticamente, la composizione del personale della Scuola. Le interviste di follow-up sono state invece realizzate tra dicembre 2017 e gennaio 2018: anche in questo caso, un invito è stato rivolto a tutti i docenti che a quel momento avevano implementato in tutto o in parte quanto co-progettato con l'esperto. Tre docenti hanno accettato di realizzare l'intervista: uno dell'ambito Lingua e Letteratura (T1), uno di Storia (T2), uno di Pedagogia (T3).

## **Risultati**

In questa sezione presenteremo i risultati sul primo periodo di sperimentazione del servizio di coaching, a partire dalla descrizione del profilo dei partecipanti, delle motivazioni e delle problematiche emerse durante il colloquio, nonché delle tipologie di e-learning adottate nella progettazione. Verranno poi presentati i dati riguardanti l'effettiva implementazione in piattaforma Moodle, e l'eventuale rispondenza o meno con l'ipotesi iniziale. Le interviste hanno poi permesso di approfondire il punto di vista dei docenti rispetto alle innovazioni didattiche sperimentate e alla loro possibile applicazione in futuro.

Guardando ai partecipanti, è interessante notare che ci sono state adesioni sia da parte del personale strutturato, come docenti di ruolo (7) e ricercatori (2), sia da parte del personale aggiunto dedicato alla didattica, quali collaboratori linguistici, esperti a contratto ecc. (11). Durante il colloquio, è stato inoltre valutato il livello di abilità tecnologiche: 16 partecipanti sono stati classificati come livello base, 6 di livello intermedio e 2 avanzato. Per quanto riguarda le motivazioni, è emersa una ampia casistica, riconducibile da un lato al desiderio di acquisire competenze tecnologiche (13) e, dall'altro, da un interesse per innovare la didattica attraverso l'e-learning. Rispetto alle problematiche e alle sfide didattiche affrontate negli insegnamenti per i quali si chiedeva il supporto allo sportello, i docenti hanno sottolineato alcune questioni al centro del cambiamento del mondo accademico, quali la crescente numerosità degli studenti (20) e la relativa logistica (10), nonché le modalità con cui poter rendere accessibili i materiali di studio (22) o poter fornire un feedback agli studenti sui risultati di apprendimento (10). La visione prevalente nei docenti partecipanti allo sportello era quella di ricorrere all'e-learning per gestire funzioni trasmissive e organizzative, e semplificare i processi di monitoraggio: solo i professori più avanzati sul piano tecnologico-didattico erano orientati verso approcci attivanti e collaborativi (8). Non sorprende quindi che nella co-progettazione del corso sia prevalso un approccio tradizionale di tipo *content&support* (12), mentre solo un docente abbia adottato un approccio collaborativo.

Nella fase di monitoraggio a medio termine, è stato innanzitutto osservato il livello di implementazione del corso nella piattaforma Moodle: è stato così possibile determinare che la maggior parte dei docenti aveva sviluppato totalmente (12) o parzialmente (4) la proposta iniziale, mentre negli altri 7 casi la classe virtuale era stata creata per fare delle prove, ma non era poi stata utilizzata effettivamente nella didattica. Risulta interessante incrociare il livello di aderenza tra progetto didattico e implementazione sia rispetto al livello di abilità tecnologiche (Figura 1) sia rispetto alla tipologia di e-learning scelta (Figura 2).

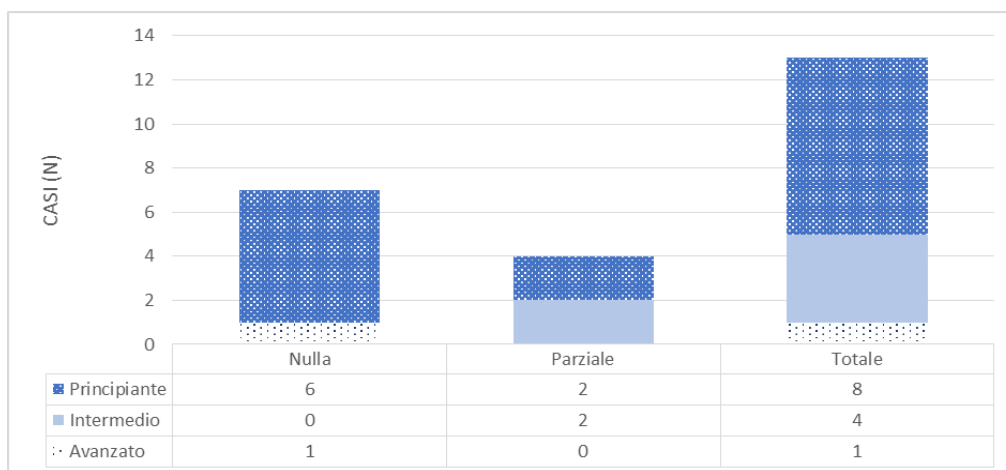


Figura 1. Livello di aderenza tra le ipotesi progettuali negoziate e le abilità tecnologico-didattiche possedute

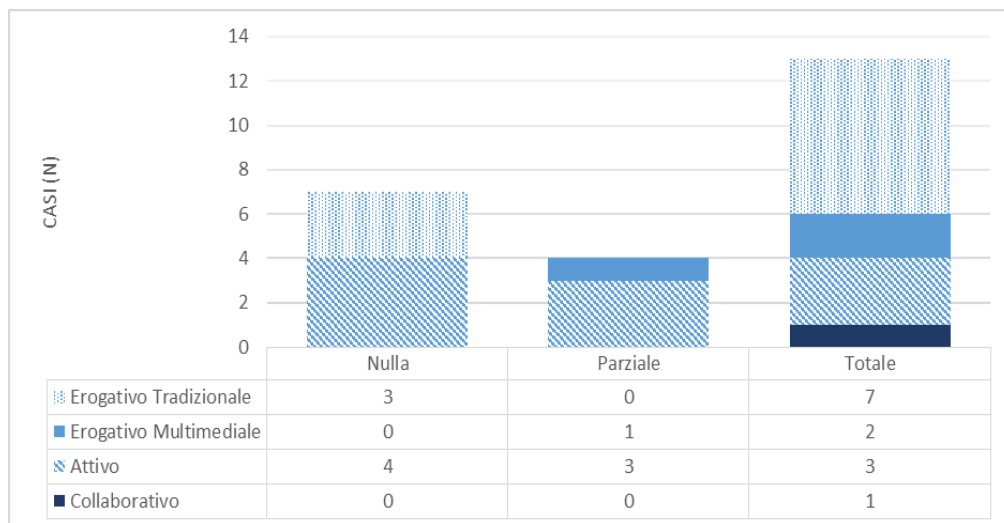


Figura 2. Livello di aderenza tra le ipotesi progettuali negoziate e l'implementazione a medio termine

Si può osservare che l'aderenza maggiore tra progetto e implementazione si è verificata per i casi di e-learning erogativo, ovvero per la tipologia di e-learning meno spinta sul piano didattico, in quanto riproduce la logica più trasmissiva e centrata sul docente. Tuttavia, se analizziamo l'aderenza tra progettazione e implementazione in combinazione con le abilità tecnologico-didattiche iniziali, osserviamo che una buona parte dei docenti con basse competenze tecnologico-didattiche si è adoperata per sperimentare soluzioni innovative,

ovvero 10 casi su 16 (implementazione parziale o totale). I docenti con livello di competenza “medio” hanno sempre implementato le soluzioni previste (2/6 parzialmente, 4/6 totalmente). I dati sembrano quindi suggerire un cauto approccio all'innovazione, che si manifesta anche con la realizzazione di piccoli passi verso un cambiamento più generale delle proprie pratiche didattiche.

L'effettuazione delle interviste in profondità è andata proprio nella direzione di monitorare l'impatto a lungo termine dell'azione di sviluppo professionale attraverso la progettazione, andando ad approfondire il punto di vista dei docenti e l'eventuale presenza di ostacoli all'innovazione. Pur avendo sperimentato diverse tipologie di e-learning, tutti e tre i docenti intervistati convergono su una comune riflessione circa il modo in cui hanno ripensato i materiali didattici per la didattica online. I cambiamenti sembrano interessare vari aspetti: si va da una diversificazione dei formati nell'ottica di una valorizzazione della multimedialità a una vera e propria progettazione dei materiali per supportare lo studio autonomo. Ad esempio, T1 commenta dicendo: “Ho arricchito i materiali e li ho resi più complessi rispetto agli anni precedenti: non ho fornito solo immagini, ma anche un sommario delle lezioni, con l'indicazione dei principali argomenti, e altri materiali”. Il docente sottolinea che, avendo a disposizione la piattaforma, non si è più limitato a mettere a disposizione i materiali mostrati durante la lezione, ma ha fornito indicazioni per lo studio e strumenti di scaffolding, che diventano fondamentali nei casi di apprendimento autoregolato (Persico & Steffens, 2017). I docenti hanno sottolineato che la produzione di questi materiali richiede un certo impegno in termini di tempo ed energie, reso tuttavia sostenibile nell'ottica di poter riutilizzare tali materiali: il docente T2 ha infatti riportato di aver adottato alcuni dei materiali delle lezioni online anche nel corso in presenza dell'anno successivo, poiché aveva riscontrato ricadute positive sui livelli di apprendimento degli studenti.

Sempre rispetto all'impatto sull'apprendimento, i docenti hanno sperimentato la possibilità di somministrare delle prove intermedie attraverso la piattaforma: i docenti T1 e T2 hanno richiesto la consegna di un compito scritto, mentre T3 ha utilizzato un quiz di autovalutazione online. In entrambi i casi, i docenti hanno riflettuto sul fatto che queste prove sono state utili per “orientare l'attenzione degli studenti verso la preparazione dell'esame finale, individuando i propri punti di debolezza” (T3). In particolare, i docenti hanno sottolineato che la piattaforma online ha rappresentato un fattore abilitante per sperimentare questi nuovi approcci pedagogici, basati sul restituire agli studenti un feedback in itinere.

Le interviste hanno anche innescato nei docenti una riflessione sul servizio messo a loro disposizione e sulla presenza di ostacoli all'effettivo raggiungimento dell'innovazione nella didattica. Il supporto alla progettazione è stato favorevolmente recepito in relazione alla possibilità di sperimentare l'uso delle nuove tecnologie nella didattica, tuttavia coloro che avevano competenze medio-basse hanno sottolineato quanto questo non sia sufficiente per muoversi autonomamente. L'uso della piattaforma è infatti percepito come complesso, soprattutto perché va ad aggiungersi ai già tanti impegni accademici, come sottolinea T3: “con la quantità di didattica – e non solo – che dobbiamo svolgere, l'uso di Moodle non è immediato,

richiede ore di pratica, e lo devo fare da sola ma per me non è sempre così facile”. Se il docente non raggiunge un buon livello di padronanza dello strumento, è molto restio ad utilizzarlo nella didattica, poiché diventa un fattore di complessità aggiunta, che potrebbe anche causare imprevisti. È per questo che i docenti sottolineano che avrebbero bisogno di un ulteriore accompagnamento anche nella fase di implementazione, con una figura dal profilo tecnico che possa supportarli e risolvere eventuali problemi tecnici.

Un'ulteriore problematica segnalata dai docenti riguarda invece il fattore motivazionale: gli intervistati sottolineano infatti che il messaggio istituzionale non è sempre coerente, in quanto da un lato l'istituzione invita ad innovare per migliorare la qualità dell'insegnamento e quindi il ranking del dipartimento o dell'ateneo, dall'altro non riconosce formalmente lo sforzo effettuato in tale direzione. L'uso della piattaforma è infatti considerata “un'attività aggiuntiva” (T3): la mancanza di un riconoscimento formale ha un impatto importante sulla motivazione del docente, che è quindi meno incline a mettersi in gioco e sperimentare nuovi strumenti e nuovi approcci didattici.

## **Discussione e conclusione**

In generale, sia i dati qualitativi che quelli quantitativi hanno mostrato che i docenti erano favorevoli a riprogettare l'insegnamento e l'apprendimento prestando attenzione alla dimensione pedagogica e agli aspetti tecnologici. Infatti, pensare all'utilizzo delle tecnologie per il loro insegnamento ha dato loro l'opportunità di sperimentare nuove soluzioni pedagogiche per vecchie sfide didattiche come fornire feedback e scaffolding agli studenti, promuovere l'apprendimento autoregolato e la collaborazione tra gli studenti. Inoltre, se i dati quantitativi indicano trasformazioni generali come l'adozione di nuove tipologie di e-learning (ad esempio il passaggio dal tradizionale approccio erogativo al modello collaborativo), i dati qualitativi ci hanno permesso di apprezzare anche le micro-trasformazioni come il rimodellamento del contenuto per l'apprendimento online, la definizione del programma per una migliore gestione del tempo, ecc.

Anche considerando gli esiti della sperimentazione dell'ipotesi progettuale delineata attraverso il servizio Se-L, emerge che i docenti hanno riscontrato migliori prestazioni da parte degli studenti alla fine del corso. Sulla base di simili risultati incoraggianti, si potrebbe avanzare l'ipotesi che i docenti siano intenzionati a proseguire con la sperimentazione di nuove soluzioni didattiche trasferendole a nuove esperienze. Al contrario, dalle interviste realizzate per monitorare la fase di riprogettazione sono emersi alcuni ostacoli che circoscrivono la portata dell'effettivo cambiamento. Infatti, guardando ai risultati attraverso la lente dell'IMTPG di Clarke e Hollingsworth (2002), possiamo osservare che mentre il coaching come elemento del dominio esterno ha avuto successo nel supportare l'innovazione nel campo della pratica, mancano ancora altri elementi per garantire un cambiamento didattico effettivo. In particolare, per quanto riguarda il dominio personale i docenti hanno esperito un sentimento di inadeguatezza nell'ambito delle tecnologie didattiche, una percezione che richiederebbe un supporto continuo, incorporato nella pratica. Inoltre, circa il dominio esterno, i docenti hanno

sottolineato che il disallineamento tra le politiche istituzionali (ad esempio, sollecitazioni all'adozione di e-learning) e il riconoscimento formale (ad esempio, incentivi) influisce negativamente sulle loro motivazioni personali, portandoli infine ad interrompere il processo trasformativo. Pertanto, sebbene le motivazioni personali positive abbiano condotto i docenti ad avvicinarsi inizialmente al servizio Se-L, al termine dell'esperienza, il servizio si è rivelato una condizione necessaria ma non sufficiente per la riprogettazione della didattica nel senso di un cambiamento sul lungo termine.

Infatti, tutte le variabili dell'IMTPG dovrebbero essere tenute sotto controllo per garantire l'effettivo cambiamento delle pratiche tecnologico-didattiche. In particolare, i docenti hanno sottolineato l'importanza degli approcci integrati per lo sviluppo professionale e le sue possibili limitazioni. Hanno apprezzato il supporto in fase di progettazione, ma hanno anche richiesto la continuazione del supporto durante la fase di implementazione: adottare nuovi approcci pedagogici e nuove soluzioni tecnologiche significa affrontare un rischio, che dovrebbe essere minimizzato con un supporto continuo, e uno sforzo che dovrebbe essere riconosciuto e valorizzato da parte dell'istituzione.

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## ONLINE TUTORING TO ENHANCE UNIVERSITY SUCCESS

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### Abstract

This paper presents an experimental model of online tutoring designed and developed by the research group of the University of Turin, that aims at reducing the number of students starting the second academic year with a low number of passed exams, by helping students with the lessons they find more difficult. The Project, called TutoratoOnline, offers students online support in their study through synchronous and asynchronous tutoring. The service is developed through a Moodle platform integrated with a web conference service. An example of this is the online tutoring experience of a French course for which many students have signed up and which has met with great success. Through this example, the proposed model and the key strengths of an online tutoring will be analysed.

### Introduction

In the Italian higher education system, the tutoring was introduced together with the orientation in the universities in 1990 with the Reform of the University Didactic Ordinances (Law 341, art.13), which defines the general aims of tutoring actions. As explained in the official documents of the Conference of Rectors of Italian Universities (CRUI, 1995, Michelon, 2000), each university should take care of the activities of incoming orientation, reception and tutoring, accompanying students through the entire course of studies (Giuliani, Moretti, & Morini, 2016). The didactic autonomy allows each University to organize their own tutoring model according to their needs and possibilities; nonetheless, all the interventions have some common aims: giving information and advice to better address the course of study, preparing paths for the recovery of learning gaps, providing assistance for the preparation of the thesis. The tutoring involves a heterogeneous set of actions that have the task of supporting students, upon entering the University and during their academic life, implementing the resources available to face possible difficulties in each phase of the training process; it must also have the purpose of removing obstacles to a profitable attendance of courses, also through initiatives related to the attitudes and needs of individuals.

In the academic year 2016/2017 the University of Turin enhanced the existing tutoring activities (disciplinary tutoring in attendance, reception activities for first year students, study assistance for enrolled students, advice on the training offer and study plans, support in finding information on international mobility) offering students an online tutoring service. The main objective of this Project, called "TutoratoOnline", is to reduce the number of students starting the second academic year with a low number of exams passed, helping students in the lessons

in which they can find more difficulties. Ten bachelors of the University joined the Project by offering the service for one or more courses, chosen among those that were found to be more difficult. Our research group at the University of Turin has been involved in the design of an effective online tutoring model that offers students online study support through synchronous and asynchronous activities, and in the development of the model using a Moodle platform (available at the following link: <http://tutoratonline.orientamento.unito.it/>) integrated with a web conference tool (through which the tutor has the possibility to share the screen of his PC and the audio with the participants). This integrated platform was developed by the University of Turin (Baltoni, et al., 2011).

This article presents the online tutoring model designed and developed through the platform and, as an example, the online tutoring experience of a French course to which many students have enrolled and which has met with considerable success.

### **State of the art**

The tutoring services can use various teaching strategies and there are more and more universities that dedicate interest and funds to the structuring of specific tutoring services, convinced that those supporting actions which are tailored on the specific needs of each student can “provide an important contribution to guarantee the effectiveness and equity of the higher education system and, at the same time, respect for the autonomy of the individual” (Torre, 2006). Although university tutoring services are principally aimed at freshman students and provide training and educational support, the guidelines differ according to the specific socio-cultural background of reference. In the Anglo-Saxon reality, the reference model is that of pastoral care, theorized by Marland and Gill (1974). According to the author, the centre of the tutor’s interest must be the tutee, which must be monitored throughout the training process and helped with the job placement, enhancing their personal needs and interests. This model requires that a professor plays the role of tutor, so that it is guaranteed that the tutor is qualified to intervene on questions of didactic nature. However, in the Anglo-Saxon reality there is no shortage of tutoring experiences that leverage the practice of peer tutoring (Falchikov, 2001). Different is the tutoring approach used in the Central European tradition, which pays particular attention to the planning of orientation and training interventions as well as to the didactic aspects. In this context the space to perform a tutorial function is left to the students, whose progress is encouraged through designing and supporting activities for their classmates.

Tutorial activities usually involve a number of different activities: modelling appropriate learning behaviours, supporting and developing students’ learning by introducing ideas and insights, questioning and probing students’ responses, and focusing the discussions on critical concepts, principles and skills (Ferreira, 2013). Tutors need to engage in, and encourage, “social” activities with their students. This includes creating a friendly, informal environment necessary for successful academic learning, as well as acknowledging student’s contributions and promoting collaborative work. Tutors also have a managerial role in setting the agenda and planning the tutoring sessions. This includes a variety of tasks such as introducing the learning group, establishing the expected outcomes, introducing and setting tasks, focusing and re-

focusing the discussions, setting the pace and managing the time, summarizing the outcomes, closing the discussions or conferences. Tutoring in higher education cannot be narrowly defined as the concept may change from institution to institution, and it can be implemented following a myriad of models. Independently from the case, the main objective of tutoring is to promote and enhance the overall development of the student. It is thus an important component of graduate and post-graduate programs as it provides students with the opportunity to seek help on a one-to-one basis or in a small group setting. In this way the tutor not only helps with academic work, but also becomes a mentor, a friend and a role model.

### ***The online tutoring***

Historically, online tutoring began with emailing. In this format, a student sent a question to the tutor with the expectation that the return email would contain “the answer”. Instead, what often happened was a disconnection: the tutor, being a good guide, sent back a Socratic answer with more questioning prompts; the student, expecting “the answer”, became frustrated. Although the student may expect a give and take interaction in a face-to-face tutoring session, the email format suggested to the student that the question should be answered with a direct answer. As new tools have been made available, there has been an emergence of new models, both in asynchronous and synchronous formats. The evolution of online tutoring shows that success does not merely depend on the tool selected, but also on the development of an appropriate culture for online tutoring, an understanding of the process and parameters involved (Turrentine & MacDonald, 2006). It is recommendable trying to encourage the students as much as possible because they often tend to feel quite lost, alone and discouraged. Let them know that the online procedure is new and will get easier. Students using a synchronous tutoring system may need an overview of the tool itself before participating in the online tutoring environment, so that it is simple to use. The format of online communication (no matter how transparent the tutor attempts to make the session) requires that everything be simple to understand. Best practices of face-to-face tutoring in Socratic mode also apply to online tutoring. However, some students resist the guided discovery learning process: it’s important to communicate to the student why the tutor is doing something in a certain way and that it will not be long before they get it on their own.

The use of ICT and in particular networks to support training processes is constantly growing and with them a variety of educational approaches have emerged that sometimes see the network as a great distribution channel of structured teaching material to be used in self-education or other times as a virtual space able to host collaborative learning communities (Trentin, 2003). This is also due to the need to acquire a new culture that considers such practices not so much in antagonism or as an alternative to in-presence training, but rather as a further possibility, especially where traditional approaches to training prove to be less feasible and / or effective. For example, we consider cases where space-time unity becomes a big obstacle to participate in a training event or when e-learning methods prove to be more effective, not because they solve distance problems, but rather because they allow dismounting and separately playing two components of the “space” (I do as much as possible on my own, perhaps assisted

remotely or involved in a learning group) and “time” (when the conditions on their border allow it).

## The model of the online tutoring of the TutoratoOnline Project

The TutoratoOnline Project is conceived to make available to all the students of the University of Turin an entirely online constant support to their studies through the platform. All the students of the University of Torino can access the platform with their UniTo credentials, after which they can check if the teaching they are interested in is on the platform and if so, register for the course. When students enrol in the course, they are asked to respond to a short questionnaire without filling in the contents of the course. The tutoring service offers two types of interventions:

- synchronous: agreeing the day and time with the tutor, students have the possibility to fix an online appointment to have explanations on a specific topic. They can also connect to online tutorials requested by other students to listen to explanations;
- asynchronous: students have the possibility to ask questions and doubts in a forum and to submit writing, exercises or problems and have them corrected.

Through constant support and personalized immediate feedback, we want to support students in acquiring knowledge, developing their skills but also working on other dimensions: increasing self-confidence and motivation towards studying the discipline, facilitate working students (who cannot attend classes) and out-of-school students who fail to achieve their goals. The small gap between the age of tutors and students helps in the action of tutoring and in achieving these objectives since students are much closer in age to the tutors than to the teachers (Giraud et al., 2014). The Project tutors were selected through a call for applications, where only master’s degree candidates could be employed in their respective courses. They received training (about three hours) and they received support on the use of the Moodle learning environment and on the use of the AdobeConnect web conference service, so that they were able to work independently with the students creating real virtual learning communities.

The online tutoring model developed within the TutoratoOnline Project is based on the following fundamental parameters:

- User friendly platform: one of the fundamental aspects considered in the design of the online tutoring model was the need to make it as simple as possible to identify the course of interest on the platform and its navigation. For this reason, we have created: (a) the main homepage of the site where we describe the aims and actions of TutoratoOnline Project, which is displayed when people search the site before logging in with their credentials; (b) a second new homepage which is viewed by all users after login. It explains clearly to students how to find their courses of interest and how to explore the courses on the platform (Figure 1). To create this page we have customized the Moodle DashBoard (formerly known as “My home”) through the html language and we have set it to be the page where users are addressed after the login. All the courses on the platform have the same simple structure: an introduction with an

explanation of how to use the platform, the questionnaires, the “Forum News” (for notices and communications) and the “Forum for questions and doubts” (to ask questions about the platform or the didactics); a section dedicated to the booking calendar; a section dedicated to online meetings and finally a section dedicated to the delivery of the exercises.

- Personalized online meetings: students, through the “Book an online appointment” forum in the booking calendar section, can request a personalized tutoring indicating the day and time and the topic of the lesson (possibly enclosing an explanation file). All course members receive a copy of the forum message via e-mail and in this way they are automatically informed. Finally, the tutor, after scheduling the appointments with students, inserts them into the calendar as a reminder to everyone.
- Immediate evaluation and feedback: students can at any time submit an exercise for correction or judgment or they can write a post to ask a question to the tutor in the “Questions and doubts Forum”. At the time of delivery, the tutor receives a notification via e-mail and (within the next 24 hours) responds to the student with a comment, eventually attaching an explanation file.
- Accessibility: The TutoratoOnline platform of the University of Turin has adopted EasyReading (<http://www.easyreading.it>), a high legibility font. All the resources and activities proposed are written in EasyReading and, consequently, also accessible to students with specific learning disorders.

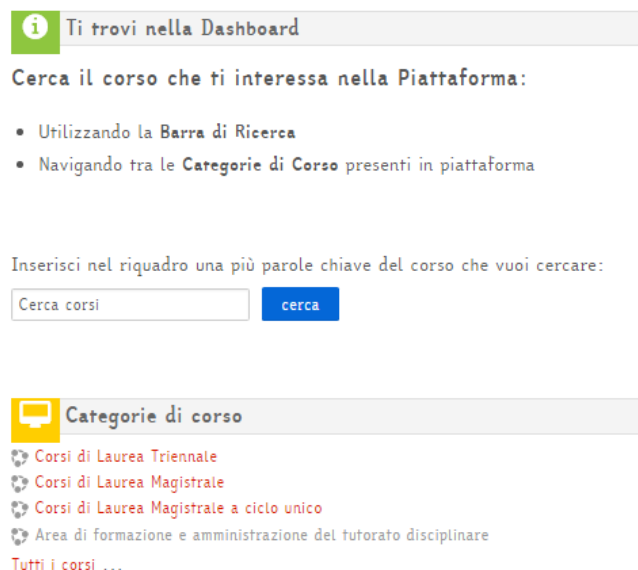


Figure1. Dashboard of the platform TutoratoOnline (home page after the login)

## Results

To understand the effectiveness of the experimental online tutoring model, we have analysed it, according to the parameters proposed, on the “French Language – first year” platform course, to which about 135 students enrolled and which met with great success. The course took place approximately from July 2017 to early February 2018 and it was managed by a single tutor. For the analysis we considered:

- the short entry questionnaire, mandatory for all students, where they were asked: name, surname, course of study, year of registration, if they had already tried to take the exam and how many times;
- an interview to the tutor, in which we asked him how he set up the synchronous and asynchronous tutoring with his students, which activities he felt most effective, his personal opinion on the experience and further observations;
- the Moodle reports about the use of the forums by students, participation to the online meetings, submission of the exercises and response to short texts added by the tutor, in agreement with the teacher, to give further support.;
- an optional final satisfaction questionnaire where we asked the students:
  - if it was easy to find the course “French Language – First Year” within the platform and if the navigation of the same was intuitive.
  - what was their participation in the various activities and which of them was support for the study;
  - if having a tutor available supported them in the preparation of the exam and if they used the online tutoring service in the preparation of the exam;
  - if they passed the exam and if they would like a similar service to be activated for other courses.

The answers to the entry questionnaire show that the majority of students are enrolled in the Degree Course in Linguistic Mediation Sciences (85%) or in the Course of Modern Languages and Literatures (7%). The year of enrolment varies widely: 34% of them are enrolled in third year, 26% in second year, 19% in first year and 21% of students are enrolled in supplementary years. Most students (62%) had already tried to sit the exam, of which 63% once, 28% twice, 5% three times and 4% more than three times. During the interview, the tutor explained that since the “French – First year course” is aimed at first year students, on the platform there are students in French from the first year or the second year who have not yet passed the exam. However, it can also be chosen by third-year students, for example in English, who have to choose one more language to study for only one year. The tutor, a graduate student in languages and a specialist in French, set up tutoring activities reflecting the program of the lecturer, which is divided into two parts: part A (grammar and translation) for which the submission tool and the tests on the platform were very useful, and part B (listening) for which the use of online meetings was fundamental since he was able to carry out real exam simulations. In addition, all online events were held entirely in French, and according to the tutor students felt comfortable when asking about their doubts (perhaps because they did not have the webcam activated but only the microphone) interacting directly in a foreign language.

### ***User friendly platform***

According to the tutor, the navigation of the platform is very intuitive and the choice to insert a second homepage (dashboard) was effective because in this way finding the course of interest is very simple, and only very few students had difficulties in finding the resources within the course (perhaps deriving from inattention in reading the instructions). This opinion is confirmed by the students’ answers to the final questionnaire where the question “Was it easy

to find the course in the platform?” 86% of the students answered “absolutely yes” and the rest “more yes than no” (nobody answered “absolutely no” or “more no than yes”). With the same criterion of answers, we asked if the navigation of the platform was intuitive, and 57% of the students answered “absolutely yes”, 29% “more yes than no” and the rest “more no than yes”.

### ***Personalized online meetings***

According to the tutor, the online meetings were the most useful tutoring activity for students. Initially, he himself scheduled meetings in the calendar to encourage the timidest students to participate and to help them understand the functioning of online tutoring. After that, the students were asked to request appointments through the forum or at the end of an online tutoring if they still needed help. During the interview the tutor reported that up to 24/25 students participated to the online meetings (not always the same ones) and that, to try to involve as many as possible, he tried to schedule the online meetings at times that could suit everyone, for example at the weekends at different times, or at 9 pm (as many if not all are working students) or even during the holidays, because the students wanted to take advantage of the holiday days to practice.

This answer agrees again with the students’ answers in the final questionnaire, where all the students chose online meetings as the most supportive activity (they could choose between “Forum for questions and doubts”, online meetings, delivery of exercises and quizzes). The most significant answers to the question “Why?” were: “Because we could work well with the tutor, asking questions during online appointments if something was not clear”, “To discuss with those who master the French language”, “To have the opportunity to attend an interactive lesson directly from home” and “Because they help practicing in preparation for the exam”.

The analysis of the Moodle logs (Table1) about online meetings confirms the results so far emerged and adds other significant aspects. Table1 shows an overview of the online meetings held throughout the duration of the course (from July 2017 to early February 2018 for a total of 30 weeks).

Table 1: Overview of the online meetings

Total number of online meetings held	103
Average number of online meetings per week	3.4
Total participation in online meeting	527
Average number of connected users	5
Users who participated in at least one tutoring	83

Analysing the number of participants in an online meeting we highlighted that the minimum number of users connected was 1 while the highest number was 29 (especially near the examination session). Figure 2 summarizes the number of participations in online meetings, which consequently became both targeted and personalized interventions and real online lessons. In the case of many connected users, the tutor emphasized the effectiveness of the web conference service which allows to authorize the use of the microphone through the “raising of hands” option.

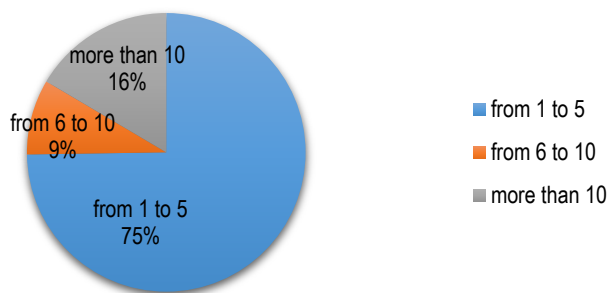


Figure 2. Participation in online meetings

### **Immediate evaluation and feedback**

During the interview the tutor explained that for the part of grammar and translation he inserted some short exercises on the platform, as exam simulations, adding a few lines of theoretical explanation to make sure students read the grammar rule before applying it. According to him, it is essential to recommend to students to work seriously and to insert the exercises from time to time to invite them to work constantly, because procrastinating till the last minute is not effective and because the tutor alone would not be able to correct hundreds of translations in a few days. Thanks to this method, many students have worked constantly. From the students' answers in the final questionnaire and from the analysis of the Moodle reports it appears that the task submission tool and the quiz resolution were less used by the students (24 students submitted at least one task and 15 performed at least one test). However, for both activities it is essential to have feedback or evaluation from the tutor. During the interview the tutor explained that if he was connected to the platform when the students delivered a task, he immediately returned the correction and the students highly appreciated the immediate feedback. This is very effective because students feel supported and therefore they are motivated to keep studying. In the final questionnaire, we asked the students "Was it useful to have a tutor available to support you in the preparation of the exam?" and they answered "absolutely yes" (71%) and "more yes than no" (29%). To the question "Why?" the most significant answers were: "Because the tutor was very helpful and patient with all the students, following them step by step", "The tutor was available for different corrections and doubts that I previously had", "Because he gave me the necessary support that I didn't have in class" and "The tutor has always been available and competent".

### **Conclusions**

The results concerning the example of the French course show that the implementation of the online tutoring model developed has achieved considerable success among the students: 86% of them stated in the final questionnaire that they would like this online tutoring service to be activated for other teachings. The success of online tutoring is obviously also given by the competence and availability of the tutor, who is very satisfied with the experience. The results also show the advantage of an online tutoring compared to a tutoring in presence, i.e. the flexibility of the calendar (lessons at the weekend, at 9 pm, or during the summer) and a more informal learning environment for students who have more difficulty expressing their opinion in presence. The figure of the tutor can become a real reference point for university students who often need someone who can help them in the management of the study and in the clarification of doubts. Surely for the effectiveness of online tutoring it is important that the tutors are motivated, flexible and adequately prepared on the subject of teaching and on the modalities of the exam; moreover, they should structure the tutoring activity using the presented model and respecting the parameters described, but adapting everything to the needs of the course and of the students. In fact, in other courses the Project did not give equally positive results, perhaps because the tutors were not very motivated, or maybe they were not able to use the tools provided adapting them to the needs of the course, or because the service



was not properly advertised. For this reason, it is necessary to invest more in the training of tutors, in communication between tutors and teachers and in publicizing the service provided.

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## **DISEGNARE L'APPRENDIMENTO: UN MODELLO DINAMICO PER PIANIFICARE PERCORSI DAL MICRO- AL MESO- AL MACRO- LEARNING**

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### **Abstract**

Questo articolo raccoglie l'esperienza sul campo dell'autore come insegnante e come docente formatore in questi anni di riforme profonde della società e della scuola italiana. Dopo una breve analisi delle necessità formative dei futuri cittadini dell'attuale società dell'incertezza, si esaminano le pratiche di progettazione didattica in atto. Si propone poi una riflessione sulla valorizzazione dei collegamenti fra i micro-, meso- e macro- apprendimenti sia dal punto di vista dei discenti che da quello delle istituzioni per ridisegnare i percorsi formativi mediante la creazione di curricoli dinamici ed una progettazione flessibile, adeguata a potenziare e migliorare i risultati formativi.

### **Introduzione**

Il processo educativo di ogni Paese europeo mira a fornire ai propri cittadini cultura, capacità di informarsi e formarsi ed adeguate competenze per l'acquisizione di skill spendibili nel mondo del lavoro reale. In Italia, secondo una recente ricerca del Sole24ore pubblicata nel dicembre 2017, i titoli di studio e le qualifiche italiani forniscono un'indicazione molto debole delle reali competenze e abilità degli studenti e dei lavoratori che li possiedono ed il 35% delle persone fa un lavoro che non ha nulla a che vedere con il percorso di studi che ha fatto. Le reti familiari e le conoscenze personali si sostituiscono ai canali di reclutamento pubblici e le offerte di lavoro rimangono spesso nascoste a chi non ha un network personale. La situazione appare molto compromessa anche se si consultano in dettaglio i dati delle rilevazioni nazionali (Invalsi) ed internazionali (Ocse-Pisa) degli apprendimenti degli studenti italiani: decisamente sotto la media in entrambi i casi. Il problema della formazione sta assumendo nel nostro Paese contorni preoccupanti. Occorrono dunque soluzioni educative diverse. Più formazione sul campo accanto alle conoscenze teoriche, adozione di nuove tecnologie e rafforzamento delle competenze digitali, dialogo tra sistema formativo e territorio, forte coinvolgimento degli stakeholder della formazione, responsabilizzazione personale e crescita dell'autonomia degli studenti.

La nostra è la società dell'incertezza del mondo liquido moderno; la società sempre connessa dei giochi e delle relazioni virtuali, non sempre costruttive e gratificanti; la società delle forme di comportamento violento perpetrate da chi si sente "escluso dal gioco", escluso dai templi del consumo, ma è avido di partecipare al "rito". Oggi i giovani sono visti come una sorta di "bidone

dei rifiuti” per l’industria dei consumi; la disabilità, anormalità e minoranza rappresentano problemi politici; l’indignazione si concretizza in raggruppamenti politici a forma di sciame. La situazione dei ragazzi di oggi ed il ruolo dell’educazione interpella come non mai gli educatori di oggi in uno scenario dove le certezze non possono essere date per scontate e l’arte di insegnare si radica nello sforzo di comprensione reciproca come fonte di creatività (Bauman, 2012). Per affrontare questa crisi, che Edgar Moren definisce multidimensionale, è urgente una riforma profonda dell’educazione, fondata sulla sua missione essenziale: insegnare a vivere, come già sosteneva Rousseau. Ciascuno deve imparare a comprendere per conoscere. Così sviluppando la propria individualità ed il legame con gli altri, attraverso il riconoscimento della complessità umana, sarà in grado di prepararsi ad affrontare le molteplici difficoltà della vita senza trovarsi disarmato e strumentalizzato (Moren, 2015).

Per raccogliere la sfida di formare cittadini del nostro tempo è necessario ridisegnare i percorsi di apprendimento e ideare curricoli dinamici, flessibili, che coinvolgano la persona e siano in grado di permettere allo studente di relazionarsi positivamente e costruttivamente con gli altri.

### **Stato dell’arte: l’Unità Formativa**

Il modello che si utilizza oggi per la progettazione degli apprendimenti e lo sviluppo delle competenze disciplinari e di cittadinanza è l’Unità Formativa, detta anche Unità di Apprendimento, con una sfumatura riguardo al più ampio respiro della prima denominazione. Secondo la Rete Veneta Competenze (RVC), in accordo ai documenti di legge che regolano la materia, le fasi di una Unità Formativa sono così suddivise:

1. identificazione, a cura dei Dipartimenti di asse all’interno di Reti di scuole, dei saperi essenziali lungo l’arco del quinquennio, di ogni asse culturale e area professionale, comprendendo pure l’ambito della cittadinanza che, nel contesto dell’obbligo di istruzione, rischia di essere marginalizzata mentre rappresenta il riferimento prioritario del comportamento o condotta;
2. definizione di una sequenza di compiti – ovvero delle sfide presentate sotto forma di problemi (cfr. Bandura: autoefficacia) - che scandiscono il cammino di apprendimento degli allievi nel quinquennio, sapendo che alcuni di tali compiti sono comuni a tutti i docenti (ad esempio quelli connessi alle competenze di cittadinanza) mentre altri vedono coinvolti meno docenti;
3. elaborazione, a cura del Consiglio di Classe (cdc), del piano formativo annuale composto da un insieme di Unità di apprendimento, avendo la sicurezza che:
  - tutte le competenze, abilità e conoscenze indicate nei traguardi formativi siano state attivate entro le esperienze formative previste;
  - ogni UdA comprenda gli indicatori/evidenze previste dalle rubriche delle competenze;
  - per ogni UdA sia stata elaborata, di comune accordo del consiglio di classe, la griglia di valutazione unitaria comprendente tutti i criteri rilevanti, tenuto conto della natura del compito, della varietà dei fattori in gioco (prodotti, processi,

linguaggi...), dei descrittori del livello di accettabilità previsto dalle rubriche delle competenze mirate.

Per rendere possibile un apprendimento per competenze, occorre infatti puntare ad un Piano formativo concordato ed essenziale da parte del Consiglio di classe (cdc), composto tutto di UdA di asse/area, disciplinari e interdisciplinari, che esaurisce l'insieme dei traguardi formativi e quindi le competenze e le evidenze delle relative rubriche. Questo passaggio richiede peraltro un passo preliminare per assi culturali ed aree professionali che punta ad individuare i saperi essenziali ed i compiti su cui questi possono essere mobilitati in una logica di apprendimento autentico. Tutte le esperienze di apprendimento (disciplinari, inter o sovradisciplinare) sono gestite come UdA, ovvero azioni che soddisfano pienamente le competenze mirate, e che quindi portano a valutazioni attendibili sulla base della corrispondenza dei compiti proposti rispetto agli indicatori/evidenze delle rubriche di riferimento. Le competenze mirate, proprie di ciascuna di queste, sono pienamente sollecitate se i compiti/problemi previsti soddisfano le evidenze della rubrica. In questo caso, la valutazione della specifica UdA coincide anche con la valutazione delle competenze mirate. La scheda di valutazione è necessaria per consentire il lavoro unitario del Consiglio di classe (cdc), mentre gli altri strumenti (verifiche, rubriche di dettaglio, descrittori di performance...) sono di supporto a questa. Sulla base di questo lavoro, è possibile passare con una certa sicurezza alla valutazione delle competenze (Linee Guida RVC)

Nella rivisitazione dei traguardi formativi in termini di competenze e della loro articolazione in dimensioni di analisi, i cdc usano partire da problemi legati alla realtà come spunto per sviluppare i saperi essenziali (bottom up), altre volte invece cercano esempi pratici legati alla realtà da utilizzare per sviluppare quelle competenze che hanno individuato come fondanti (top down).

E' indifferente procedere in un modo e nell'altro: risultano entrambi efficaci, purché siano ben identificati i contenuti come incroci tra competenze chiave e saperi disciplinari (dichiarative e procedurali). Il processo formativo viene ristrutturato in relazione alle sfide poste dall'insegnamento come ponte fra esperienza e riflessione. Il processo valutativo è sempre pensato in termini plurali, cioè come apprezzamento della competenza del soggetto centrata sulla costruzione di compiti autentici, insieme alle modalità di osservazione del processo ed all'attivazione di strategie di autovalutazione. (Castoldi, 2013). L'approccio dei componenti dei cdc all'apprendimento per competenze è sempre più laboratoriale e cooperativo e alterna l'identificazione dei nuclei fondanti disciplinari e trasversali con la definizione della sequenza di compiti (problemi, compiti di realtà...) che portano all'acquisizione delle conoscenze/abilità e competenze richieste in uscita. I docenti in classe mettono in atto le strategie della Didattica Attiva nel consueto lavoro in classe, incoraggiando climi di lavoro collaborativi che favoriscano l'apprendimento sociale, l'interdipendenza positiva, la definizione dei ruoli all'interno dei gruppi, l'assunzione di responsabilità individuali, la valutazione individuale e di gruppo, le esperienze interpersonali positive per un sano sviluppo cognitivo, psicologico e sociale degli studenti (Johnson, Johnson, & Holubec, 1996).

## **Disegnare L'apprendimento: Un Modello Dinamico per Pianificare Percorsi dal Micro- al Meso- al Macro-Learning**

*Flavia Giannoli*

Si stanno diffondendo diversi modelli di pratica didattica attiva come gli Episodi di Apprendimento Situato (EAS) proposti dal Prof. Rivoltella per attivare l'apprendimento mediante momenti operatori (Guasti) od altri, più olistici, ispirati alla tecnica del Design Thinking per lo sviluppo della creatività nel portare a termine compiti problematici. L'Innovative Design dei processi educativi scolastici, prevede quattro fasi per il disegno e la realizzazione delle attività previste nell'UdA: identificazione delle opportunità (esplorazione e generazione delle idee), ideazione del prodotto (selezione delle idee), elaborazione del prodotto (creazione del prototipo), feedback finale (confronto e presentazione). Il metodo, messo a punto da un team di 100 insegnanti di tutta Italia e di ogni ordine e grado, risulta molto efficace per sviluppare autonomia, resilienza e responsabilità negli studenti mentre gli stessi conseguono effettivi risultati di apprendimento.

### **Micro-education**

In accordo con le disposizioni della Legge 107/15 della Buona Scuola e grazie ai corsi di formazione finanziati dal Piano Operativo Nazionale (PON), i docenti stanno acquisendo maggior esperienza e sempre più ricorrono agli ambienti tecnologici e social in rete per creare ambienti di apprendimento online, estesi oltre la classe fisica, che permettono di entrare in una nuova visione, socio-costruzionista, dell'apprendimento. Ciò getta le basi per il Lifewide Learning ed il Computer Supported Collaborative Learning. La rete diviene così mezzo per sperimentare nuove forme di coinvolgimento dei discenti: aumento della curiosità e della voglia di imparare, possibilità di simulare in rete situazioni pratiche, sviluppo di forme di educazione assistita, sviluppo del tutoring fra pari, possibilità di garantire ai discenti feedback immediati (Capogna, 2014). Esperienze come la Flipped classroom rovesciano il paradigma della lezione e permettono di creare le condizioni per l'apprendimento cooperativo tra pari. Altre come la Gamification introducono elementi ludici in contesti non ludici per favorire il coinvolgimento attivo e stimolare il progresso cognitivo. Le esperienze di Webquest permettono di sviluppare negli alunni la capacità di informarsi, selezionare ed utilizzare criticamente l'informazione e di accedere ai gradini "alti" della tassonomia di Bloom: analisi, sintesi e valutazione.

A livello di micro-education, interpretando in chiave sociologica i fenomeni connessi con la diffusione dell'utilizzo della rete e dell'e-learning, si nota che quando in una organizzazione didattica la formazione viene erogata in forma blended o totalmente online si hanno immediate modificazioni nell'interazione formativa. I contenuti sono condivisi, ci sono supporti aggiuntivi all'apprendimento, anche multimediali ed inclusivi, gli atteggiamenti degli allievi verso il docente si diversificano, essi acquisiscono una maggior autonomia nell'esperienza di apprendimento, si creano relazioni solidali, come anche subentrano possibili rischi di isolamento (Colombo, 2008). Il processo di informatizzazione produce il cambiamento dei mezzi per l'apprendimento e provoca contestualmente un cambiamento della cultura dell'apprendimento: nelle diverse organizzazioni formative si produce una trasformazione della conoscenza stessa, che si orienta verso l'acquisizione degli skill per vivere e lavorare nel XXI secolo (Figura 1).

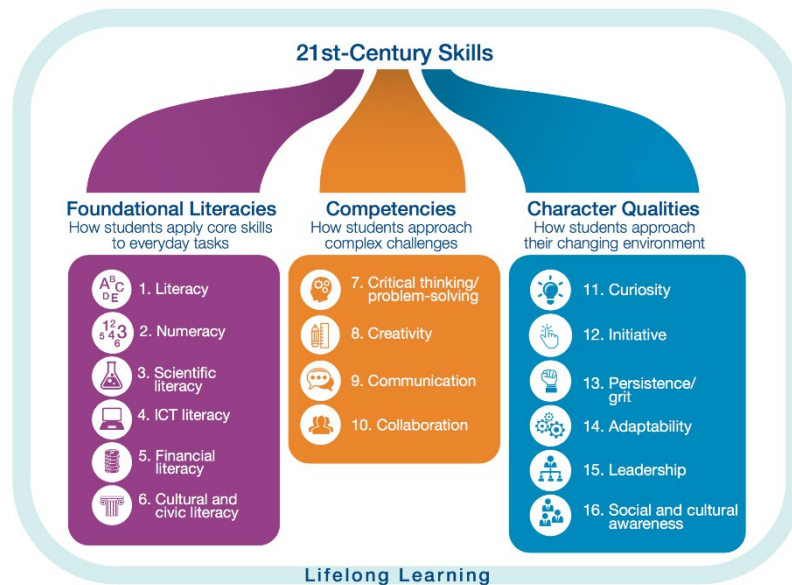


Figura 1. World Economic Forum, New Vision for Education (2015)

## Curriculum mapping

Per evitare la dispersione e/o di trascurare alcuni nuclei fondanti durante il percorso di apprendimento per problemi e prove autentiche è importante per i docenti progettare il curricolo guardando alla sua interezza ed al suo snodarsi negli anni, cioè pensarlo in termini di portfolio. L'istruzione si inquadra così sullo sviluppo delle strutture di conoscenza, orientate mediante le procedure educative, che incorporano la conoscenza con le condizioni del suo uso e della sua realizzazione (Glaser, 1987). La cosa non è certamente banale a realizzarsi perché occorre far coesistere due punti di vista ed alternare sapientemente momenti top-down (partendo dal curricolo e dalle linee guida) e bottom-up (partendo dai bisogni educativi specifici dei discenti) nelle fasi di progettazione didattica. Il processo di insegnamento-apprendimento deve essere documentato e valutato. La corretta valutazione può avvenire solo mediante un accurato monitoraggio del processo stesso. Ogni docente sa che occorre effettuare frequenti valutazioni formative dopo l'istruzione prima di assegnare agli studenti una prestazione contestualizzata. Ciò per verificare l'efficacia dell'insegnamento in termini di effettivo apprendimento da parte dei discenti ed attivare eventuali correzioni al processo prima di pervenire alla valutazione sommativa. Questa ha infatti la funzione di riassumere e sintetizzare il risultato complessivo conseguito da uno studente ed è orientata a riferire, in particolare ai fini della certificazione, i risultati conseguiti al termine di un corso di studi (Comoglio, 2015). Ogni Unità formativa si aggiunge al curricolo personale dello studente e contribuisce allo sviluppo del portfolio, cioè del percorso formativo seguito, delle scelte fatte e dei risultati conseguiti (Figura 2). L'utilizzo degli strumenti del Curriculum mapping consente esperienze di apprendimento autentico, ma anche di eccellenze formative perché la valutazione critica dei risultati si estende al metodo dell'insegnante ed alle risorse didattiche utilizzate.

## Disegnare L'apprendimento: Un Modello Dinamico per Pianificare Percorsi dal Micro- al Meso- al Macro-Learning

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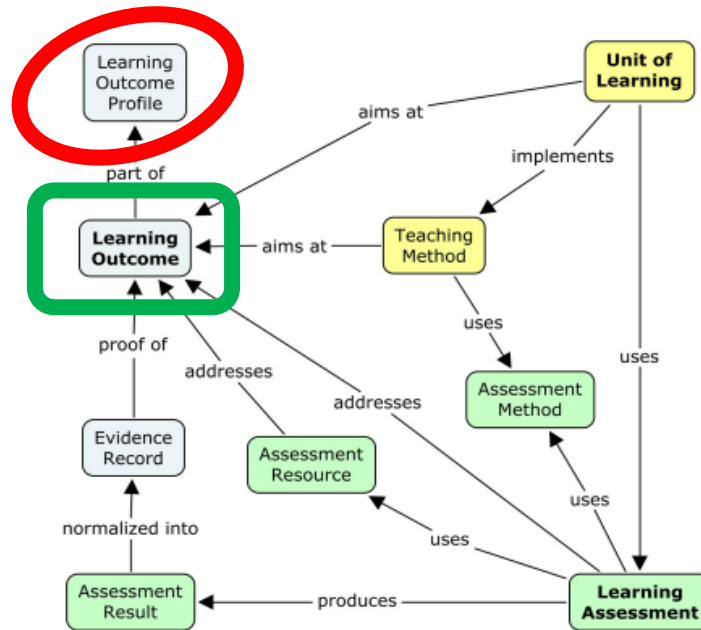


Figura 2. Automated curriculum mapping tools for measuring learning outcomes (2017)

### Meso-education

Tramite l'utilizzo degli strumenti informatici e del curriculum mapping nelle scuole gli apprendimenti individuali si innestano nel quadro istituzionale degli apprendimenti formali, sono visibili e si intersecano con gli apprendimenti socio culturali e quelli delle organizzazioni complesse, come, imprese, enti locali, servizi, che contaminano il processo formativo nelle scuole e nelle università (basti pensare alle attività di Alternanza Scuola-Lavoro). Le interazioni del singolo e degli enti formativi influenzano e sono influenzate dai meccanismi della società dell'informazione. Grazie all'introduzione di nuovi ruoli e figure tra i protagonisti della formazione (animatori digitali, team dell'innovazione, tecnici d'aula, centri per la didattica a distanza, ecc.) ed al diffondersi dell'utilizzo della rete si sta riscontrando un notevole aumento della produzione e della circolazione dei contenuti dell'apprendimento, la riduzione dell'importanza dei confini disciplinari.

A livello di meso-education, l'innovazione dell'offerta formativa e la modificazione degli status cristallizzati da decenni si riflettono anche sull'organizzazione del processo formativo. Dirigenti, Animatori e Coordinatori hanno bisogno di gestire i propri Team in modo funzionale e flessibile. I flussi operativi necessari negli istituti per il buon funzionamento organizzativo ed il coordinamento delle tante attività che si intersecano possono essere facilmente implementati in strumenti online come p.es. Trello. Gli elementi sociali inclusi nei meccanismi informatici permettono di riorganizzare il design dei processi, semplificando e supportando il lavoro dei Team.



Figura 3. Kanban flow con attività ed assegnazioni

Per esempio Trello permette di organizzare le azioni da fare, quelle in fieri e quelle portate a termine (Modello di Kanban) su una lavagna dinamica, nella quale sono riportate le assegnazioni dei compiti (chi fa cosa) il grado di completezza delle assegnazioni (Figura 3). Ciascun membro del Team può interagire con gli altri, postare documenti, aggiornare in tempo reale il grado di completamento di una attività o le eventuali difficoltà emerse, etc. e lo strumento permette una efficace interazione sociale.

## Macro-education

Il profilo educativo dell'allievo, elaborato nell'ambito delle competenze dell'autorità pubblica, indica le mete finali dei percorsi formativi in quanto caratteristiche che un giovane dovrebbe sapere e fare per essere l'uomo e il cittadino che è lecito attendersi da lui in questo momento della sua crescita globale. È il punto di convergenza dell'azione educativa e formativa dell'organismo (scuola, centri formazione professionale) e si riferisce alla persona (non alle discipline ed ai loro contenuti) come soggetto unitario (linee guida RVP). I risultati dell'apprendimento vengono riferiti ai livelli di competenza europea EQF. Nella vita adulta e nel mondo del lavoro si entra nella necessità del lifelong learning, sia per i paradigmi disciplinari che evolvono e si approfondiscono nel tempo e con l'età, che per quelli interdisciplinari e trasversali: entrambi necessitando di aggiornamento continuo.

A livello di macro-education si registra la modifica radicale del valore degli apprendimenti, che sono fortemente esposti a rischi di standardizzazione ed alienazione rispetto ai soggetti coinvolti. Per effetto dell'accelerazione impressa dalla società liquida e tecnologica la conoscenza può trasformarsi in un prodotto valorizzato principalmente in termini economici. La competizione per entrare e rimanere nel mondo del lavoro sembra essere il fine ultimo della formazione. Non sarà così se all'apprendere per competere si sostituisce, grazie al supporto delle tecnologie, un processo di appropriazione del sapere che include il corpo, la relazione tra il sé e la collettività, la capacità di auto-organizzazione e di scelta a tutti i livelli dell'azione sociale. (Colombo, 2008). Proprio grazie al fatto che la nostra è la società dell'informazione si può scegliere di fare una selezione fra le diverse opzioni offerte dalle innovazioni in atto. Acquisire competenze digitali permette infatti di affrontare situazioni complesse mediante l'esplorazione



## Disegnare L'apprendimento: Un Modello Dinamico per Pianificare Percorsi dal Micro- al Meso- al Macro-Learning

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dei nuovi contesti tecnologici in modo flessibile, interagendo ed utilizzando le ICT in modo responsabile (dimensione etica) per accedere, selezionare e valutare criticamente l'informazione (dimensione cognitiva) (Calvani, Fini, & Ranieri, 2010).

A livello macro per le istituzioni scolastiche si registrano altre importanti innovazioni introdotte dall'utilizzo delle tecnologie riguardo all'organizzazione complessa degli istituti stessi. La più importante riguarda la necessità di tenere un sito della scuola attraverso il quale sia ottemperato l'obbligo di dematerializzazione e di trasparenza riguardo a tutti gli atti della scuola stessa. Inoltre la Legge 107/15 prevede il controllo di qualità del servizio educativo erogato e la compilazione online del Rapporto di Auto Valutazione (RAV), con la conseguente predisposizione del modello Piano di Miglioramento (PDM). In tale contesto l'istituto scolastico si configura come ente che autoapprende e l'utilizzo delle tecnologie informatiche è molto importante per pianificare, documentare e monitorare il miglioramento continuo della qualità dell'offerta. Il ciclo di Deming (o ciclo di PDCA, acronimo dall'inglese Plan-Do-Check-Act) è un modello di gestione iterativo in quattro fasi utilizzato per il controllo e il miglioramento continuo dei processi e dei prodotti. Esso ben si adatta al processo di miglioramento continuo della qualità dell'offerta formativa in un'ottica a lungo raggio e di stretto rapporto con il territorio e gli stakeholder. Il modello prevede la pianificazione dei quattro step necessari per il primo miglioramento in programma, raggiunto il quale si passa al secondo e così via, anno dopo anno (Figura 4).

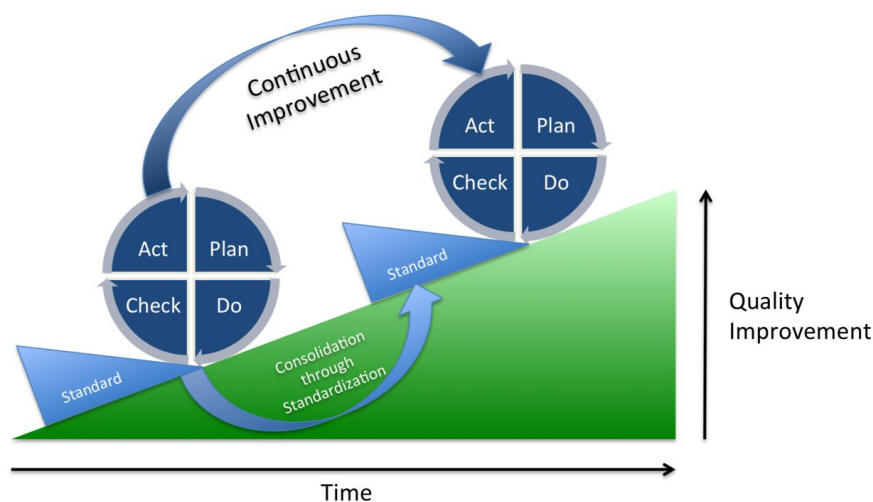


Figura 4. Project planning e supporto al modello dinamico

## Conclusioni

La progettazione collegiale dei docenti della scuola italiana si sta lentamente orientando sulla formazione di cittadini responsabili ed alla costruzione del portfolio dei discenti, monitorato e documentato nel curriculum mapping, per il conseguimento di livelli di competenza europei (EQF) spendibili nel mondo del lavoro in Italia come all'estero. L'apprendimento autentico degli studenti si dipana a spirale in un continuo lasciare e riprendere, in un progressivo consolidamento significativo, di tutti gli aspetti delle competenze sviluppati negli anni (micro):

le attività didattiche disciplinari e trasversali sinergicamente concorrono al comporsi di un puzzle di competenze complesso e personalizzato dalle esperienze di apprendimento formale, ma anche informale e non-formale dei singoli (meso). Perciò non si può oggi prescindere dagli aspetti socioculturali della società dell'informazione, la quale influenza le modalità temporali e spaziali dell'apprendimento, i contenuti e la loro erogazione, la forma ed i processi della formazione (Hug, 2005). Ciò comporta rischi ed opportunità per la persona che apprende, che deve imparare ad imparare, per sapersi informare e formare lungo tutto l'arco della vita, muovendosi in modo responsabile ed autonomo nella società del XXI secolo (macro) per evitare di esporsi all'alienazione ed al rischio che la sua formazione sia valorizzata solo in termini economici.

Anche le istituzioni scolastiche sono soggetti in formazione, che apprendono e verificano periodicamente i propri apprendimenti (micro). Esse si trovano a dover promuovere una cultura della qualità, tesa al miglioramento continuo dei processi educativi e dell'offerta formativa ed all'utilizzo ottimale delle risorse umane e materiali per gli scopi istituzionali che si sono proposti. La scuola oggi è chiamata a rispondere al cambiamento, piuttosto che seguire un piano prestabilito, ed a mettere in atto strategie flessibili (meso). Gli obblighi di trasparenza e la complessità dei rapporti socio economici con il territorio di riferimento cambiano radicalmente il metodo di approccio al problema educativo (macro). Gli strumenti tecnologici e l'utilizzo dell'elearning in particolare forniscono supporti oggi imprescindibili per ridisegnare i percorsi formativi mediante la creazione di curricula dinamici ed una progettazione flessibile, adeguata a potenziare e migliorare i risultati formativi. Il modello di gestione è di tipo spiraliforme e segue quattro tappe successive di pianificazione, attuazione, controllo, revisione e correzione, che si ripetono dinamicamente poggiandosi sugli obiettivi raggiunti.

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## **INNOVAZIONE DELLA FORMAZIONE: IL MODELLO DI E-LEARNING ADOTTATO DALL'ESERCITO ITALIANO**

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### **Abstract**

In questo lavoro viene discusso e analizzato il modello di e-learning sviluppato dall'Esercito Italiano per rispondere alla necessità di far crescere le competenze digitali del proprio personale. Il modello, che contempla formazione in autoapprendimento, assistita e collaborativa per soddisfare le diverse esigenze, in questa prima fase persegue l'obiettivo di creare una comunità capace di utilizzare un ambiente virtuale di apprendimento nello svolgimento di incarichi e attività differenti. Particolare attenzione è rivolta al personale che a vario titolo dovrà ricoprire il ruolo di docente militare per consentirgli di adottare nuovi strumenti di interazione e nuove metodologie didattiche con i discenti. Il modello è stato concepito all'interno di un intenso programma di e-learning sviluppato con l'Università di Torino per la formazione di base degli ufficiali del ruolo normale. Nel medio termine si prevede che il personale formato possa creare e condividere materiali ed esperienze utili per tutta la comunità militare.

### **Introduzione**

In questa società della conoscenza per un cittadino attivo e consapevole diventa sempre più essenziale avere a disposizione la possibilità di aggiornarsi continuamente in un'ottica di Long Life Learning (Lovece, 2009). Anche all'interno della Forza Armata questa esigenza è diventata quanto mai pressante sia per la versatilità richiesta al personale militare durante la sua carriera sia per il continuo mutamento degli scenari in cui è chiamato adoperare. La formazione militare non può prescindere dall'utilizzo delle nuove tecnologie che, se utilizzate in maniera opportuna, facilitano l'innalzamento della qualità dell'apprendimento agevolando sia l'accesso a risorse e servizi sia gli scambi e la collaborazione a distanza. L'e-learning inteso come processo in cui il soggetto è attivo e utilizza tutti gli strumenti elettronici, presenta numerosi punti di forza (Calvani, 2001) in questo contesto in quanto offre:

- la possibilità di aggiornare costantemente i contenuti e di sviluppare comunità di apprendimento;
- la possibilità di contestualizzare l'apprendimento nell'ambiente di lavoro per incrementare il senso di responsabilità e produttività del personale;
- l'apprendimento continuo per far fronte ai rischi di obsolescenza del lavoro in qualunque contesto;

- la possibilità di favorire la collaborazione soprattutto per affrontare problemi puntando su un approccio del tipo problem solving;
- la possibilità di personalizzare i percorsi di apprendimento e di accesso alle risorse formative per migliorare le proprie competenze personali e lavorative.

Per aggiornare e facilitare la formazione militare è stato quindi sviluppato un modello capace in una prima fase di innalzare le competenze digitali del personale militare e in una seconda di offrire una formazione continua flessibile in cui l'elemento umano assume sempre maggiore importanza come fattore su cui puntare per il successo dell'Istituzione. Il Comando per la Formazione e Scuola di Applicazione dell'Esercito di Torino (COMFOR) e l'Università di Torino (UNITO) vantano una collaborazione molto proficua sul tema dell'e-learning per la formazione di base degli Ufficiali del ruolo normale (Marchisio et al, 2017b). Per rispondere ad esigenze formative specifiche e ad una necessità di internazionalizzazione hanno sviluppato insieme piattaforme integrate per la didattica (Marchisio et al, 2017a; 2018) e hanno concepito questo nuovo modello che sarà discusso e analizzato nei prossimi paragrafi.

### **Stato dell'arte**

Non è sempre facile reperire informazioni su come altri Istituzioni e Università italiane e straniere che si occupano di formazione di militari abbiano risposto a questa necessità di cambiamento e aggiornamento nella formazione. Nell'ambito delle Forze Armate italiane altre iniziative simili sono state intraprese dall'Aeronautica e dalla Marina Militare e dallo Stato Maggiore della Difesa. L'Istituto di Scienze Militari Aeronautiche alla pagina <https://am-elearning.aeronautica.difesa.it/> offre un ambiente E-learning dell'Aeronautica Militare per migliorare la qualità dell'apprendimento, per costruire in rete una comunità di apprendimento e per mantenere un aggiornamento costante. L'Accademia Navale di Livorno utilizza da anni una piattaforma e-learning raggiungibile alla pagina [http://www.marina.difesa.it/formazione-in-marina/accademia\\_navale/Pagine/elearning.aspx](http://www.marina.difesa.it/formazione-in-marina/accademia_navale/Pagine/elearning.aspx), gestita in collaborazione con l'Università di Pisa, per erogare la formazione di base degli ufficiali. All'indirizzo <https://el-stelmilit.difesa.it/> si trova invece la piattaforma didattica e-learning dello Stato Maggiore della Difesa (SMD) utilizzata per i corsi erogati on-line e quale supporto integrativo ed introduttivo ai corsi in presenza erogati dagli Istituti di Formazione dell'area SMD. Nell'ambito dei Paesi Membri dell'Unione Europea alcuni enti di formazione adoperano piattaforme e-learning per erogare i corsi di base come per esempio l'Accademia Militare portoghese (<https://moodle.academiamilitar.pt/>). In particolare la rete delle università militari costituita dalla Theresan Military Academy di Wiener Neustadt (Austria), dalla Military University of Land Forces di Wroclaw (Polonia), dalla Land Forces Academy di Sibiu (Romania), dalla University of Defence di Brno (Repubblica Ceca) e dalla National University of Public Services di Budapest (Ungheria) ha potuto pensare e realizzare un progetto, denominato Strategic Partnership, finanziato nell'ambito del Programma ERASMUS Plus Key Action 2, grazie all'utilizzo di piattaforme e-learning. Nel progetto sono stati preparati e testati online common modules che rientrano all'interno dell'iniziativa europea per lo scambio dei giovani ufficiali, ispirata dall'ERASMUS, il c.d. MILITARY ERASMUS, sotto l'egida dell'European Security and Defence College (ESDC) di Bruxelles (<https://www.awl.edu.pl/sp-news/5946-dissemination-of->

the-project-outputs-strategic-partnership-project-briefing-in-brussels). I learning objects e tutto il materiale preparato nell'ambito del progetto è ora a disposizione degli altri istituti di formazione dell'Unione Europea per essere trasferito sulle altre piattaforme e-learning e riutilizzato a favore di tutti gli studenti militari e civili in chiave interforze ed europea. Lo stesso ESDC, network college dell'European External Action Service (EEAS), utilizza una piattaforma e-learning

([https://esdc.adlunap.ro/login.php?target=&client\\_id=esdc&cmd=force\\_login&lang=en](https://esdc.adlunap.ro/login.php?target=&client_id=esdc&cmd=force_login&lang=en)) per favorire la diffusione dei contenuti formativi per il personale civile e militare, chiamato ad operare nelle proprie istituzioni UE e/o prima dell'invio in Missioni e Operazioni dell'Unione ed anche quale ausilio e repository per la preparazione degli incontri periodici delle sue diverse articolazioni e configurazioni. I paesi anglosassoni hanno una maggiore esperienza nell'utilizzo dell'e-learning nella didattica. Per esempio in Australia da molto tempo si sono posti come obiettivo quello di sviluppare una cultura dell'e-learning all'interno della forza armata (Newton & Ellis, 2007), negli Stati Uniti riflettevano e comparavano i modelli di e-learning adottati nella formazione militare già all'inizio degli anni Duemila (Wood, Douglas, & Haugen, 2002) e prestano attenzione alla progettazione dei corsi online per la formazione militare tuttora (Bailey & Bankus, 2017). In Gran Bretagna il Ministero della Difesa già nel 2006 aveva stanziato 300.000 sterline per il Defence Learning Portal che offre una serie di servizi web-based per supportare l'e-learning di tutta la Difesa (Buch, 2006).

## **Il modello di formazione adottato dall'Esercito Italiano**

L'e-learning richiede agli utenti di impegnarsi in un'adeguata autoregolazione. Le due teorie alla base della costruzione del modello di formazione sono la teoria dell'autodeterminazione e la teoria del controllo del valore. Spiegano i meccanismi della motivazione e dell'autoregolazione dello studente e insieme alle teorie di learning design consentono di aumentare l'active e il collaborative learning. La prima teoria (Raes & Schellens, 2015) sostiene che il discente beneficia maggiormente dalle opportunità di apprendimento autonomo se è intrinsecamente motivato ad apprendere e questa situazione è fondamentale se si vuole creare un ambiente di apprendimento capace di sviluppare competenze (van Loon & Martens, 2012). La seconda teoria (Muñoz et al., 2016) afferma che gli studenti hanno emozioni di successo riguardo alle loro capacità di completare un'attività e raggiungere un obiettivo; solo quando attribuiscono un valore all'attività che debbono svolgere si concentrano al raggiungimento del successo. Tali teorie forniscono suggerimenti fondamentali per la progettazione di attività didattiche sfidanti e coinvolgenti consentendo al tempo stesso esperienze di apprendimento strutturate socialmente. Per la creazione del modello si sono tenuti anche presente i comportamenti collaborativi nell'apprendimento, in particolare ci si è riferiti al quadro ICAP (Chi & Wylie, 2014) che contempla i quattro modi possibili dal più al meno coinvolgente: interattivo, costruttivo, attivo e passivo. Le attività proposte nei corsi online di formazione del modello mirano ad un apprendimento interattivo, attraverso per esempio a discussioni con i pari, o costruttivo, attraverso la preparazione di documenti, o ancora attivo mediante l'utilizzo di materiali multimediali che richiedono elaborazione personale prima di rispondere a domande mirate. Si è cercato di evitare l'apprendimento passivo in quanto è dimostrato che

una filosofia cognitiva di design che sfrutta la struttura ICAP per la collaborazione può aumentare la motivazione e l'impegno individuale (Nokes-Malach et al., 2015).

Il modello ha come obiettivi principali quelli di:

- razionalizzare e valorizzare la formazione dei militari, in particolare quella che avviene lungo la carriera al di fuori dei momenti prefissati e formali anche post laurea;
- garantire una formazione di qualità e accessibile a tutto il personale anche a coloro i quali sono dislocati in teatri operativi esteri;
- contribuire ad innalzare le competenze digitali del personale militare;
- creare una comunità di militari in grado di scambiarsi soluzioni, strategie risolutive, buone pratiche e di supportarsi a vicenda, aumentando il team building anche in ambiti diversi quale l'ambiente di apprendimento virtuale.

La struttura del modello può essere pensata come un tetraedro nei cui vertici sono posizionati quattro piattaforme integrate che contemplano: (a) il portale dei corsi di formazione self-paced. Ha la funzione di garantire una formazione continua per il dipendente della F.A. ed è rivolto a tutte le categorie di personale. La piattaforma ospita i corsi in formato e-learning che sono fruibili in qualsiasi momento della propria carriera. Configurando opportunamente la piattaforma, per ogni individuo si avrà un percorso formativo ben delineato che sarà indispensabile per l'accesso ai futuri corsi che il singolo vorrà intraprendere. I progressi formativi saranno evidenziati dai badge elettronici conseguiti. In quest'ottica si potrà fare uso anche della nuova capacità della piattaforma Moodle di delineare dei piani formativi per l'acquisizione di determinate competenze che saranno previste e programmate a livello centrale; (b) il portale della conoscenza. Ha il compito di rendere disponibile una mediateca comprendente le pubblicazioni militari di interesse della F.A. e video di approfondimento delle varie discipline. Nata con l'idea di costruire una sorta di circolo del lettore dove l'utente potrà oltre che accedere ai contenuti richiesti anche confrontarsi con eventuali esperti di materia, in un ambiente interattivo e multimediale. Sono previste delle aule virtuali dove si potranno tenere delle mini-lezioni di approfondimento utilizzando webcam e microfono, in modo da poter anche creare un link diretto e visivo tra l'esperto e gli utenti. Con la risorsa Database di Moodle è stato creato un vero e proprio archivio delle pubblicazioni in modo da poter velocizzare la ricerca di un determinato argomento, indicizzando le parole chiavi dei documenti. In questo modo si avrà una importante evoluzione: da qualsiasi altra piattaforma Moodle si potrà effettuare un link per la pubblicazione di interesse disponibile direttamente su questo portale. La manutenzione delle pubblicazioni, l'aggiornamento delle stesse e così via, sarà del tutto trasparente ai corsi pubblicati in quanto i link virtuali saranno preservati. Se in un dato corso è stato inserito un link ad una pubblicazione di interesse e la pubblicazione dovesse essere aggiornata, non ci si dovrà preoccupare di andare a correggere il link ogni volta; (c) il portale delle lingue estere. Ha lo scopo di fornire in formato e-learning i corsi di mantenimento delle lingue straniere. Data la complessità della materia e i numerosi plug-in necessari per apprendere al meglio le lingue su Moodle, questa è una istanza ad hoc. La specializzazione di tale portale permette agli utenti di avere un unico ambiente integrato per approfondire lo studio delle lingue, accedendo a risorse multimediali specifiche; (d) l'E-Portfolio dell'IT-Army. Questa

piattaforma, su base Mahara, è di fatto il collante a lungo periodo per la formazione del personale. Mahara si integra completamente in Moodle e fornisce quell'ambiente unico di apprendimento e condivisione che permette alle persone di creare e alimentare quei contatti accademici che consolidano la propria preparazione. Grazie all'aspetto social di Mahara, il personale potrà creare una vera e propria rete di conoscenze che si porterà lungo tutta la vita, con la possibilità di condividere i lavori, acquisire degli spunti, approfondire gli studi con materiali di altri colleghi, ecc. In questo modo si potrà avere un unico archivio di materiale anche per la preparazione di insegnamenti da svolgere in presenza.

All'interno del tetraedro si trova la piattaforma di supporto. Quest'ultimo portale, anch'esso su base Moodle ed integrato nel sistema dei portali, ha il compito di supportare tutti i docenti ed i discenti per quanto riguarda l'uso di Moodle. L'obiettivo è quello di creare un ambiente pienamente integrato che permetta di superare qualsiasi problema sia di natura tecnica sia relativo alla didattica con la supervisione di esperti del settore di e-learning e l'ausilio di tecnici. È possibile richiedere uno spazio nel quale provare eventuali plugin, risorse o attività di Moodle. Per gli utenti saranno disponibili mini-corsi sull'uso di Moodle, permettendo così una alfabetizzazione più completa ed un utilizzo migliore di tutte le risorse che la piattaforma mette a disposizione.

Dopo un'accurata analisi delle esigenze formative, il modello di e-learning scelto non rientra nella tassonomia dei modelli di e-learning per la didattica integrata proposta in (Banzato & Midoro, 2005), che prevede tre classi: autonomo, assistito, collaborativo, ma piuttosto è un mix di questi e può essere definito un modello BeL – Blended e-Learning - nel senso che è una combinazione di più approcci e-learning nell'ambito della stessa azione formativa dove la dinamica face-to-face non si sviluppa onsite (normalmente il termine blended indica in presenza) quanto piuttosto attraverso sistemi di comunicazione sincrona online (video-conference, webinar, conference-call, ecc.). I tre modelli classici vengono utilizzati a seconda dell'obiettivo formativo che si vuole raggiungere. Nella Figura 1 vengono mostrate le componenti del modello in relazione ai processi di apprendimento che intende mettere in atto, alle tipologie di interazione funzionali agli stessi processi nonché agli indicatori di Dublino, usati per raggiungere agli utenti i risultati di apprendimento voluti unitamente alle competenze trasversali da coltivare.

Le strategie principali di e-learning adottate dal modello sono:

- uso mirato di micro blocchi (micro learning objects) di contenuto (blocchi significativi di contenuti correlati, particolarmente importanti per materiale complesso);
- monitoraggio continuo della formazione attraverso test e verifiche all'inizio, in itinere e alla fine;
- condivisione di materiale, funzioni di social media (ad esempio, forum di discussione, costruzione di wiki, blog, vlog) e attività di cooperazione e di valutazione tra pari che incoraggiano la collaborazione;
- autovalutazione con feedback e commenti per il discente per migliorare la metacognizione e l'autoregolamentazione.



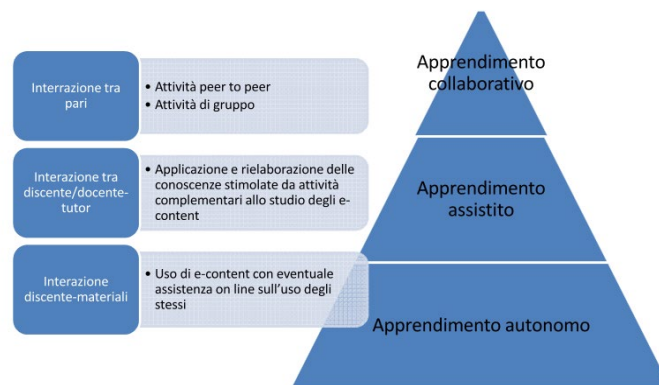


Figura 1. Modello BeL

Il modello contempla l'utilizzo di materiale digitale vario come applicazioni di realtà virtuale, animazioni 3D, scenari immersivi, strumenti real time, video, interviste, tutorial, podcast, blogs, forum, chat, wikis, test con valutazione automatica in grado di contemplare non solo quiz ma anche risposte con formule, liste, immagini e grafici, file interattivi che consentono di risolvere problemi passo a passo.

Gli attori coinvolti sono molti: esperti di e-learning di COMFOR (comprese le scuole dipendenti) e UNITO, tecnici, formatori, docenti, tutor da un lato e tutte le categorie di personale della Forza Armata, di ogni ordine e grado compreso il personale civile, in qualità di fruitori dall'altro. In prospettiva il personale che potrà essere coinvolto potrà essere coincidente con tutto il personale in servizio.

Il modello dopo una prima fase di progettazione e realizzazione è diventato operativo nel settembre 2017 e ha già erogato due corsi base Moodle per tutti i primi blocchi di personale che a vario titolo andrà ad operare come formatore sulle piattaforme. Ai corsi hanno partecipato 112 persone (54 e 58) e lo hanno completato in 99 con feedback ampiamente positivi (gradimento: 15 eccezionale, 66 buono, 16 soddisfacente e solo 2 insoddisfacente). È in previsione il lancio di un modulo avanzato, al quale hanno già dichiarato di voler prendere parte in 45 mentre in 18 no.

Nella costruzione di questo modello di e-learning la collaborazione di COMFOR e UNITO è stata fondamentale sia nella fase di progettazione sia nella ricerca congiunta da parte delle due istituzioni di soluzioni ad hoc per soddisfare richieste specifiche di formazione. Nel futuro la collaborazione potrà prevedere anche la produzione congiunta di materiali, la condivisione di insegnamenti on-line e di personale come formatori e tutor.

### Analisi e discussione del modello

Una prima analisi del modello di e-learning sviluppato può essere condotta analizzando le tre dimensioni principali: quella pedagogica, quella dell'utente e quella tecnica. Ciascuna

dimensione contempla delle sottodimensioni da verificare. Per effettuarla sono stati utilizzati sia i dati ottenuti tramite studio e valutazioni di esperienze pilota, effettuate durante la progettazione del modello, sia i risultati dei due questionari sottoposti ai partecipanti dei primi corsi Moodle, erogati in forma collaborativa al termine di tutte le attività. La tabella seguente raccoglie i principali risultati ottenuti in base alle azioni intraprese.

Tabella 1: Analisi multidimensionale dimensionale del modello

Dim. pedagogica	Azione adottata nel modello	Verifica
Inclusione	Mircro e-learning objects per facilitare il raggiungimento delle competenze secondo un apprendimento personalizzato.	Gli utenti, anche quelli con minime abilità informatiche sono riusciti a completare i corsi e a raggiungere obiettivi formativi minimi. Non ci sono stati utenti con disabilità.
Valutazione formativa	Test di varie tipologie con valutazione automatica e feedback immediati.	Ha consentito agli utenti di avanzare solo se i contenuti erano stati ben compresi.
Modularità	Moduli contenenti argomenti indipendenti con mappa che illustra eventuali propedeuticità e organizzati secondo obiettivi formativi differenti.	Gli utenti oltre ai moduli obbligatori hanno costruito il loro learning path personalizzato con moduli aggiuntivi di loro interesse tra quelli offerti. Il 91% ha dichiarato idoneo la quantità di lavoro richiesta dai vari moduli.
Efficacia dell'apprendimento	Monitoraggio continuo dei tempi e dei risultati delle prove intermedie. Attività interattive e collaborative. Consegne intermedie in piattaforma. Possibile interazione tra tutor e docente.	Gli utenti nei questionari hanno apprezzato le attività collaborative che li hanno costretti a mettersi in gioco in prima persona (2.7 su una scala da 1 a 4) e il supporto dei tutor e del docente (2.9 su 4). Hanno prodotto tutti del materiale multimediale e hanno rispettato i tempi delle consegne.
Esaustività	Inserimento in ciascun corso online di moduli componibili per obiettivi formativi.	3 su 4 è stata valutata la chiarezza dei materiali e sempre 3 su 4 la completezza degli argomenti affrontati. 3.1 la pertinenza degli argomenti.
Dim. dell'utente	Azione adottata nel modello	Verifica
Strumenti disponibili	Strumenti social (forum, chat), di autovalutazione, help on line sempre attivo.	3.2 su 4 la valutazione dell'utilizzo dei forum per scambiare opinioni con i colleghi e con il docente. 3.3. il gradimento dello strumento anche solo per leggere.
Disponibilità	Piattaforma Moodle integrata sempre disponibile 24 h. Accesso con credenziali uniche.	Nei commenti dei campi liberi gli utenti hanno manifestato grande apprezzamento per la possibilità di collegarsi in piattaforma nei momenti sia lavorativi che extra. In questo modo nessuno ha dichiarato l'impossibilità a completare il corso.

Usabilità	Materiali multimediali facilmente trovabili in piattaforma e scaricabili.	Molti sono stati gli utenti che hanno scaricato in formato cartaceo i materiali e i video sul proprio pc. Poche richieste all'help di aiuto per trovare materiali.
Dim. tecnica	Azione adottata nel modello	Verifica
Tecnologia	Moodle integrato con sistemi di web conference, ambienti di calcolo evoluto e altri plugin specifici.	Gli appunti sincroni si sono sempre svolti con regolarità senza intoppi di rete.
Affidabilità	Sistema sempre disponibile 24 ore su 24. Servizio help desk di primo (tutor) e secondo livello (amministratore).	Gli utenti non hanno mai segnalato difficoltà di accesso o indisponibilità dei materiali.
Interoperabilità	Materiali preparati secondo gli standard, utilizzabili nelle differenti piattaforme.	Alcuni docenti militari hanno cominciato ad adoperare dei materiali prodotti nel corso per i loro insegnamenti.
Efficienza	Riduzione degli errori della piattaforma al minimo, possibilità di usare anche solo una parte della piattaforma in maniera indipendente.	Le 4 piattaforme hanno operato anche in maniera indipendente e l'accesso per taluni utenti è stato dato con limitazioni. Dall'apertura non si è verificato alcun errore.
Riutilizzo	Corsi online riutilizzabili anche su altre piattaforme.	Si sta discutendo su una coproduzione e una condivisione di insegnamenti e minicorsi online con UNITO.

Da questa prima analisi sicuramente scaturisce una serie di raccomandazioni per il futuro immediato. Continuare ad adoperare nella preparazione dei materiali nei vari formati multimediali e di contenuti basati sulla filosofia cognitiva dell'interattività. Somministrare un pre-test agli utenti prima della frequenza di qualunque corso per consentire loro di testare le loro basi in maniera che possano indirizzarsi in maniera mirata verso quelle risorse e attività utili per loro. Utilizzare tecniche appropriate di comunicazione per massimizzare le opportunità di apprendimento (ad es. utilizzo di parole chiave e mappe concettuali, limitazione di informazioni non necessarie). Includere strategie di autoapprendimento per aiutare il discente nello sviluppo delle capacità di autoregolazione. Utilizzare strategie capaci di stimolare i livelli più profondi di elaborazione cognitiva (ad esempio, l'elaborazione o la progettazione di una nuova attività). Consentire l'autovalutazione ove appropriato e fornire ulteriori opportunità agli studenti di riflettere sulle proprie competenze e sulla comprensione dei concetti. Usare nella valutazione feedback e commenti. Favorire la collaborazione con Wiki, discussioni e valutazioni tra pari, chat room online per consentire ai gruppi di utenti di verificare reciprocamente le ipotesi.

## Conclusioni

Sicuramente i risultati di questa prima fase sono molto incoraggianti anche perché non sono state rilevate particolari criticità. Da un lato confermano la bontà del modello adottato dall'altro suggeriscono di procedere nella direzione intrapresa in maniera decisa e spedita. Occorre pertanto da un lato continuare ad investire in termini di risorse infrastrutturali e di personale e

dall'altro, essendo l'e-learning un processo in continua evoluzione, proseguire, anche sfruttando l'attento monitoraggio delle attività svolte consentito dal modello, la ricerca e l'implementazione di soluzioni sempre più avanzate e sempre più adeguate ai fabbisogni della formazione militare.

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## **METTERE A SISTEMA L'APPRENDIMENTO DIFFERENZIATO: IL CASO DELL'IC MARITI DI FAUGLIA**

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### **Abstract**

In questo contributo verrà presentato il caso dell'IC "Giovanni Mariti" di Fauglia (Pisa), in quanto caso emblematico dell'introduzione e della messa a sistema di un'innovazione in ambito scolastico. L'IC "Giovanni Mariti" nel 2002 ha iniziato il suo percorso di Apprendimento Differenziato, giungendo negli anni ad una sistematizzazione di tale approccio fino a farlo diventare nel 2016 una delle 15 idee del Movimento "Avanguardie Educative". Dal 2016 l'IC "Giovanni Mariti" è scuola capifila per l'idea "Apprendimento Differenziato" e nel 2017, in stretta collaborazione con i ricercatori di INDIRE, ha realizzato le "Linee guida di Apprendimento Differenziato" per le altre scuole interessate ad adottare questo approccio. Per costruire questo studio di caso, seguendo il protocollo elaborato dalla redazione del Movimento "Avanguardie Educative" che coordina l'azione "proponi un'esperienza", si è proceduto a: una visita generale alla scuola con la Dirigente Scolastica, un'intervista alla Dirigente Scolastica, un'osservazione in classe e un'intervista alla docente referente. In questo contributo, che si focalizza sulla messa a sistema dell'approccio Apprendimento Differenziato, non verrà presa in considerazione la parte relativa all'osservazione in classe, che sarà oggetto di un successivo contributo.

### **Introduzione**

La valorizzazione dello studente nel contesto classe, come connubio unico e irripetibile di potenzialità, talenti e bisogni, è uno degli obiettivi primari della differenziazione dei processi di insegnamento e apprendimento. È nel contesto classe che il soggetto diviene individuo a tutto tondo, e accogliere il singolo studente nella sua interezza di persona è un atto pedagogico costante che presuppone una "scuola pensata" (Pampaloni, 2008). Con la differenziazione si guarda agli studenti per ciò che sono, valutando realisticamente le loro conoscenze e le loro competenze in un dato momento (Pampaloni, 2008). L'Apprendimento Differenziato, come sottolinea Pescioli (2001), è sia una cultura educativa che un modello didattico (per un approfondimento dell'approccio Apprendimento Differenziato si rimanda a Cannella et al., 2017 e a Pieri et al., 2017). L'approccio Apprendimento Differenziato - AD è stato introdotto e messo a sistema presso l'Istituto Comprensivo "Giovanni Mariti" di Fauglia (Pisa), già promotore della Rete Nazionale Senza Zaino (Orsi, 2016), fino a diventare nel 2016 una delle idee del Movimento "Avanguardie Educative". Il Movimento "Avanguardie Educative" è stato creato nel 2014 grazie all'iniziativa congiunta di INDIRE e di 22 scuole con il fine di portare a sistema le esperienze più significative di trasformazione del modello organizzativo e didattico

della scuola italiana. Attualmente il Movimento ha una galleria di 15 idee, delle quali una è appunto “Apprendimento Differenziato”. L'IC “Giovanni Mariti”, scuola capofila di questa idea, ha realizzato in stretta collaborazione con INDIRE le “Linee Guida dell'Apprendimento Differenziato” (Cannella et al., 2017) per accompagnare l'adozione di questo approccio in altre scuole italiane. In questo contributo si prenderà in esame il caso dell'IC “Giovanni Mariti”, in quanto esempio significativo dell'introduzione e della messa a sistema di un'innovazione in ambito scolastico.

## **Il caso di studio dell'IC Mariti**

Nella visione di Apprendimento Differenziato dell'IC Mariti è presente un forte richiamo alle competenze di cittadinanza attiva in chiave europea, ben radicato già dal 2001 nei valori di responsabilità, comunità e ospitalità della Rete di Senza Zaino (Orsi, 2016). Gli studenti affinano l'autonomia e sperimentano la responsabilità verso sé stessi e verso gli altri, per poter di volta in volta scegliere le attività da svolgere, partendo da quelle favorite fino ad arrivare a quelle più ardue. Sono il gruppo classe e il docente che, di volta in volta, stimolano e sostengono ogni studente nel completamento di tutte le attività differenziate. In questo modo, ad esempio, pure il ragazzo più reticente riuscirà con successo a completare anche le attività meno gradite, come ad esempio le “spremuta di testi” dei laboratori di italiano, che aveva riservato come ultimo traguardo. La preparazione delle attività differenziate può essere molto laboriosa: richiede inizialmente uno sforzo progettuale e di creazione di materiali preparatori, che viene poi capitalizzato per le classi successive. Ad esempio, si predispongono le schede con istruzioni per l'uso condivise con i ragazzi per gli output richiesti e i tempi necessari, e le card di registrazione per annotare i progressi e i momenti di feedback per poter poi svolgere anche le attività più impegnative perché ritenute lontane dalla propria propensione e preparazione. Nelle attività differenziate in classe, il docente assume tutti i gradienti possibili dei livelli di intervento, dall'osservatore recettivo ma silente, fino a colui che, in uno stato di apprendistato cognitivo e di modellamento, svela al soggetto in situazione il “come fare” per risolvere un determinato compito.

## **Metodo**

Seguendo il protocollo elaborato dalla redazione del Movimento “Avanguardie Educative” che coordina l'azione “proponi un'esperienza” (D'Anna & Nardi, 2018), il caso di studio è stato costruito e documentato attraverso un approccio qualitativo e una messa a confronto delle prospettive dei soggetti coinvolti, nello specifico tramite:

- una visita generale alla scuola con la Dirigente Scolastica;
- un'intervista con la Dirigente Scolastica;
- un'osservazione in aula;
- un'intervista con la docente referente.

Il materiale raccolto è stato organizzato e analizzato; i risultati di questo lavoro, che verranno presentati nelle prossime pagine, sono stati precedentemente condivisi con la Dirigente Scolastica e la docente referente dell'IC Mariti. In questo contributo che, come già accennato,

si focalizza sulla messa a sistema dell'approccio Apprendimento Differenziato non verrà approfondita la parte relativa all'osservazione in classe, che sarà oggetto di un successivo contributo.

## ***Principali risultati***

### *Visita generale della scuola e agli spazi con la Dirigente Scolastica*

L'Istituto Comprensivo G. Mariti è situato in un territorio collinare della provincia di Pisa. L'attività principale di questa zona è l'agricoltura, in particolare negli ultimi anni si sta sviluppando fortemente l'agricoltura biologica, e nella zona c'è una sola grande fabbrica, una multinazionale che produce acciaio. Molti dei genitori degli alunni sono pendolari che dormono nella zona e per lavoro si spostano a Livorno, Cecina o Pisa. Il livello socio-culturale dell'utenza della scuola viene definito dall'INVALSI medio-alto. Attualmente i genitori degli studenti sono nella maggior parte dei casi laureati e diplomati, negli ultimi anni il numero delle persone con un livello di istruzione medio-alto residenti nella zona è aumentato grazie alle persone che sono arrivate dal Nord Italia per aprire agriturismi e coltivare biologico. Questo istituto comprende quattro scuole primarie, tre scuole secondarie di primo grado e sei scuole dell'infanzia, e opera in quattro comuni: Crespina Lorenzana, Fauglia, Santa Luce e Orciano Pisano. L'Istituto Comprensivo G. Mariti rappresenta un punto di riferimento importante per le famiglie del territorio, la sua identità è molto simile a quella di una scuola di comunità aperta al confronto e al dialogo con il contesto circostante. A questo proposito, la Dirigente Scolastica racconta che alcune famiglie si sono trasferite a vivere nel territorio di riferimento della scuola per garantire ai ragazzi l'accesso all'offerta formativa proposta e al metodo utilizzato.

### *Intervista con la Dirigente Scolastica*

La Dirigente Scolastica, che è in servizio presso l'IC Mariti dal 1996, spiega che l'idea di introdurre nell'IC Mariti l'Apprendimento Differenziato è nata nel 2001 su iniziativa di un piccolo gruppo di insegnanti della scuola primaria per fare fronte alla necessità di garantire agli studenti un percorso di formazione individuale. Questo gruppo di insegnanti ha discusso l'idea all'interno del collegio docenti che l'ha approvata immediatamente. L'Apprendimento Differenziato è stato quindi introdotto, dopo un anno di progettazione, prima nella scuola primaria (nel 2002 prima e seconda primaria e poi ogni anno è stata aggiunta una classe) poi nella scuola dell'infanzia. Nel 2006 l'Apprendimento Differenziato viene praticato in tutta la scuola dell'infanzia e in tutta la primaria.

La scuola secondaria di primo grado ha avuto un percorso più lento, iniziato anch'esso nel 2002, ma arrivato al documento finale approvato dal collegio docenti nel 2016. Il lavoro per la scuola secondaria di primo grado è stato molto più complesso e sfidante perché ha implicato maggiori cambiamenti a livello metodologico, didattico e di organizzazione dell'ambiente classe. Per far comprendere e accettare l'Apprendimento Differenziato ai docenti della scuola secondaria di primo grado, e per metterli nella condizione di saper fare Apprendimento Differenziato, sono stati necessari molto tempo e tanta formazione. La Dirigente Scolastica sottolinea come per introdurre e mettere a sistema l'Apprendimento Differenziato nella scuola in generale sia di enorme importanza la formazione dei docenti: bisogna lasciare tempo ai docenti per provare,



sperimentare e attivare dei propri percorsi di ricerca-azione, l'insegnante deve poter approfondire e sperimentare. La Dirigente Scolastica sostiene che nella scuola non bisogna imporre l'innovazione dall'alto ma si deve co-costruire l'innovazione tramite la condivisione dell'idea innovativa e con azioni di ricerca metodologica. Per i docenti nuovi che arrivano all'IC Mariti sono previsti diversi strumenti e dispositivi per avvicinarli all'approccio di AD. Fra questi strumenti vi sono un decalogo relativo alla scuola, l'affiancamento di un tutor (il coordinatore didattico di ogni scuola) e un percorso formativo. I docenti senior formano i docenti nuovi facendo fare loro prima attività di riflessione e poi almeno due esperienze pratiche di come si gestisce una classe e di come si fa Apprendimento Differenziato ai tavoli (simulazione tra adulti). Infine, tutti gli insegnanti nuovi devono leggere il libro della Tomlinson "Condurre e gestire una classe eterogenea" (2012).

La Dirigente Scolastica sottolinea che le risorse economiche necessarie per la formazione si possono trovare in più modi, se c'è un'idea di fondo e questa idea è valida. Come strategia per reperire risorse economiche la Dirigente Scolastica suggerisce di dare trasparenza alle famiglie, alle associazioni di volontariato e alle banche locali. Se la scuola fa nascere la cultura dell'appartenenza arrivano i fondi, ad esempio il consiglio di quartiere che ha comprato i tavoli. L'idea di fondo è quella di una scuola che informa il territorio, è pensata per il territorio e appartiene al territorio. Oltre al corpo docente anche le famiglie devono essere costantemente informate e formate, sia in fase di iscrizione dei ragazzi che nel corso degli anni scolastici, relativamente al modello di Apprendimento Differenziato. In alcune classi gli insegnanti hanno fatto sperimentare l'Apprendimento Differenziato direttamente ai genitori, attraverso attività differenziate, ossia mettendoli a lavorare in tavoli diversi facendo cose diverse per perseguire lo stesso obiettivo didattico.

Con l'Apprendimento Differenziato lo spazio-scuola e lo spazio-aula risultano completamente rivoluzionati, il tempo scuola si caratterizza per una maggiore dilatazione e lentezza al fine di favorire nei ragazzi e nei docenti momenti di condivisione, discussione e riflessione, e anche le modalità tradizionali di insegnamento-apprendimento hanno subito notevoli cambiamenti. Nello specifico:

- Spazio: per permettere a tutti gli studenti di fare un lavoro differenziato che risponda al ritmo dei diversi studenti è necessario rivedere in toto sia lo spazio aula che lo spazio scuola in generale. Lo studente deve essere al centro e deve imparare ad essere autonomo e responsabile. Ad esempio, i banchi vengono sostituiti da grandi tavoli per aree di lavoro, la presenza di più aree di lavoro permette agli studenti di scegliere attività diverse e di lavorarci in autonomia. Ogni area di lavoro ha delle procedure scritte da insegnanti e studenti insieme. Ogni volta che nell'aula si inserisce una nuova area di lavoro docenti e discenti co-costruiscono procedure di utilizzo, ad esempio per materiali come il leggio o lo schedario di lingue, nelle procedure di utilizzo verrà esplicitato come si usano e come si mettono a posto. Gli spazi e gli arredi dell'IC Mariti sono stati fortemente modificati, ad esempio, i banchi sono stati sostituiti dai tavoli e sono state messe delle palline da tennis sotto tutte le sedie per attutire il rumore.

- Tempo: il tempo scuola con l'Apprendimento Differenziato è più lento, gli studenti hanno bisogno di leggere e capire le istruzioni prima di avviare l'attività. Il tempo *slow* è un tempo che permette a tutti di partecipare. Il tempo *slow* è stato oggetto di riflessione per un anno con gli studenti della scuola, dall'infanzia alla secondaria di primo grado, con il libro "La lentezza della lumaca" di Luis Sepulveda. Ogni mattina studenti e docenti fanno la pianificazione della giornata e decidono a cosa dare la priorità all'interno del programma della giornata, quindi il tempo non è mai lo stesso. Ad esempio, ogni classe fa la ricreazione quando lo ritiene opportuno.
- Modalità tradizionali di insegnamento-apprendimento: gli studenti svolgono un ruolo attivo nella pianificazione delle attività quotidiane e le lezioni frontali sono ridotte al minimo. Quando gli studenti terminano il lavoro, il docente fa una sintesi e alla fine della lezione chiede un feedback alla classe ponendo domande come, ad esempio, "cosa avete imparato?" o "cosa vi è piaciuto?". Alla scuola primaria non si fanno interrogazioni ma "mini-conferenze" nelle quali gli studenti raccontano quello che hanno imparato, e non ci sono voti. Alla secondaria di primo grado si alternano "conferenze" e "interrogazioni" con i voti. I compiti non ci sono per la scuola primaria perché la scuola è a tempo pieno, i docenti danno solo delle piccole attività da svolgere o da terminare per il fine settimana. Nella scuola secondaria di primo grado, dove c'è solo un tempo prolungato da 36 ore mentre tutti gli altri ne prevedono 32, i compiti ci sono: nel primo anno sono meno e poi aumentano con il passare degli anni e il crescere della responsabilità, arrivando ad un massimo di un'ora e mezza/due al pomeriggio.

Le tecnologie sono presenti all'interno della scuola e favoriscono la realizzazione delle attività differenziate, ma hanno un ruolo secondario e di supporto rispetto alla sostenibilità dell'approccio AD. Nella scuola ci sono molti computer mobili e fissi, tablet e il collegamento wi-fi è disponibile in tutte le classi. Nella scuola è presente una persona che si occupa della manutenzione delle tecnologie. I docenti e i ragazzi decidono quali tecnologie usare di volta in volta: tablet, pc fissi e Lavagne Interattive Multimediali (LIM). Nelle scuole primarie si è scelto di mettere la LIM in un'aula collettiva e non in ogni singola aula. Dal 2016 nelle classi quarte e quinte della scuola primaria tutti i ragazzi hanno dei tablet che restano a scuola. Nella scuola secondaria di primo grado ci sono alcuni insegnanti che mettono in atto l'approccio Bring Your Own Device (BYOD), gli studenti possono quindi portare a scuola i loro dispositivi mobili ma, per norma condivisa dell'IC Mariti, possono estrarli dallo zaino solo quando servono come strumenti di lavoro in classe.

Per quanto concerne il radicamento e la diffusione della proposta di innovazione, l'Apprendimento Differenziato, la DS sottolinea come, una volta definita la proposta di innovazione con un gruppo di docenti, l'aspetto prioritario sia costruire passi informativi/formativi per coinvolgere gli altri docenti. Quando dei docenti manifestavano interesse l'istituto pagava la loro formazione, e in cambio questi docenti dovevano restituire alla loro scuola e poi al Collegio quello che avevano imparato. E poi man mano quanto era stato appreso veniva diffuso e messo a sistema. La DS ha sottolineato che talvolta ci sono state, e ci sono, delle resistenze alla messa in atto dell'approccio Apprendimento Differenziato da parte di alcuni docenti; in certi casi questi docenti hanno vinto le loro resistenze nei confronti di AD

grazie al tempo che è stato dato loro per sperimentare e apprendere l'approccio, in altri casi questi docenti hanno cambiato scuola.

Per quanto riguarda la valutazione dell'esperienza di innovazione, l'IC Mariti utilizza una griglia di autovalutazione (una checklist con degli indicatori e dei descrittori e con rubriche e di autovalutazione dei docenti, costruite in modo condiviso nel tempo) che gli insegnanti usano per fare il punto della situazione. Dal punto di vista legislativo non ci sono particolari problemi a mettere in atto l'Apprendimento Differenziato nella propria scuola: le Indicazioni Nazionali (2012; 2018) permettono già di realizzare un lavoro differenziato e l'Autonomia consente alle scuole di organizzare le attività che ritengono importanti per costruire la loro idea di scuola. Gli attori principali coinvolti nell'esperienza di innovazione sono i docenti, che possono sperimentare attivamente nelle proprie classi anche senza la spinta del DS, ma se l'innovazione deve essere portata a sistema a livello di scuola il ruolo del DS è fondamentale nell'organizzazione di attività di formazione, nello scambio di buone pratiche, nel riconoscere l'attività di ricerca e di innovazione portata avanti dai docenti. Il personale ATA vive il clima della scuola, anche se non ha un rapporto diretto con l'attività di differenziazione. Per quanto riguarda una valutazione globale dell'esperienza la DS ha individuato diverse criticità da sciogliere per intraprendere AD, fra queste criticità vi sono a) il dover portare tutti i docenti alla condivisione della metodologia e b) la rigidità dell'assegnazione dei docenti sulla scuola secondaria di primo grado.

La DS sottolinea come in casi come quello dell'IC Mariti si rivelerebbe più utile la possibilità di avere un organico funzionale piuttosto che un organico rigido e su cattedra. Tra gli aspetti positivi vi sono sicuramente il coinvolgimento e la soddisfazione nello stare a scuola, il piacere di venire a scuola dei bambini e l'entusiasmo dei docenti. La DS ritiene che per rendere questa esperienza replicabile in altre scuole sia indispensabile la disponibilità del DS e dei docenti a metterla in pratica.

#### *Intervista con la docente referente*

La docente referente sottolinea come l'approccio Apprendimento Differenziato consenta di sviluppare al massimo le competenze degli studenti in relazione ai loro stili di apprendimento. L'Apprendimento Differenziato, come ha sottolineato la DS, prevede una diversa impostazione dello spazio e del tempo dell'insegnamento/apprendimento e sostiene il docente nel suo agire didattico per far emergere le potenzialità di ogni studente e, contemporaneamente, offrire anche nuovi stimoli a tutta la classe. L'introduzione dell'approccio Apprendimento Differenziato nel fare scuola quotidiano implica un impegno costante e di continua ricerca da parte del docente. L'applicazione di un modello di progettazione e validazione ciclico alla programmazione consente al docente di riflettere sul percorso realizzato e di costruire il processo di apprendimento conferendo agli studenti un ruolo attivo nella definizione delle attività didattiche.

La definizione del curriculum, ad esempio, è il risultato di un lavoro di co-progettazione tra docenti e studenti, elemento che aumenta la gratificazione e il livello di partecipazione degli alunni. Gli studenti partecipano in maniera più attiva al loro percorso formativo, avendo

consapevolezza degli obiettivi formativi e giungono, alla fine del percorso, ad avere anche gli strumenti per auto-valutarsi. La consapevolezza da parte degli studenti relativa al percorso di apprendimento consente loro di auto-valutarsi. Le modalità di valutazione sono condivise tra i docenti e tra i docenti e gli studenti, e vertono sull'attività svolta e non sul soggetto. La scuola utilizza un "sistema dei semafori" (rosso, arancione, verde e blu) che sostituisce la valutazione numerica. La valutazione riguarda compiti autentici e la prestazione svolta. Il comportamento incide a livello di impegno, partecipazione e responsabilità dell'alunno. Le schede di valutazione e autovalutazione vengono consegnate anche alle famiglie.

Il lavoro che si svolge all'interno della scuola è anche di partecipazione sociale, verso la realizzazione di un curriculum verticale, per piccole tappe, dalla scuola dell'infanzia alla scuola secondaria di primo grado. L'approccio Apprendimento Differenziato consente agli insegnanti di organizzarsi per lo svolgimento delle attività, grazie all'apertura e alla collaborazione tra colleghi. Per quanto riguarda i benefici per gli studenti, l'Apprendimento Differenziato, che si basa sullo sviluppo delle competenze degli studenti in relazione ai loro stili di apprendimento, consente di potenziare le eccellenze (anche attraverso azioni di tutoraggio). Le attività basate sulla partecipazione e sulla cooperazione tra docenti e studenti permettono di sviluppare, all'interno di questo modello, le competenze di cittadinanza. Invece per i docenti i maggiori benefici riguardano l'apertura verso dinamiche di collaborazione, stimolo e dialogo continuo. Le famiglie scelgono di portare i loro figli in questa scuola e, come già accennato, alcune addirittura si spostano appositamente per potere accedere a questa realtà. Esiste una profonda condivisione dei valori relativi all'idea di scuola promossa che vengono riassunti nel documento "Patto per la scuola" (Manifesto) che individua diritti e doveri di tutti i soggetti coinvolti (studenti, insegnanti e famiglie). La cura delle relazioni con le famiglie è unica e comporta molto lavoro da parte del personale docente.

Per ciò che concerne gli aspetti dell'Apprendimento Differenziato da potenziare, secondo la docente referente, vi è la necessità di costruire continuamente dei materiali didattici da utilizzare per le attività di differenziazione didattica. Esiste una "Fabbrica dei materiali" che serve proprio a questo scopo. Si evidenzia, inoltre, il bisogno di implementare la dotazione tecnologica andando in una logica 1:1. Si deve riflettere sui limiti stessi della differenziazione didattica dovuta alla presenza nella classe di una popolazione non omogenea che rappresenta un limite del modello proposto. Per quanto riguarda gli aspetti piacevoli dell'esperienza la docente referente evidenzia il poter applicare questo metodo, che trova congeniale rispetto alla sua idea di insegnamento, nella didattica quotidiana, l'aver a disposizione una documentazione controllata e trascrivibile e il lavorare in una scuola che ha delle risorse (materiali, ambienti e dotazioni tecnologiche) che facilitano il ruolo del docente. Gli aspetti problematici invece riguardano il carico di lavoro e l'impegno costante da parte del docente.

## **Conclusioni**

L'approccio Apprendimento Differenziato è indubbiamente innovativo per quanto riguarda la trasformazione della didattica, l'organizzazione dello spazio e del tempo del fare scuola. La messa in pratica dell'approccio Apprendimento Differenziato modifica totalmente lo spazio

poiché, per permettere a tutti gli studenti di svolgere un lavoro differenziato, che risponda al ritmo dei diversi studenti, all'IC Mariti è stato necessario rivedere radicalmente la configurazione delle aule. L'approccio Apprendimento Differenziato prevede la sostituzione dei banchi tradizionali con grandi tavoli strutturati per aree di lavoro che consentono agli studenti di scegliere le attività di Apprendimento Differenziato da realizzare e di lavorare in autonomia (con i compagni di tavolo, a coppie o individualmente). Il tempo e l'organizzazione della scuola sono stati rivisti a seguito dell'introduzione dell'approccio AD per venire incontro alle esigenze di apprendimento degli studenti. Il tempo slow, che è caratteristica distintiva di questo approccio, è stato introdotto per facilitare la partecipazione di tutti.

A conclusione di questo contributo, si pongono in evidenza gli elementi che, come emerso dalle interviste alla Dirigente Scolastica e alla docente referente, sono strettamente necessari per introdurre e mettere a sistema l'Apprendimento Differenziato in ambito scolastico:

- condivisione all'interno della realtà scolastica del modello e dei valori e della visione di scuola che lo caratterizzano;
- formazione iniziale e in itinere dei docenti coinvolti;
- collaborazione tra docenti;
- informazione e dialogo costante con le famiglie;
- accesso, creazione e condivisione di materiale didattico a sostegno delle attività di Apprendimento Differenziato;
- cambiamento delle aule a livello di setting.

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## **LE PERCEZIONI DEGLI STUDENTI UNIVERSITARI SULLE FAKE-NEWS: UNA SPERIMENTAZIONE FORMATIVA ED EDUCATIVA**

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### **Il problema delle fake news nell'era dei Social Network**

Il tema della veridicità e della verifica delle informazioni veicolate dai Social Network si è recentemente imposto all'attenzione nei contesti educativi e formativi. Un recente report relativo al mondo anglosassone ad esempio rileva la notevole difficoltà degli studenti nel giudicare in modo critico i contenuti dei flussi informativi a cui sono connessi (McGrew et al., 2017). È notevole rilevare però come il problema sia avvertito, oltre che dalle generazioni più giovani, anche tra le fasce di età più alte che hanno ormai eguagliato i loro modelli comportamentali nell'utilizzo degli strumenti del Web 2.0 e sono diventati sempre più simili a quelle più giovani. I social network stanno diventando infatti una delle più importanti fonti di informazione in tutte le fasce di età: Facebook ad esempio è utilizzato dal 35% degli italiani e la percentuale sale al 48% tra i giovani che lo considerano comunque la più importante fonte informativa a cui fanno riferimento (Rapporto Censis, 2017), mentre i media tradizionali perdono costantemente terreno.

Più della metà degli italiani (52%) ha almeno una volta preso per vere notizie in realtà false provenienti dalla Rete. E' interessante constatare che il dato non sia molto legato al livello di istruzione poiché rimane pressoché uguale (51%), ma sale fino al 58% tra i più giovani. Dal punto di vista della percezione del rischio relativo alle fake-news, la maggioranza gli italiani (78%) lo ritiene reale e potenzialmente grave. Per quanto riguarda l'intenzionalità e l'origine delle false notizie, i pareri sono unanimi nel ritenere il fenomeno per lo più come politicamente connotato: anche se tutti concordano che la maggior parte delle news probabilmente sono diffuse da persone o organizzazioni con finalità ben precise, e sono soprattutto le persone più istruite a pensare che esse siano uno strumento per influenzare l'opinione pubblica (74%). La maggior parte degli italiani dichiara comunque di aver fiducia nella propria capacità di riconoscere le notizie false (61% abbastanza e 19% molto) (LaRiCA-Università di Urbino, 2017). Nel contesto italiano gli intervistati dichiarano di credere più a blog e motori di ricerca (62%) che ai giornalisti di carta stampata, radio e TV (48%) (Osservatorio News Italia, LaRiCA-Università di Urbino, 2017). Da questo punto di vista, possiamo quindi dire che nonostante venga percepito il rischio di imbattersi in fake-news, l'influenza dei Social supera comunque di gran lunga quella dei media tradizionali. Interessante anche notare che le notizie sono percepite non più in modo omogeneo, ma come elementi mescolati assieme ad altri contenuti di altre fonti online (The Media Insight Project, 2016).

## **Cosa sono le fake-news e perchè ci crediamo**

Il termine “fake-news” in realtà può assumere significati differenti relativamente al fatto che venga interpretato come *mis*-informazione ovvero l’involontaria diffusione di informazioni false o non corrette oppure come *dis*-informazione vera e propria, ovvero la deliberata creazione e diffusione di informazioni false con una precisa intenzionalità o infine anche come *mal*-informazione: ovvero informazione basata su fatti certamente reali ma che viene usata per colpire persone o organizzazioni (Wardle, 2017). Alcune recenti ricerche sul tema hanno rilevato che molte delle nostre decisioni di dare credito ad informazioni o notizie, indipendentemente dal contesto virtuale o reale nel quale ne veniamo in contatto, dipendono poco dalla razionalità, ma molto dalle cosiddette “shared group-level narratives” (Sloman & Fernbach, 2017) ovvero dalle persone o dai gruppi di cui accettiamo le eventuali affermazioni senza sentire il bisogno di una particolare verifica. Quindi la nostra percezione delle veridicità delle (fake) news dipende molto più dal grado di fiducia che poniamo nella fonte di informazioni e quindi nei processi sociali-relazionali piuttosto che da processi razionali di verifica (Metzger et al., 2010) (Berinsky, 2017). Il ruolo quindi di amici, parenti e conoscenti, di cui ci fidiamo, è in questo senso fondamentale (Southwell, 2013). Ancora più importante il fatto che preferiamo selezionare e credere a informazioni che confermano le nostre credenze, (il cosiddetto “confirmation bias”) piuttosto che a quelle che le contraddicono (Sunstein et al., 2016) e ciò fa sì che costruiamo attorno a noi una vera e propria “bolla di filtraggio” informativa costituita dai nostri preconcetti (Pariser, 2011) che si rivelano poi molto difficili da demolire (Weeks, 2015).

## **Per una educazione al pensiero critico nella valutazione delle informazioni online**

La letteratura di ricerca sul tema della selezione/valutazione e comunicazione delle informazioni è abbastanza concorde a rilevare che gli studenti molto spesso non riescono a raggiungere degli adeguati livelli di padronanza nella selezione e valutazione: ciò sembra dovuto al fatto che le competenze di tipo metacognitivo sono le meno sviluppate (vedi ad es. Ilomäki et al., 2016), mentre dal punto di vista tecnico-operativo non hanno grossi problemi nell’utilizzo degli strumenti come ad esempio i motori di ricerca. Nei contesti formativi ed educativi è importante perciò favorire lo sviluppo del critical thinking (Eales-Reynolds et al., 2013) che aiuta gli studenti a decidere se le fonti da cui provengono le informazioni trovate in Rete siano o meno valide ed affidabili o se i contenuti esaminati siano supportati effettivamente da dati o statistiche. Attività formative ed educative in questo senso sono molto importanti anche per gestire la quantità e la qualità del flusso di informativo a cui gli studenti sono quotidianamente sottoposti e non per non essere soggetti a forme di “l’information overload” a livello cognitivo (Khalid, Saeed, & Syed, 2016) o di l’”information anxiety” a livello emotivo (Bawden & Robinson, 2009).

Il tema della selezione e valutazione critica delle informazioni è presente nella Raccomandazione del Parlamento Europeo DIGCOMP-Digital Competence Framework



## **Le Percezioni degli Studenti Universitari Sulle Fake-News: Una Sperimentazione Formativa ed Educativa**

*Corrado Petrucco, Cinzia Ferranti*

(Ferrari et al., 2013). In particolare, la sua versione più recente Digicomp 2.1 (Carretero, Vuorikari, & Punie, 2017) presenta una tassonomia per lo sviluppo della competenza digitale con indicazioni dettagliate sulle singole dimensioni che la compongono. La prima è proprio la “Information e data Literacy” che si compone di due sotto aree, la 1.1 “Browsing, searching and filtering data, information and digital content” e la 1.2 “Evaluating data, information and digital content” (Troia, 2017). Il framework DigComp può essere usato come riferimento per costruire delle dettagliate rubric (Reddy & Andrade, 2010) per valutare una o più competenze digitali in modo analitico e preciso. La maggior parte degli approcci valutativi alle Competenze Digitali risente però di criticità importanti relative alla scelta dello strumento che si intende utilizzare per la valutazione: test, quiz e questionari tradizionali, non riescono a cogliere la complessità delle dimensioni e dei processi che entrano in gioco nel momento in cui lo studente esce dal contesto formale della scuola o dell’Università e si trova in una situazione problematica reale. Per cui devono trovare spazio forme di authentic assessment (Wiggins, 1998) molto più simili a situazioni reali e ai contesti di vita e di lavoro.

Nella nostra sperimentazione abbiamo voluto perciò coinvolgere gli studenti in una vera e propria attività reale di fact-checking su news presenti sui social e nei media relative ad alcune tematiche di attualità sociale e politica caratterizzate da un livello emozionale importante quali ad esempio l’immigrazione, le ragioni per cui i giovani emigrano all’estero, la legittima difesa.

### **Gli effetti della sperimentazione educativa e formativa sul fact-checking e le fake-news in un corso universitario: dati quali-quantitativi**

All’interno del laboratorio dedicato allo sviluppo delle competenze digitali e all’information literacy, si è quindi proposta una attività formativa sull’Information Literacy e sul fact-checking, da svolgere in modalità blended (in presenza e a distanza) attraverso la piattaforma Moodle. Al termine dell’insegnamento è stato proposto un questionario a cui hanno risposto n=21 (M=0; F=21) studenti. Sono stati rilevati alcuni dati riferiti a prima e dopo l’attività di formazione mirati a comprendere il grado di cambiamento avvenuto attraverso la specifica azione formativa. Ogni domanda del questionario proposto agli studenti è composto da una scala likert a 5, dove 1 corrisponde a “per niente” e 5 a “moltissimo”. Per alcune domande sono riportati media e moda di ogni item riferito a prima e dopo la frequenza del corso.

La prima domanda riguarda la modifica della percezione sull’accuratezza e l’affidabilità delle informazioni presenti sul web (siti, blog, testate, wikipedia, social software, ecc). Si può notare che prima del corso la percezione del web era di una media accuratezza (MEDIA =3 e MODA =3) mentre a fine corso diminuisce (MEDIA =2.71 e MODA =2). Questo significa che l’attività formativa ha in parte diminuito la percezione di accuratezza e affidabilità delle informazioni su web, avendo fornito agli studenti degli strumenti di consapevolezza maggiore nella valutazione delle informazioni.

Dopo l'esperienza che hai fatto, quante delle informazioni che trovi su Web pensi siano accurate o affidabili?

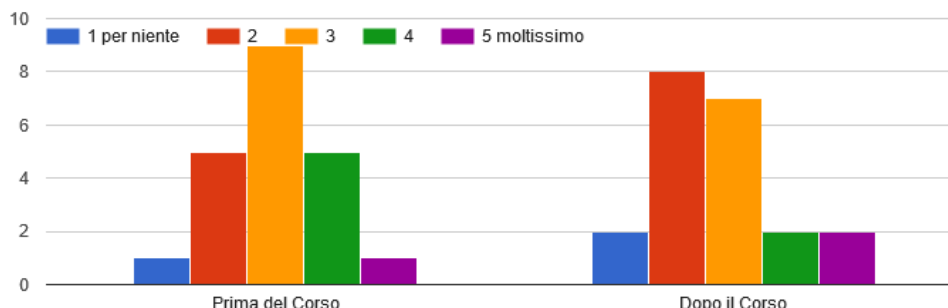


Grafico 1. Percezione di accuratezza e affidabilità delle informazioni su Web

Nel set di domande relative all'importanza attribuita ai vari attributi dell'informazione, ovvero: autorevolezza, accuratezza, completezza e aggiornamento, si può notare che il valore attribuito a tali aspetti dell'informazione nel web è aumentato notevolmente passando da medie comprese tra 2.76 e 2.90 in entrata a medie comprese tra 4.43 e 4.52 in uscita, e portando la moda pari 5 su tutti gli item (Tabella 1).

Tabella 1: Importanza della autorevolezza, accuratezza, completezza e aggiornamento (dati in entrata e in uscita)

Item su autorevolezza, accuratezza, completezza e aggiornamento	MEDIA entrata	MEDIA uscita	MODA entrata	MODA uscita
Quando cerchi sul web, quanto ritieni importante valutare la autorevolezza della fonte?	2.76	4.43	3	5
Quando cerchi sul web, quanto ritieni importante valutare l'accuratezza delle informazioni?	2.90	4.52	3	5
Quando cerchi sul web, quanto ritieni importante valutare la completezza delle informazioni?	2.86	4.48	2	5
Quando cerchi sul web, quanto ritieni importante valutare l'aggiornamento delle informazioni?	2.86	4.48	3	5

Per quanto riguarda la frequenza con la quale gli studenti percepiscono di incorrere in fake-news, quasi la metà degli studenti dichiara che si è imbattuta raramente in notizie rivelatesi in seguito false, mentre circa il 48% dichiara una frequenza maggiore e il 14% addirittura quotidiana.

## Le Percezioni degli Studenti Universitari Sulle Fake-News: Una Sperimentazione Formativa ed Educativa

Corrado Petrucco, Cinzia Ferranti

Ti sei mai imbattuto in notizie che si sono in seguito rivelate false?

21 responses

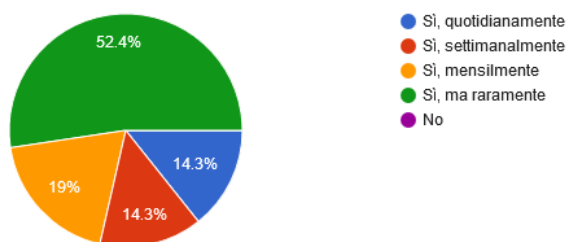


Grafico 2. Percezione della frequenza di incontri delle fake-news

In genere si ritiene che i mezzi di comunicazione online siano maggiormente deputati a diffondere notizie false e che vi siano alcuni motivi specifici alla base. Gli studenti, quasi unanimemente, ritengono che questo avvenga per le seguenti ragioni: mancanza di verifica della notizia, sfruttamento delle emozioni del lettore, fini economici, e fini politici. Il gruppo ha opinioni contrastanti invece sul fatto che sia difficile individuare fake-news (Tabella 2).

Tabella 2: Ragioni della diffusione online di fake-news

Item sui mezzi di comunicazione e fake news	SI	NO
In generale vi è la convinzione che la diffusione di notizie false avvenga più facilmente attraverso i mezzi di comunicazione online. Indica se concordi o meno con le seguenti affermazioni:		
Le notizie sui social media vengono condivise senza una verifica preliminare	20	1
Le notizie false cercano di sfruttare le emozioni del lettore	21	0
Le notizie false sono concepite per generare introiti pubblicitari (esche digitali)	20	1
È difficile individuare le notizie false	12	9
Alcuni paesi o gruppi cercano di orientare il dibattito pubblico mediante la diffusione strategica di notizie false	19	2
Non credo che la diffusione di notizie false avvenga più facilmente attraverso i mezzi di comunicazione online	5	16

Molto interessanti le opinioni sui soggetti che potrebbero intervenire per diminuire il grado di disinformazione online. Secondo gli studenti, che potevano scegliere più di una risposta, il sistema d'istruzione (Scuola e Università – 95.2%) e le autorità pubbliche come ad esempio UE, governi nazionali, autorità competenti (81%) dovrebbero intervenire in quanto soggetti principali di azioni informative ed educative sul tema della disinformazione generata dalle fake-news. Seguono in ordine decrescente di preferenza: i mezzi di comunicazione (61.9%), i cittadini (42.9%), le organizzazioni della società civile (28.6%) e le piattaforme online (19%). Infine gli studenti hanno espresso una valutazione dell'efficacia di alcune azioni adottate dal sistema di istruzione e dalle organizzazioni per arginare le notizie false. Le risposte con relativa media e moda sono raccolte in Tabella 3:

Tabella 3: Valutazione delle azioni per contrastare la diffusione di notizie false

Item sulla valutazione dell'efficacia	MEDIA	MODA
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Quanto sarebbero efficaci le seguenti azioni adottate dal sistema educativo/formativo (Scuola e Università) e altre organizzazioni per favorire le informazioni affidabili e contrastare quelle false?		
Investire di più in nuove forme di giornalismo (ad es. giornalismo investigativo basato sui dati) per offrire informazioni affidabili e accattivanti	3.90	4
Aumentare la cooperazione con altre organizzazioni del settore dei media	4.00	4
Aiutare i lettori a sviluppare competenze in materia di alfabetizzazione mediatica in modo da avere un approccio critico alle notizie online	4.43	5
Aiutare i lettori a valutare le informazioni quando e dove le leggono (ad es. link alle fonti)	4.52	5
Sostenere le organizzazioni della società civile e le piattaforme partecipative (ad es. utilizzando il modello di Wikipedia/Wikinews) per migliorare il monitoraggio e lo smascheramento delle notizie false	4.24	5
Investire in soluzioni tecnologiche per rafforzare la loro capacità di verifica dei contenuti, in particolare per i contenuti generati dagli utenti, in modo da non contribuire alla proliferazione di notizie false.	4.33	5

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Davvero interessante il quadro delle risposte per chi si occupa di progettare o promuovere azioni di sensibilizzazione e formazioni su questi temi. Considerando che mediamente le opzioni mostrate agli studenti si sono rivelate tutte prese in alta considerazione, va notato che risulta molto importante (con una MEDIA= 4.52) saper aiutare i lettori a valutare le informazioni quando e dove le leggono, ad esempio citando e inserendo il link alle fonti, un'azione che richiama l'impegno di tutti, frequentatori del web dove ognuno può leggere e scrivere, non solo di esperti e gli attori della comunicazione.

## Conclusioni

Forse uno dei risultati più interessanti dell'indagine è che la maggior parte degli studenti (più dell'80%) utilizza come elemento discriminante per il giudizio di affidabilità delle informazioni soprattutto la fiducia e la reputazione attribuita alla fonte (persone o istituzioni), e conferma anche la teoria delle "shared narratives" (Sloman & Fernbach, 2017) perché dichiara di cercare conferme alle informazioni sentendo le opinioni da amici o colleghi.

Altro elemento importante da rilevare è come vi sia una forte richiesta da parte degli studenti per una formazione alla fruizione critica delle informazioni e non solo di quelle online. Il fatto che ben l'85% non crede che le fake-news appartengano solo al Web e ai Social è effettivamente un indice che vede la richiesta di una educazione che ponga più attenzione allo sviluppo di un atteggiamento critico verso tutti i flussi informativi dei contesti di vita e di lavoro, indipendentemente dai media utilizzati. È infine consolante, ma anche stimolo ad una grande responsabilità per tutti gli attori della formazione, rilevare che ben il 95% degli studenti indichi la scuola e l'Università come le istituzioni più indicate per attuarla.

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## Le Percezioni degli Studenti Universitari Sulle Fake-News: Una Sperimentazione Formativa ed Educativa

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### **Attribuzioni**

Corrado Petrucco ha scritto i par. 1,2,3 e 5; Cinzia Ferranti il par 4.

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## **DIDATTICA PER COMPETENZE: AZIONI E FIGURE NELLA FORMAZIONE UNIVERSITARIA**

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### **Abstract**

Il contributo presenta le azioni e le figure coinvolte nel progetto “Didattica per competenze” attivato presso l’Università degli Studi di Modena e Reggio Emilia.

Il progetto di durata triennale, nato dalla riflessione sull’acquisizione di competenze trasversali da parte degli studenti in ambito accademico, comporta il ripensamento di strategie didattiche al fine di rendere la formazione universitaria completa e adeguata alle richieste del mondo del lavoro. Le principali azioni condotte sono: formazione dei docenti e dei tutor; ri-progettazione didattica degli insegnamenti e successiva sperimentazione di metodologie didattiche attive in aula; attività con gli studenti di misurazione delle competenze di team working e problem solving.

Oltre agli studenti interessati nel progetto, l’intervento su soft skills e metodologie didattiche ha interessato 16 docenti, titolari degli insegnamenti coinvolti nelle attività sperimentali dell’a.a. 2017/18, e altrettanti tutor.

La riflessione proposta mira a identificare il ruolo e le funzioni delle professionalità coinvolte e a definire le caratteristiche e le modalità operative della comunità di apprendimento che si sta costituendo attorno al tema dell’innovazione didattica all’interno dell’Ateneo.

### **Introduzione**

Come evidenziato nelle “Linee di indirizzo per lo sviluppo professionale del docente e strategie di valutazione della didattica in Università” dell’Agenzia Nazionale di Valutazione dell’Università e della Ricerca (ANVUR), l’attenzione posta sui livelli di qualificazione e valutazione della didattica universitaria richiede la messa in atto di azioni mirate al rafforzamento delle “competenze di insegnamento-apprendimento” dei docenti. L’azione di consolidamento richiede un cambio di rotta rispetto al processo di insegnamento visto come “un fatto privato, per lo più svolto in solitudine nella propria aula” (Ivi, p. 14). Le variabili in gioco chiamano in causa la relazione docente-studente e l’organizzazione didattica delle discipline in due ordini di fattori: in primo luogo, lo stretto legame tra processi di apprendimento e le metodologie didattiche utilizzate dal docente; in secondo luogo, le azioni messe in atto dalle Università per migliorare la qualità della didattica “considerata come la capacità di garantire apprendimenti adeguati e rispondenti alle aspettative degli studenti e di

tutte le parti interessate” (Ivi, p.17), in particolare rispetto alle richieste del mercato del lavoro in termini di acquisizione di competenze trasversali.

Da quando esse sono entrate a far parte del dibattito scientifico e delle indicazioni nazionali e internazionali, l'attività normativa attorno al tema si è evoluta in maniera del tutto naturale, dando maggiore importanza agli esiti di apprendimento (learning outcomes) degli studenti e al loro adeguato inserimento nel futuro contesto professionale, partendo dalla valutazione dell'efficienza e dell'efficacia dell'attività didattica.

Per uno studente universitario in vista della fine del percorso accademico, la definizione delle competenze trasversali acquisite è soprattutto un processo che diviene fondamentale nel momento in cui riflette un'idea di competenza che guarda al ventunesimo secolo, alle richieste espresse dal mercato del lavoro, ai nuovi strumenti tecnologici e alle nuove alfabetizzazioni. Secondo l'analisi “La domanda di laureati da parte delle imprese” del centro Studi Unioncamere e basata sul Sistema Informativo Excelsior, ai laureati è richiesto di saper lavorare su progettualità complesse, su cui interviene una pluralità di soggetti sia interni sia esterni alla realtà aziendale, ai quali approcciarsi con un profilo manageriale e dall'elevato tenore comunicativo. Le attese nei confronti dei laureati sono molto più elevate, anche per quanto concerne il possesso di spiccate attitudini al problem solving e di analisi e sintesi, nonché alla capacità di gestione autonoma dei propri compiti.

Nella dimensione accademica, invece, la definizione delle competenze degli studenti è un obiettivo: l'ANVUR presenta già nel suo documento costitutivo (DM 987/2016, all.E) la possibilità di aggiornare l'insieme degli indicatori di accreditamento delle Sedi e dei CdS a seguito delle sperimentazioni e sulla raccolta di dati condotti al riguardo. Ciò significa che, nell'allineamento gestionale e amministrativo su cui gli Atenei lavorano in vista dell'accREDITAMENTO periodico, l'attenzione alla didattica non può certamente essere posta in secondo piano rispetto al resto degli adempimenti. Anche le recenti indicazioni della CRUI vanno in questa direzione: il Report 2015 dell'Osservatorio Università-Imprese ha focalizzato l'attenzione sulle competenze rilevanti per il mondo del lavoro e, tra le questioni emerse, ci sono:

- necessità di creare, all'interno dei corsi di laurea magistrale e dottorati di ricerca, percorsi che promuovano l'imprenditorialità e la cultura d'impresa;
- necessità di promuovere la diffusione di competenze trasversali e multidisciplinari, anche attraverso forme di sperimentazione didattica.

A vent'anni dal Processo di Bologna, l'intensa attività intergovernativa tra gli Stati partecipanti ha permesso lo statement di uno spazio unico europeo dell'Alta Formazione, organizzato con regole comuni e principi condivisi. Tra le importanti novità apportate dal processo, l'attenzione posta sulla figura del discente (e non del docente) come centro dell'agire didattico, ha spronato gli atenei a concentrarsi su una progettualità volta al ripensamento della didattica orientata a due obiettivi di fine percorso: l'effettivo raggiungimento delle competenze disciplinari espresse nelle schede di insegnamento e lo sviluppo di competenze trasversali.

In linea con quanto descritto finora, il contributo descrive e presenta le figure coinvolte nel progetto Didattica per Competenze, finanziato dal MIUR, che ha per obiettivo lo sviluppo, su



base sperimentale, di metodologie, strumenti e strategie che permettano ai docenti dell'Ateneo di mettere in atto azioni che, favorendo un apprendimento partecipativo degli studenti, siano finalizzate alla formazione di laureati con un bagaglio di competenze trasversali coerente con quanto previsto dal Processo di Bologna.

## **Il progetto “Didattica per competenze” dell'Università degli Studi di Modena e Reggio Emilia**

Fra gli obiettivi dell'Università di Modena e Reggio Emilia vi è quello di favorire lo sviluppo e il potenziamento di buone competenze negli studenti, collegate ai profili professionali richiesti dal mercato del lavoro, in riferimento alle azioni previste dal piano integrato 2016-2018 inerenti l'assicurazione di un'offerta formativa dai contenuti solidi e lo sviluppo e il rafforzamento di buone prospettive occupazionali per i laureati (Piano Integrato UNIMORE, pp. 25-26).

Da tale necessità è stato proposto e avviato il progetto “Didattica per competenze” che si articola attorno all'ipotesi per la quale l'introduzione di azioni di innovazione didattica nei contesti universitari incide positivamente sull'acquisizione da parte degli studenti di competenze trasversali. Focus del progetto è lo sviluppo di due particolari soft skills: problem solving (risoluzione dei problemi) e team working (lavoro di gruppo).

Alle attività di studio della letteratura con particolare attenzione al contesto Italiano, è seguita nel triennio in oggetto l'individuazione di docenti da coinvolgere nelle attività di formazione e sperimentazione didattica e la misurazione su gruppi sperimentali e di controllo delle competenze trasversali in entrata e in uscita. Da qui le fasi del progetto:

- a.a. 2016/17, analisi dello stato dell'arte, progettazione didattica dei corsi e formazione dei docenti con il supporto di coach esperti.
- a.a. 2017/18, sperimentazione didattica in sedici insegnamenti afferenti a tre macroaree disciplinari: area scientifica, area economico-sociale e area sanitaria, con il coinvolgimento di circa 1800 studenti (congiuntamente gruppo sperimentale e gruppo di controllo).
- a.a.2018/19, estensione della metodologia sperimentata ad altri 16 insegnamenti degli stessi Corsi di Studio.

I docenti aderenti alla sperimentazione sono stati affiancati da tutor disciplinari posti a sostegno delle necessarie azioni di riprogettazione dell'insegnamento e nelle fasi di erogazione e verifica dei risultati. La metodologia scelta per la sperimentazione è il Team Based Learning (TBL). Questa strategia didattica si fonda sul lavoro collaborativo, sulla flipped classroom (classe rovesciata) e sull'importanza centrale dell'attività in aula che vede gli studenti lavorare prima individualmente e poi in gruppo nella risoluzione di questionari e di un caso-problema. La metodologia è stata utilizzata nei 16 insegnamenti sperimentali. Per gli altrettanti insegnamenti coinvolti nel progetto per l'anno accademico in corso in qualità di gruppo di controllo non sono state previste variazioni nell'erogazione della didattica.

Entrambi i gruppi sono stati interessati nelle prove di misurazione in ingresso e in uscita che hanno previsto la somministrazione on line di una prova definita *in basket*. Si tratta di una classica prova di assessment ad esecuzione individuale, in cui il candidato “gioca” il ruolo di un manager che ha assunto una nuova posizione in un’azienda. L’attività proposta dall’azienda Idea Management è volta alla misurazione delle capacità degli studenti universitari di affrontare problemi in contesti socio-economici e lavorativi non noti a priori, contestualizzando conoscenze, abilità e competenze già acquisite. Il valore atteso è l’incremento statisticamente significativo del valore mediano delle competenze trasversali degli studenti in sperimentazione rispetto agli studenti dei gruppi di controllo.

I primi risultati analizzati mostrano che la maggioranza degli studenti sottoposti alla prova posseggono in maniera adeguata le competenze di problem solving e team working collocandosi nell’intervallo che prevede maggiori possibilità di intervento e potenziamento dei comportamenti in osservazione; basse percentuali di studenti sono collocati nel range della scala che corrisponde a una scarsa/inesistente consapevolezza dei comportamenti che definiscono le due competenze. Il confronto tra i dati emersi dai questionari pre-test e post-test, analizzati limitatamente a quelli svolti da circa 500 studenti, non indicano una sostanziale variazione dei risultati della misurazione. Tale elemento, la cui analisi e definizione è ancora in progress, può spiegarsi in primo luogo con la necessità di intensificare la quantità di azioni di innovazione didattica e di attuare modalità di lavoro più durature nei corsi universitari. Tuttavia le azioni progettuali sono ancora da concludere e la valutazione si sta arricchendo di nuovi elementi e strumenti di ricerca (questionari e Focus Group).

Nella tabella seguente (Figura 1) è possibile visualizzare nel dettaglio temporale le azioni previste per l’a.a. 2017/18 e lo stato di avanzamento delle attività ad oggi.

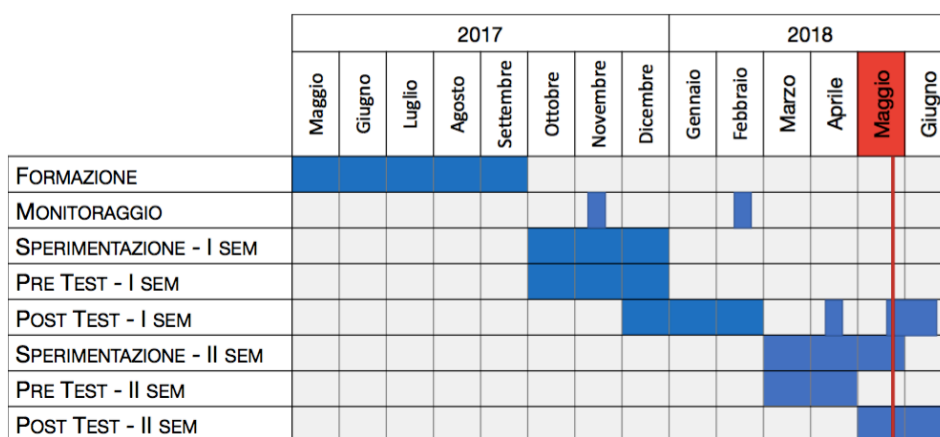


Figura 1. Timeline delle attività progettuali svolte nell’a.a. 2017/2018

Nella sperimentazione sono stati coinvolti:

- 16 docenti;
- 20 tutor disciplinari;
- 1800 studenti;

- gruppo di coordinamento e ricerca formato da docenti, giovani ricercatori, personale amministrativo.

Il lavoro congiunto e la partecipazione attiva di questi attori in tutte le fasi progettuali ha permesso una riflessione approfondita sulle opportunità e sulle criticità emerse sul campo. Lo scenario co-costruito dall'esperienza di ognuno sta evolvendo in molteplici linee di ricerca.

## **Metodi**

L'analisi delle figure coinvolte nel progetto è stata svolta attraverso numerose azioni e strumenti (le rilevazioni relative al secondo semestre sono ancora in corso di svolgimento):

- studio dei documenti di progetto e della letteratura scientifica;
- osservazione e partecipazione agli incontri di formazione e monitoraggio con i docenti, alle prove di misurazione con gli studenti, alle riunioni del team di coordinamento;
- somministrazione on line di tre questionari rivolti rispettivamente a docenti, tutor e studenti coinvolti nelle attività sperimentali nell'a.a 2017/2018.
- realizzazione di due Focus Group, di cui uno con i docenti e uno con gli studenti.

In particolare, i risultati presentati in questo lavoro fanno riferimento ai questionari somministrati nel primo semestre dell'anno accademico corrente.

L'indagine rivolta ai docenti è composta da 39 domande di cui 21 a risposta chiusa e 18 a risposta aperta. Oltre a domande specifiche sull'insegnamento di afferenza e sull'applicazione del TBL, il questionario ha previsto quesiti volti a raccogliere le opinioni e il livello di soddisfazione sulla formazione svolta e sul TBL (metodologia didattica, tempi e numeri, riflessioni sui processi di innovazione didattica). Ai tutor sono state poste 27 domande di cui 8 a risposta aperta e 21 a risposta chiusa. L'indagine si concentra sulle esperienze didattiche e formative pregresse e sulle opinioni degli stessi in merito alla sperimentazione per definire indicazioni pratiche di miglioramento delle azioni sperimentali, le criticità rilevate e il tipo di influenza che tale azione ha avuto sullo sviluppo delle concezioni didattiche dei tutor. Per gli studenti è stato predisposto un questionario di 25 domande di cui 5 a risposta aperta. Nella sezione dedicata al TBL si riprende l'indagine proposta da Parmelee, DeStephen e Borges nell'articolo "Medical Students' Attitudes about Team-Based Learning in a Pre-Clinical Curriculum", pubblicato nel 2009 dalla rivista online Med Educ. Oltre alle informazioni sullo svolgimento di attività lavorative e extracurricolari, il questionario ha indagato le opinioni degli studenti sulle attività sperimentali: attività di didattica attiva in aula e prove di misurazione delle competenze trasversali.

## **Risultati**

Riportiamo di seguito una sintesi delle risposte raccolte nelle indagini somministrate a docenti, tutor e studenti che ci consente di ricostruire le figure degli attori principali coinvolti nel progetto e definire le principali osservazioni sulle attività sperimentali svolte.

## **Docenti**

Come evidenziato, il questionario rivolto ai docenti ha previsto domande volte a raccogliere anche le opinioni e il livello di soddisfazione sulla formazione ricevuta per la realizzazione del progetto e in particolare sul TBL (metodologia didattica, tempi e numeri, riflessioni sui processi di innovazione didattica). I docenti, ripensando alle loro aspettative rispetto al percorso formativo proposto, sottolineano l'importanza del confronto con i colleghi sia di discipline affini che di discipline di aree differenti. Il carattere *interdisciplinare* del gruppo di progetto – formato da docenti, dalle figure di supporto e team di coordinamento e ricerca - si conferma come variabile fondamentale nella costruzione di una comunità di pratiche.

Come favorire la costruzione di una relazione positiva tra docente e studente? Quello che emerge in questa prima fase di analisi dei questionari è la presenza di un clima d'aula che risente in positivo del ripensamento del setting d'aula - anche in relazione delle metodologie didattiche utilizzate nel corso della sperimentazione (TBL). Tra gli obiettivi e le aspettative segnalate dai docenti emerge la necessità di ripensare e al tempo stesso instaurare un rinnovato rapporto con gli studenti e ancora “incidere positivamente sulle competenze degli studenti e sul clima della classe migliorando la capacità di partecipazione”. 4 dei 7 docenti rispondenti è molto soddisfatto rispetto al percorso formativo offerto per partecipare alla sperimentazione; i restanti 3 moltissimo. Per quanto concerne il TBL 5 docenti ritengono che la metodologia sia molto efficace nel proprio insegnamento; 2 moltissimo. Confermano inoltre l'intenzione di utilizzare il TBL nella loro didattica anche in corsi non coinvolti nella sperimentazione oggetto del progetto.

## **Tutor**

La figura del *tutor* sta assumendo un ruolo centrale nella didattica universitaria: in aule di dimensioni sempre maggiori e in ambienti digitali di apprendimento per proporre attività di didattica interattiva come suggerito dai documenti ministeriali e dalle prescrizioni didattiche, è fondamentale aumentare il numero di esperti disciplinari che possano intrattenere dialoghi costruttivi con gli studenti e collaborare attivamente nell'utilizzazione di metodologie attive in aula.

Hanno risposto all'indagine tutti i tutor coinvolti nel primo semestre di sperimentazione, ossia 15.

7 dei 15 individuati hanno un'età compresa fra i 25 e 28 anni; 4 superiore ai 45 anni. 8 hanno un titolo di laurea magistrale, 5 di dottorato di ricerca. Altri 4 dichiarano di star svolgendo un dottorato di ricerca e 3 sono assegnisti.

13 dei 15 dicono di aver già svolto attività di supporto alla didattica in precedenza, 8 affermano di aver partecipato a corsi di didattica nei percorsi di formazione universitari o finalizzati all'insegnamento nelle scuole.

La maggior parte dei rispondenti dichiara di aver partecipato da studente ad attività didattiche svolte nelle modalità di lezioni frontali (14) ed esercitazioni (11). Nel ruolo di esperti

disciplinari, la scelta delle strategie didattiche da utilizzare per l'insegnamento della propria disciplina si allarga a un ventaglio più ampio: lezioni frontali (7), lavoro in piccoli gruppi (3), analisi di casi di studio (2), testimonianze di esperti (2). La risposta è rilevante se collegata anche al fatto che essi riconoscono che le attività di formazione e lo svolgimento delle attività sperimentali ha modificato le loro concezioni su didattica, competenze e progettazione didattica.

Affermano di aver svolto all'interno della sperimentazione principalmente attività di guida nelle attività di gruppo per gli studenti e supporto ai docenti per quanto riguarda la progettazione didattica, la gestione del corso, l'organizzazione dei gruppi, degli incontri, del materiale didattico, la valutazione dei questionari svolti nelle attività di Team Based Learning in aula e anche attraverso l'uso della piattaforma e-Learning di dipartimento. Oltre a tale attività riferiscono di aver svolto il ruolo di osservatori anche al fine di individuare eventuali criticità nello svolgimento delle attività sperimentali. I tutor sono stati spesso coinvolti anche nelle attività di misurazione delle competenze, accompagnando e seguendo gli studenti nei laboratori dell'ateneo sia per la prima che per la seconda prova.

I tutor hanno apprezzato l'entusiasmo manifestato dagli studenti nello svolgimento delle attività riconoscendo un miglioramento nelle prestazioni degli stessi nell'intero percorso formativo. La collaborazione con i docenti, da un lato, e con gli studenti dall'altro fanno del tutor una figura centrale per l'implementazione di pratiche di innovazione didattica.

### **Studenti**

La figura dello studente assume un ruolo centrale nella sperimentazione, perché si configura non solo come attore principale delle azioni proposte in aula, ma anche di quelle in uscita mediante le attività di misurazione e valutazione delle competenze. Del totale di 1800 studenti coinvolti in tutto il corso della sperimentazione, circa 700 hanno preso parte all'attività di misurazione e valutazione delle competenze trasversali nei gruppi sperimentali del primo semestre e, di questi, 304 hanno risposto al questionario proposto dal team di ricerca. L'indagine ha come obiettivo principale quello di conoscere le percezioni e opinioni su tutte le fasi dell'intera sperimentazione svolta. Di particolare rilevanza e approfondimento è stata la sezione di domande sull'esperienza di Team Based Learning, dopo un cospicuo numero di domande sulle esperienze professionali (non accademiche) durante o pre-percorso universitario. La scelta di approfondire questo aspetto è stata dettata dalla consapevolezza che, parlando di competenze trasversali, si deve tenere debitamente conto anche (e soprattutto) di ciò che accade al di fuori dei contesti formali di formazione. A tale riguardo, la percentuale dei rispondenti pari al 71,95% ha affermato di non svolgere attualmente un'attività lavorativa; molto simile è la percentuale di coloro che non ne svolgevano alcuna nemmeno in precedenza (75,99%). Per la stessa ragione è stata posta la domanda sulle attività non lavorative (sport, arte, volontariato etc.) nelle quali gli intervistati sono attualmente impegnati.

La popolazione studentesca è composta da studenti tra i 20 e i 30 anni, frequentanti il primo o secondo anno di corso. Il loro background scolastico è diversificato, ma per lo più la provenienza deriva da un liceo scientifico (36,18%) e da un istituto tecnico (37,83%). Completa

l'informazione il dato che mostra che più della metà dei rispondenti sta attualmente frequentando un Corso di Studi di area economico-sociale (54,93%).

I risultati sulla sezione dedicata al Team Based Learning sono corposi e variabili. Generalmente gli studenti si sono espressi in maniera positiva riguardo all'efficacia della metodologia (quasi il 50% ha risposto positivamente alla domanda "L'attività di TBL è stata utile per lo sviluppo delle competenze trasversali?", uguali risultati sono stati ottenuti alla domanda che indagava l'utilità dell'intero percorso). Il lavoro in gruppo ha sortito giudizi variabili: il 59,57% è molto d'accordo con l'affermazione "Ho trovato il lavoro in gruppo un'esperienza valida".

Tra le esperienze significative merse dai quesiti a risposta aperta ricorre spesso la possibilità, data dal TBL, di lavorare e comunicare coi colleghi di corso e il confronto tra team e con i docenti. Questo ha spronato gli studenti a ragionare insieme e a superare le divergenze nei momenti di discussione. Alcune difficoltà emergono nei commenti riguardanti il momento della valutazione. Tra i suggerimenti si trovano perlopiù risposte legate alla gestione dei tempi e ai luoghi in cui si svolgevano le attività d'aula e si propone in molte risposte un aumento del numero degli incontri.

Allo stato attuale della sperimentazione non è certamente possibile dare un giudizio definitivo sull'efficacia dell'azione intrapresa nei riguardi degli studenti. Tuttavia, essendo loro i principali destinatari della sperimentazione, l'atteggiamento propositivo verso la novità e la modifica del loro abituale clima d'aula fa ben sperare che la popolazione sia pronta ad accogliere l'innovazione e a partecipare attivamente ad essa.

## **Riflessioni conclusive**

Pur senza aver indicato queste come finalità principale, il progetto "Didattica per competenze" ha il privilegio di raccogliere attorno a un'*impresa comune* forze e professionalità diversificate del nostro ateneo. Docenti, tutor e studenti sono i protagonisti delle azioni di didattica innovativa messe in atto, ma non sono i soli: il personale tecnico-amministrativo, ricercatori e formatori, esperti delle pratiche valutative stanno mettendo a disposizione le loro competenze nell'*impegno reciproco* nelle azioni sperimentali. Nella formazione dei docenti e degli studenti, ciascuno a suo modo e in base alla sua professionalità/ruolo sta condividendo un *repertorio comune* di concetti, strumenti ed azioni legate alla didattica attiva, alla definizione di competenza, al Team based Learning. Involontariamente, il gruppo di lavoro coinvolto ha assunto le caratteristiche di una comunità di pratica così come definita da Etienne Wenger (2006).

Il progetto continuerà nei prossimi mesi e nel prossimo anno accademico con la puntualizzazione degli strumenti di misurazione delle competenze, con l'analisi completa dei questionari e dei Focus Group realizzati, con l'individuazione e la formazione di nuovi docenti e tutor. Ci sarà la possibilità di perfezionare i meccanismi di lavoro messi a punto nel primo anno di attività per permettere ai nuovi arrivati (docenti e studenti) di fare esperienze, acquisire conoscenze e competenze facendo della comunità di pratica attivata "un luogo privilegiato per la creazione di conoscenze" (ivi, p. 241). Nella relazione tra esperienze costruite e competenze

sviluppate da tutte le figure coinvolte, il gruppo di lavoro potrebbe configurarsi come una comunità di apprendimento e, come tale, diventare propulsore dell'innovazione didattica per l'intera comunità accademica.

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## COMPETENZE CRITICHE E RIFLESSIVE IN UN CORSO UNIVERSITARIO BLENDED

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### **Abstract**

Il presente contributo descrive l'applicazione dell'approccio trialogico all'apprendimento in un corso universitario blended finalizzato a promuovere competenze di knowledge-work, con particolare attenzione alle competenze critico-riflessive legate all'auto-valutazione e al miglioramento continuo dei prodotti. Al corso hanno partecipato 109 studenti divisi in 11 gruppi. Dopo aver descritto l'approccio teorico e il contesto di applicazione, con riferimento alle attività specificatamente progettate per lo sviluppo di tali competenze (ruoli, peer-feedback, strumenti di auto-monitoraggio), il contributo illustra lo studio messo a punto per osservare l'impatto del corso sulla percezione di sviluppo delle stesse e sulla capacità effettiva di valutare e auto-valutarsi. I dati raccolti comprendono 90 questionari anonimi pre- post e 22 prodotti collaborativi. I dati sono stati trattati con un metodo misto, integrando le analisi statistiche degli item Likert-scale del questionario con una valutazione dei prodotti basata su una specifica rubrica messa a punto per questo studio. I risultati evidenziano come a fine corso gli studenti ritengono di possedere tutte le competenze indagate in misura maggiore rispetto all'inizio. Dal punto di vista dei prodotti, poi, si assiste a un sensibile miglioramento a valle del peer-feedback, testimoniando una capacità oggettiva di osservazione critica del lavoro altrui e di riflessione e auto-valutazione sul proprio.

### **Introduzione teorica**

Il contributo descrive un modello di didattica universitaria blended in cui gli studenti sono coinvolti in attività concrete e collaborano per creare conoscenza e costruire artefatti significativi, mentre sviluppano o consolidano competenze chiave per il futuro accademico e lavorativo. Tra queste competenze spiccano quelle legate all'ambito della riflessione critica, alle capacità di valutare costruttivamente il lavoro altrui e di monitorare e valutare sé stessi e i propri risultati (Boud, Cohen, & Sampson, 1999; Kong, 2014). Per la promozione di queste competenze, le autrici si ispirano all'Approccio Trialogico all'Apprendimento (TLA; Paavola, Engeström, & Hakkarainen, 2010), così definito perché sintetizza i processi "monologici" di interiorizzazione concettuale e quelli "dialogici" legati alla cognizione distribuita e all'interazione nella produzione collaborativa di artefatti di conoscenza utili per la comunità e realizzati attraverso la mediazione delle tecnologie.

Il TLA viene concretamente applicato attraverso sei Design Principles (Paavola et al., 2011) che offrono altrettante indicazioni operative utili alla progettazione didattica, in particolar modo



prescrivendo che tutte le attività siano finalizzate alla creazione di “oggetti” di conoscenza, materiali o immateriali, che siano di reale utilità all’interno o all’esterno del gruppo stesso. Attorno alla realizzazione dell’oggetto, si articolano processi creativi e si mobilitano strategie di lavoro individuali e collaborative, sostenute da strumenti e ambienti tecnologici che favoriscono l’agentività individuale e l’interdipendenza fra i membri del gruppo. In particolare, l’approccio trialogico sottolinea l’importanza del miglioramento continuo dei prodotti, realizzato attraverso cicli iterativi di avanzamento della conoscenza e revisione degli oggetti della conoscenza. A tal fine, incoraggia attività di commento critico, valutazione reciproca, auto-monitoraggio, e riflessione condivisa attorno ai processi di apprendimento. Queste attività godono ormai di una lunga tradizione di implementazione e utilizzo efficace all’interno dei percorsi di apprendimento (Butler & Winne, 1995; Carless, 2007; Liu & Carless, 2006), soprattutto se inserite all’interno di una solida e ancorata progettazione didattica, capace di favorire un clima di reale collaborazione e innovazione.

## **La ricerca**

### **Contesto**

Il corso cui fa riferimento lo studio qui riportato è l’insegnamento di Pedagogia Sperimentale all’interno del corso di Laurea Triennale in Psicologia e Salute della Facoltà di Medicina e Chirurgia di Sapienza, Università di Roma, messo a punto attraverso diverse iterazioni (a.a. dal 2015 al 2018) (Sansone, Cesareni, Bortolotti, & McLay, submitted). Al corso hanno partecipato 109 studenti (M:27 – 25 %, F:82 – 75%), divisi in gruppi di 10-11 componenti ciascuno. Il corso è durato 10 settimane divise in 3 moduli didattici, ciascuno dedicato a uno specifico argomento: 1. Il Bravo Insegnante, 2. Le Tecnologie nella Didattica, 3. Lo scenario Pedagogico. Quest’ultimo costituisce l’oggetto finale trialogico e consiste nella richiesta di documentare la progettazione di una attività didattica collaborativa mediata dalle tecnologie e pensata per la scuola dell’obbligo, l’università o contesti formativi extra-scolastici. In ciascuno dei tre moduli, seguendo le indicazioni dell’Approccio Trialogico, gli studenti dovevano: (a) lavorare in gruppo per approfondire i contenuti del corso e costruire nuova conoscenza; (b) assumere specifiche responsabilità, attraverso l’assegnazione di ruoli con compiti ben definiti (es. tutor sociale, sintetizzatore, revisore); (c) integrare diverse forme e formati di conoscenza (es. procedurale, esplicita; video, casi, lezioni, etc.); (d) costruire prodotti e migliorarli iterativamente (es. mappe concettuali, scenari pedagogici), attraverso sessioni di feedback e revisione; (e) riflettere sul proprio percorso di apprendimento attraverso questionari periodici di auto-monitoraggio e ruoli specifici (l’osservatore e il revisore); (f) collaborare e comunicare con contesti esterni al mondo formativo per sperimentare pratiche e competenze professionali (in questo caso, il mondo della scuola che attraverso insegnanti e dirigenti è intervenuto a distanza e a lezione per offrire feedback sugli scenari costruiti collaborativamente nel terzo modulo); (g) usare diversi strumenti tecnologici, a seconda delle attività e degli obiettivi. In particolare, le attività online del corso si sono svolte sulla piattaforma Moodle (<http://elearning2.uniroma1.it>).

Ai fini dello studio qui presentato, riportiamo di seguito (Tabella 1) le attività più specificatamente legate allo sviluppo delle competenze critiche di valutazione e auto-valutazione che gli studenti sono stati chiamati a svolgere durante il corso.

Tabella 1: Le attività del corso a sostegno delle competenze critiche

Cosa	Quando	Come
Rivestimento ruolo <i>Osservatore del processo</i>	Durante ciascun modulo: a metà e fine modulo	A turno, in ciascun gruppo, uno studente doveva rivestire questo ruolo compilando una griglia di osservazione critica del lavoro del proprio gruppo, guidata da specifici stimoli.
Peer-feedback dei prodotti di gruppo	Alla fine del primo modulo, dopo la costruzione della mappa concettuale Durante il terzo modulo, dopo la costruzione della prima versione dello scenario pedagogico	Ciascun gruppo era chiamato a commentare criticamente i prodotti di altri due gruppi, utilizzando un template fornito dal docente. Il feedback comprendeva l'assegnazione di un punteggio per ogni criterio compreso nel template e la formulazione di un commento discorsivo con suggerimenti di miglioramento. I gruppi dovevano identificare anche suggerimenti di miglioramento del proprio prodotto, alla luce degli spunti tratti dall'osservazione di quelli altrui.
Rivestimento ruolo Revisore	Durante la costruzione dello scenario pedagogico finale	Uno studente in ciascun gruppo era chiamato a rivestire questo ruolo che consisteva nel sistematizzare i feedback ricevuti da altri due gruppi e dagli esperti, elaborando un report in cui evidenziare una rilettura complessiva dello scenario e le indicazioni finali per la sua revisione.
Compilazione del questionario di auto-monitoraggio	Alla fine di ogni modulo	Ciascuno studente doveva compilare un modulo online contenente una serie di stimoli aperti e chiusi finalizzati a favorire la riflessione sulla propria partecipazione e il proprio apprendimento

### Obiettivi

Lo studio qui illustrato mira a verificare lo sviluppo di competenze critiche di valutazione e auto-valutazione in studenti universitari che hanno preso parte a un corso di Pedagogia Sperimentale basato sull'Approccio Trialogico all'Apprendimento. Nello specifico, le domande di ricerca sono:

- È possibile osservare un cambiamento nella percezione degli studenti rispetto al possesso delle competenze critiche indagate?
- Si rintraccia un miglioramento nei prodotti realizzati dagli studenti a valle dell'attività di peer-feedback?

### Metodo e dati

Per rispondere alle nostre domande di ricerca, abbiamo utilizzato un metodo di analisi qualitativo. Nello specifico, per rispondere alla domanda 1, abbiamo somministrato un questionario anonimo pre- post-, in cui è stato chiesto agli studenti di valutare quanto ritenessero di possedere determinate capacità critiche – di valutazione e auto-valutazione – in

una scala Likert da 1 (per niente) a 5 (molto). Le competenze indagate sono: 1. Valutare il lavoro degli altri, attribuendo un giudizio oggettivo, 2. Valutare il mio lavoro, attribuendomi un giudizio oggettivo, 3. Offrire commenti costruttivi al lavoro degli altri, 4. Ricavare spunti di miglioramento a me utili, osservando il lavoro degli altri, 5. Valutare la qualità del mio impegno, 6. Individuare le mie aree di miglioramento, 7. Osservare e riconoscere ciò che apprendo quando partecipo ad un'attività, 8. Imparare dalle mie precedenti esperienze. Per garantire l'anonimato, agli studenti era richiesto di inserire un nickname che consentisse l'accoppiamento dei dati pre-post. Sui questionari raccolti (N=90; 83% degli studenti partecipanti al corso) sono state calcolate le medie per ciascun item e condotti test di significatività (Anova univariata) per rilevare l'entità del cambiamento riscontrato tra inizio e fine corso.

Per rispondere alla domanda 2, sono stati considerati i prodotti realizzati dai gruppi nel primo modulo: le mappe concettuali a valle della discussione sul Bravo Insegnante – nella loro versione pre- e post- peer feedback (N=11 + 11). Le mappe sono state analizzate da due valutatori indipendenti (il docente del corso e un ricercatore), attraverso una specifica rubrica di valutazione messa a punto per questo studio e ispirata ai principali framework teorico-metodologici in campo di mappe concettuali (Daley et al., 1999; Jacobs-Lawson & Hershey, 2002; Novak & Canas, 2006). La rubrica è composta da 3 dimensioni e 5 criteri, valutati ciascuno con un punteggio da 1 a 5, per un totale di 25 punti attribuibili a ciascuna mappa (Tabella 2)

Tabella 2: Rubrica di valutazione delle mappe concettuali

Correttezza	Contenuti		Relazioni		Codice grafico
	Esautività/sintesi		Correttezza	Articolazione	Efficacia
Quanto i singoli concetti utilizzati sono appropriati, lessicalmente corretti e chiari?	Quanto l'insieme dei concetti è in sé rappresentativo, ovvero i concetti nel loro insieme hanno un senso compiuto o per la loro eccessiva/esigua numerosità e-o scarsa correttezza non producono una mappa sensata?	Quanto le relazioni individuate tra concetti o gruppi di concetti sono corrette?	Quanto sono articolate e ricche le relazioni utilizzate, piuttosto che semplici o assenti?	Quanto la mappa è graficamente efficace grazie all'uso appropriato e funzionale di simboli, colori, font, proporzioni e alla ricchezza delle scelte nel complesso?	

## Risultati

Per rispondere alla prima domanda di ricerca, *E' possibile osservare un cambiamento nella percezione degli studenti rispetto al possesso delle competenze critiche indagate?*, abbiamo analizzato i questionari pre- e post- corso. I risultati evidenziano come a fine corso gli studenti ritengono di possedere tutte le competenze indagate in misura maggiore rispetto all'inizio (Figura 1).

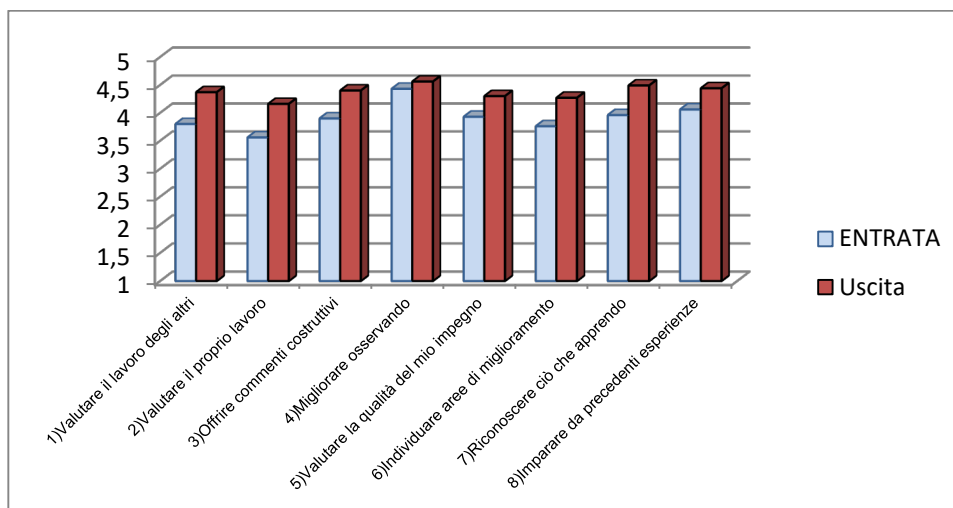


Figura 1. Percezione delle proprie competenze critiche in entrata e in uscita

Le differenze fra entrata e uscita risultano statisticamente significative con  $p < .01$  in tutti gli item, tranne il 4 (*Ricavare spunti di miglioramento a me utili, osservando il lavoro degli altri*). Gli studenti, infatti, ritengono di possedere già in entrata tale competenza (con un punteggio di 4,43 su 5), non consentendo quindi margini di miglioramento. Riconoscono, invece, di aver ampliato notevolmente le proprie capacità di valutazione, sia del lavoro altrui (pre 3,8, post 4,37;  $F = 36,074$ ;  $p < .001$ ) sia del proprio (pre 3,56, post 4,16;  $F = 28,258$   $p < .001$ ), sia della capacità di offrire commenti costruttivi (pre 3,90, post 4,40;  $F = 23,336$   $p < .001$ ). Si tratta di competenze strettamente legate alle attività di peer-feedback compiute, nelle quali era loro espressamente richiesto di valutare il lavoro degli altri, offrendo commenti costruttivi e traendone spunti per migliorare il proprio lavoro. A fine corso, inoltre, gli studenti ritengono di essere maggiormente in grado di riconoscere ciò che apprendono (pre 3,96, post 4,49;  $F = 29,857$   $p < .001$ ) e di individuare le proprie aree di miglioramento (pre 3,76; post 4,27;  $F = 19,699$   $p < .001$ ). Possiamo in tal caso ipotizzare che il miglioramento di tali competenze critiche sia stato favorito dalle attività di auto-monitoraggio richieste al termine di ogni modulo.

Riteniamo importante contestualizzare questi risultati, richiamando i dati raccolti nel questionario iniziale da cui emerge che l'81% degli studenti ( $N = 73$ ) non ha mai svolto una valutazione strutturata dei propri colleghi all'interno del percorso formativo, e il 67% degli studenti ( $N = 60$ ) non ha mai svolto un'auto-valutazione strutturata. Questo corso si è quindi inserito in un percorso sostanzialmente privo di attività finalizzate alla promozione di tali competenze, forse anche per questo riuscendo a promuovere una netta percezione di miglioramento.

Per quanto riguarda la seconda domanda di ricerca, *Si rintraccia un miglioramento nei prodotti realizzati dagli studenti a valle dell'attività di peer-feedback?*, abbiamo considerato i prodotti di gruppo realizzati dagli studenti durante una delle attività del corso, nella fattispecie le mappe concettuali sulla figura del Bravo Insegnante. Il confronto tra le valutazioni delle mappe prima e dopo il peer-feedback mostra un evidente miglioramento nei punteggi (Tab. 3):

Tabella 3: La valutazione delle mappe concettuali ante- e post peer-feedback (min. 5 – max 25)

Numero gruppo	Valutazione ante peer-feedback	Valutazione post peer-feedback
28	12	13
29	16	20,5
30	10	18
31	17	19
32	14,5	20,5
33	15	16
34	10,5	16
35	13	18
36	13,5	15,5
37	11,5	12,5
38	9,5	15

Tutte le mappe sono migliorate in fase di revisione: 5 lievemente (1-2 punti), 4 abbastanza (da 4,5 a 5,5), 2 molto (6 e 8 punti). La media delle valutazioni aumenta quindi consistentemente (3,8 punti), passando da 12,9 per le mappe ante peer-feedback a 16,8 per le mappe post peer-feedback. Notiamo come le mappe con i punteggi inizialmente più bassi (38=9,5 e 30=10) sono anche quelle che registrano un incremento di punteggio più alto delle altre (insieme alla 32); questo fenomeno potrebbe essere legato al tipo di feedback ricevuti dai colleghi o elaborati autonomamente rispetto a un prodotto di per sé inizialmente scarso e forse più facilmente migliorabile.

La Figura 2 mostra un esempio di mappa prima e dopo il peer-feedback:

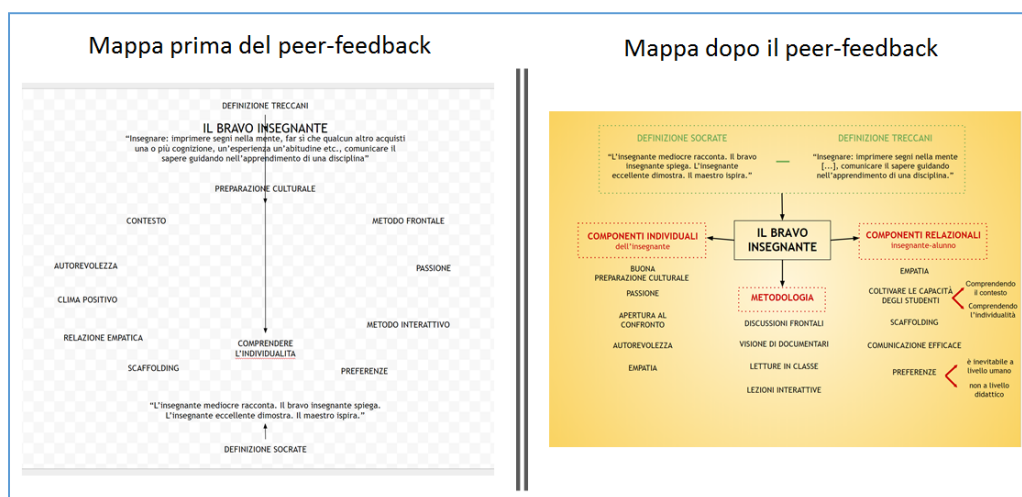


Figura 2. La mappa del gruppo 30 prima e dopo la sessione di peer-review

Emerge in figura come la prima versione della mappa (punteggio 10/25) non risponda adeguatamente ai criteri di valutazione stabiliti: i concetti riportati sono vaghi e ambigui, manca quasi del tutto l'articolazione delle relazioni e l'indicazione di livelli e categorie concettuali, le scelte grafico-formali non sostengono né migliorano la comprensione. Nella mappa finale (punteggio 18/25), invece, i concetti sono espressi in modo auto-esplicativo e, soprattutto, messi

in relazione funzionale tra loro, attraverso l'esplicitazione di diversi livelli. Le scelte grafiche, infine, potenziano i contenuti e sottolineano l'articolazione individuata tra i concetti.

## Conclusioni e direzioni future

In questo contributo abbiamo descritto lo studio effettuato nell'ambito di un corso universitario di tipo blended basato sull'Approccio Trialogico all'Apprendimento, in cui gli studenti sono chiamati a svolgere diverse attività in cui sperimentare o consolidare competenze critiche di valutazione e auto-valutazione. L'obiettivo dello studio è stato proprio quello di verificare come cambia la percezione di queste competenze dopo aver svolto il corso e se è possibile osservare un miglioramento nei prodotti costruiti dagli studenti in corrispondenza del peer-feedback legato agli stessi prodotti. A tal fine ci siamo serviti di un questionario pre- post-, somministrato anonimamente, e del confronto tra le valutazioni di specifici prodotti di gruppo, nella versione precedente e successiva al peer- feedback.

I risultati hanno evidenziato come a fine corso gli studenti ritengono di possedere tutte le competenze indagate in misura maggiore rispetto all'inizio, particolarmente le capacità di valutazione e auto-valutazione, oltre che quella di offrire commenti costruttivi. Dal punto di vista dei prodotti realizzati collaborativamente, questi ultimi migliorano sensibilmente a valle del peer-feedback, testimoniando una capacità oggettiva di osservazione critica del lavoro altrui e di riflessione e auto-valutazione sul proprio.

Questi primi risultati suggeriscono la validità del design di questo corso per la promozione delle competenze critiche tracciate. Lo studio qui presentato rappresenta, comunque, il primo lavoro sui dati raccolti e verrà integrato da: (a) un'analisi delle risposte aperte al questionario pre-, relative al tipo di attività di valutazione e auto-valutazione svolte in precedenza dagli studenti e agli apprendimenti rintracciati; (b) l'analisi dei feedback prodotti dagli studenti e l'eventuale relazione tra qualità del feedback e miglioramento del prodotto. Ulteriori studi approfondiranno le altre attività connesse alle competenze indagate: il rivestimento del ruolo di osservatore e revisore, il peer-feedback e le revisioni connesse al secondo prodotto di gruppo – lo scenario pedagogico.

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## **ATTIVAZIONE, EROGAZIONE E MONITORAGGIO DEI CORSI DI LAUREA BLENDED DELL'UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA**

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### **Abstract**

Il contributo presenta l'esperienza dei corsi di Laurea e Laurea Magistrale realizzati in modalità blended che, in linea con le indicazioni fornite nel Decreto Ministeriale 635 del 8 agosto 2016 e nelle Linee Guida per l'Accreditamento Periodico dei Corsi di Studio Universitario (2014; 2016), prevedono l'erogazione on line di una quota significativa di attività formative (30%-70%).

Il Centro Interateneo Edunova dell'Ateneo di Modena e Reggio Emilia coordina le fasi di progettazione e di realizzazione dei percorsi di studio: formazione dei docenti e degli esercitatori dei singoli insegnamenti; supporto nella (ri)progettazione didattica dei corsi; produzione dei materiali didattici e dei contenuti digitali; gestione delle piattaforme on line (dolly) e delle attività interattive; gestione amministrativa e di segreteria didattica; monitoraggio delle attività di insegnamento.

In particolare, l'intervento si concentra sulle attività inerenti i due corsi di Laurea Triennale e il percorso di Laurea Magistrale attivi nell'anno accademico 2017-2018 e le procedure di attivazione di un terzo corso di Laurea Triennale per l'anno accademico 2018-2019.

### **Introduzione**

Charles Graham (2016) descrive il blended learning "as the convergence between traditional face-to-face learning environments and computer-mediated (or distributed) learning environments" (ivi, p. 5). L'uso originale del binomio "blended learning" (o apprendimento misto) si rifà al collegamento tra classe tradizionale e formazione alle attività di e-learning generalmente accessibili da studenti al di fuori della classe (Singh, 2003). Il termine si è evoluto col diffondersi della pratica nelle università di tutto il mondo e, ad oggi, comprende un insieme molto più ricco di strategie di apprendimento, di approcci didattici, di strumenti digitali di supporto, di figure attive nei processi di progettazione, produzione ed erogazione dei corsi.

Punto focale resta la didattica: il Blended Learning, come metodologia d'insegnamento, richiede una variazione di tempi, spazi, relazioni, attività che sappia valorizzare le caratteristiche peculiari dei due momenti della formazione, cioè aula e on line. Lo svolgimento delle attività



didattiche può essere abbinato a diversificate strategie e metodologie che meglio si adeguano agli argomenti e agli obiettivi formativi di ciascuna disciplina.

I seguenti sei aspetti sono da considerare imprescindibili nella progettazione didattica di un insegnamento blended e riguardano:

1. *i contenuti disciplinari*, per definire cosa lo studente deve sapere e saper fare alla fine del percorso formativo (argomenti, obiettivi, risultati attesi).
2. *le tecnologie didattiche*, con lo scopo di individuare gli strumenti digitali disponibili per perseguire tali obiettivi (strumenti digitali per la didattica e per la comunicazione on line e affordance di ciascuno di essi).
3. *la didattica*, cioè i modelli di lavoro in aula e on line (metodologie didattiche e relazioni formative) che possono rendere più semplice e più efficace il perseguimento degli obiettivi attraverso l'utilizzazione di strumenti di varia natura.
4. *i tempi di erogazione*, aspetto da analizzare in riferimento al docente (nella progettazione, registrazione e produzione dei materiali, nella distribuzione fra ore on line e in presenza) e allo studente che non conclude le attività didattiche con la lezione in aula e con la data di chiusura del corso. I tempi d'aula si estendono nello studio individuale grazie alle registrazioni delle lezioni e alle attività archiviate che lo studente può consultare un numero illimitato di volte e secondo le sue necessità personali.
5. *gli spazi di erogazione*, che modificano le dimensioni d'aula. Lo spazio fisico sconfinava nell'ambiente digitale di apprendimento e, da lì, giunge agli spazi quotidiani della vita dello studente attraverso la connessione alla rete e un device fisso/mobile. Lo studente può "entrare in aula" (accedendo a una piattaforma) con o senza la presenza del docente secondo i suoi tempi di apprendimento e di vita.
6. *i ruoli d'aula*. Lo studente assume un ruolo attivo in un contesto nel quale il docente, oltre al ruolo dell'esperto disciplinare, diviene progettista dell'apprendimento e moderatore delle attività. Si supera la distinzione fra frequentante e non frequentante ed entrano nel processo di formazione altre figure come il tutor disciplinare e gli esperti tecnici e metodologici.

Il tempo e la didattica sono regolati (oltre che dal Consiglio dei Corsi di Studio) da regole comuni, condivise attraverso la normativa che ha disciplinato per le università l'erogazione della didattica mista e l'assicurazione della qualità della stessa. A livello nazionale sono due i documenti fondamentali per l'avvio di un Corso di Studi (CdS) blended: il Decreto Ministeriale 635 dell'8 agosto 2016 e le Linee Guida per l'Accreditamento Periodico dei Corsi di Studio Universitario dell'ANVUR del 2014 e del 2017.

Il DM 635 modifica la precedente normativa portando a quattro le tipologie dei Corsi di Studio, si parla infatti di CdS convenzionali, con modalità mista, prevalentemente a distanza e interamente a distanza. I corsi attivati dall'Università degli Studi di Modena e Reggio Emilia presentati in questo contributo si posizionano nella seconda categoria, CdS con modalità mista,

nella quale si prevede l'erogazione con modalità telematiche di una quota significativa (ma non superiore ai due terzi) delle attività formative (all. E).

Le norme sull'accREDITAMENTO periodico delle sedi universitarie e dei CdS (ANVUR, 2017) definiscono tale un corso blended se "l'attività didattica prevede il supporto delle Information Communication Technology per un numero di CFU non inferiore al 30% e non superiore al 75% dei CFU totali [...]. Nella presentazione dei singoli insegnamenti le attività di didattica devono coprire un minimo di 6 h per CFU, ed auspicabilmente andare oltre questa soglia minima, garantendo altresì almeno un'ora per CFU sia per la Didattica Erogativa che per la Didattica Interattiva" (AVA, 2014; p.3).

Fa parte della Didattica Erogativa (DE) quel complesso di azioni didattiche assimilabili alla didattica frontale in aula, focalizzate sulla presentazione-illustrazione di contenuti da parte del docente (es. registrazioni audio-video, lezioni in web conference, courseware prestrutturati o varianti assimilabili ecc.); la Didattica Interattiva (DI), di più complessa definizione, raccoglie gli interventi didattici rivolti agli studenti da parte del docente o del tutor che ne prevedono una compresenza on line: ne sono degli esempi le *e-tivity* strutturate individuali o collaborative come videoconferenze interattive, compiti, lavori di gruppo, valutazioni formative. Gilly Salmon (2013) definisce le *e-tivities* come framework che consente un apprendimento on line attivo e partecipato da parte di individui e gruppi. Economiche, personalizzabili e riutilizzabili, sono focalizzate sugli studenti e sulla loro possibilità di interpretare, rielaborare, combinare, manipolare le conoscenze. Si basano sulla forte idea che la conoscenza è costruita dagli studenti dal e nel rapporto con i pari.

Il presente contributo descrive l'esperienza dell'Università degli Studi di Modena e Reggio Emilia e, in particolare, del Centro Interateo Edunova che come Centro e-Learning d'Ateneo è attivo da più di un decennio nella produzione e nell'erogazione di corsi on line in ambito istituzionale e non. La descrizione delle fasi di lavoro, delle figure coinvolte e della progettazione didattica che si attiva per ogni disciplina mira a condividere una proposta di modello gestionale della produzione massiva di corsi on line, tenendo conto sia delle regole suddette, sia delle prassi consolidate col tempo.

## **CdL e progettazione didattica: i percorsi, i docenti, gli studenti**

L'offerta formativa dei corsi di laurea in modalità blended dell'Università degli Studi di Modena e Reggio Emilia è relativa a tre lauree di I livello e ad un corso di Laurea Magistrale, nel dettaglio: Scienze dell'Educazione [classe: L-19], Scienze e tecniche psicologiche [classe: L-24], Scienze Giuridiche dell'Impresa e della Pubblica Amministrazione [classe: L-14], Relazioni di lavoro [classe: LM-77].

I corsi di studio di "Scienze dell'educazione", "Scienze giuridiche dell'impresa e della pubblica amministrazione" e di "Relazioni di lavoro" sono stati erogati in modalità tradizionale in precedenti anni accademici prima di passare alla modalità blended; ciò ha richiesto al momento del passaggio un'azione di riprogettazione dei singoli insegnamenti da parte dei docenti per

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rispondere alle richieste non solo normative, ma anche didattiche della nuova modalità di erogazione del percorso. Diversamente da questi, il corso di “Scienze e tecniche psicologiche” è stato pensato e progettato dai due atenei in modalità blended a partire dalla sua istituzione presso l’ateneo modenese.

In tutti i corsi la strutturazione dei singoli insegnamenti ha previsto una azione di progettazione didattica che, attraverso metodologie e strategie didattiche da integrare sia in presenza che on line, ha previsto l’implementazione di azioni di didattica in presenza e didattica on line (erogativa e interattiva); oltre ai luoghi e agli strumenti tradizionali per l’insegnamento e l’apprendimento, tale didattica si avvale di strumenti di interazione sincroni e asincroni (forum di discussione, anche tematici, e con la presenza di un tutoraggio on line di contenuto; aule virtuali ecc.).

I corsi sono ospitati su un unico Portale di Ateneo (Figura 1). Esso integra al suo interno anche un’area dedicata al campus virtuale. Quest’area è pensata per consentire agli studenti iscritti ai diversi corsi di studio di condividere degli spazi on line, a partire dall’area dedicata ai Forum di discussione e alla sezione relativa alla Helpdesk tecnico (Figura 2). Si tratta di aree comuni ai diversi corsi di studio nell’ottica della costruzione di un unico portale di accesso dedicato ai corsi offerti in modalità blended.

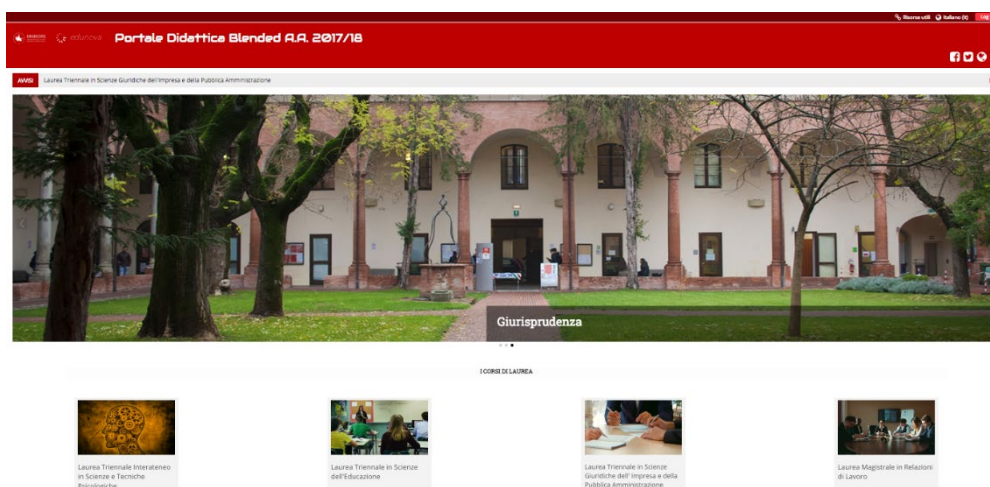


Figura 1. Portale della Didattica Blended a.a. 2017-2018, <http://dolly.blended.unimore.it/2017/>



Figura 2. Campus virtuale Portale della Didattica Blended a.a. 2017-2018, <http://dolly.blended.unimore.it/2017/>

Il corso di laurea in “Scienze dell’Educazione” è stato progettato con la finalità di creare una figura di educatore polivalente, in grado di operare in differenti e specifici contesti educativi per il sociale rivolti alle età della vita.

Il corso è stato attivato in modalità blended a partire dall'a.a. 2016-2017, la fase di progettazione e implementazione dei contenuti è relativa quindi al primo e al secondo anno per quanto concerne il I e II semestre. Sono in fase di realizzazione i contenuti didattici del I semestre del terzo. I docenti coinvolti sono 17 comuni per i primi due anni di corso e differenziati per i due profili in uscita (terzo anno di corso): educatore di nido e dei servizi per la prima infanzia (5) educatore sociale e interculturale (5). Gli studenti immatricolati anno accademico corrente sono pari a 614.

Il Corso di studio triennale in “Scienze e Tecniche Psicologiche” ad accesso programmato (300 immatricolati all'anno), Interateneo con l'Università degli studi di Parma, intende fornire una solida preparazione di base nei principali ambiti di conoscenza della psicologia, nelle metodologie e tecniche utilizzate nella ricerca psicologica e, in parte, anche in ambito psicologico professionale. Il corso è stato attivato a partire dall'anno accademico 2015-2016 e nel corrente anno accademico (2017-2018) è stata completata la realizzazione dei primi tre anni di corsi in modalità blended. I docenti e gli insegnamenti coinvolti negli insegnamenti curricolari e opzionali previsti nel terzo anno di corso sono 30.

Il Corso di Laurea in “Scienze Giuridiche dell'Impresa e della Pubblica Amministrazione”, offerto a partire dall'anno accademico 2018-2019 in modalità blended, “risponde alle esigenze emerse – sia nell'ambito del pubblico impiego che nel settore privato – di unire ad una solida preparazione giuridica di base l'acquisizione di capacità di comprensione e di applicazione della normativa esistente in settori specifici e specializzati”. Per il corso, che dal prossimo anno accademico verrà attivato nella modalità blended, sono nella fase di progettazione e produzione i primi 3 insegnamenti del I semestre del primo anno di corso. A partire dagli anni successivi saranno previsti tre curricula: Curriculum Giuristi d'Impresa, Curriculum Consulenti del Lavoro e Curriculum Giustizia, Sicurezza Pubblica e Amministrazione.

Il Corso di Laurea Magistrale in “Relazioni di lavoro” è concepito come esperienza formativa interdisciplinare in materia di relazioni di lavoro: “il corso presenta una sua unicità del panorama accademico nazionale in forza di un approccio alle relazioni di lavoro che unisce materie giuridiche, economiche, organizzative e di management”. I docenti e gli insegnamenti coinvolti (nella fase attuale di sviluppo del corso) sono 12, gli studenti immatricolati nel corrente anno accademico 78.

## **Il processo di produzione**

La progettazione, la realizzazione e l'erogazione dei corsi di laurea blended giungono nel processo di crescita del Centro Interateneo Edunova dell'Università di Modena e Reggio Emilia come fase di lavoro più recente sui corsi e-Learning: le attività precedentemente avviate, di cui molte ancora attive, hanno riguardato la produzione di master e corsi on line, CdL FAD, corsi BLECS per l'attivazione di insegnamenti singoli in modalità blended, collaborazioni con aziende ed enti esterni per la produzione di corsi di formazione on line sulla sicurezza, l'aggiornamento professionale (per approfondimenti si veda: Minerva, Nuccio, Tedeschi, & Cavedoni, 2011; per approfondimenti sulla sperimentazione BLECS si veda: Cecconi, 2015).

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Le esperienze condotte e l'adeguamento a decreti ministeriali e Linee Guida dell'ANVUR hanno condotto all'implementazione di un metodo di lavoro standardizzato in continua ridefinizione che prevede una scansione temporale delle attività produttive nell'intero anno accademico (Figura 3) e la distribuzione dei compiti nel team del centro secondo la schematizzazione presentata in Tabella 1. Le azioni condotte sono prevalentemente di tre tipi: amministrative, tecniche, didattiche. Mentre le prime due sono indispensabili per adattare le procedure tradizionali di ateneo all'erogazione dei corsi in questa nuova modalità, le ultime garantiscono l'efficacia e la qualità dei corsi attivati. Le azioni didattiche hanno avvio e sono fortemente centrate sulla formazione dei docenti e sulla progettazione didattica degli insegnamenti, elementi indispensabili per un ripensamento non solo tecnologico ma anche metodologico dei percorsi formativi.

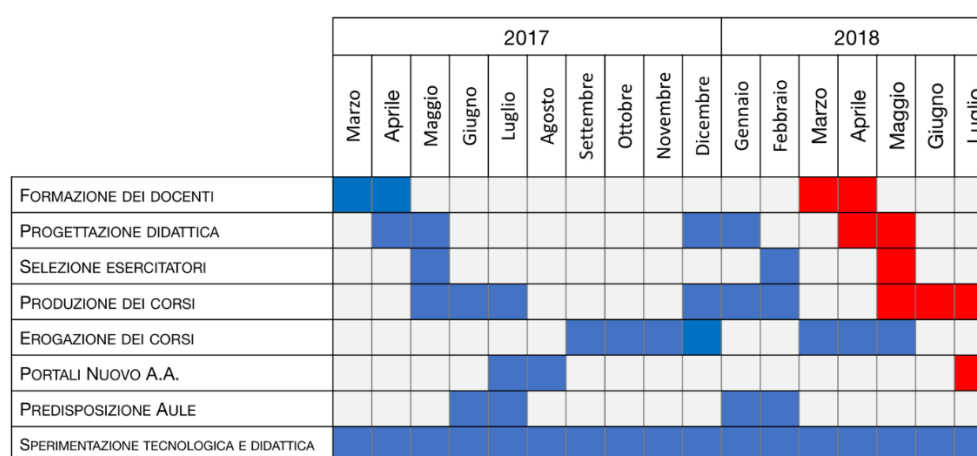


Figura 3. Timeline del processo di produzione dei corsi di laurea durante un anno accademico. Le azioni in rosso indicano le attività riferite all'anno accademico successivo.

Tabella 1: Distribuzione di attività e risorse umane del Centro Interateneo Edunova dell'Università degli Studi di Modena e Reggio Emilia in riferimento all'implementazione di corsi di laurea blended

Azioni	Risorse umane di Edunova - Unimore	Risorse umane dell'ateneo
Definizione del calendario didattico e del carico didattico dei docenti, gestione degli studenti	Segreterie	Coordinatori didattici
Definizione di azioni a livello di sistema necessarie per la standardizzazione del processo di erogazione di corsi blended	Coordinatori del centro	Amministrazione centrale
Avvio delle procedure e delle pratiche per attivare un corso di laurea in modalità blended	Coordinatori del centro	Responsabili del corso di laurea, collegio dei docenti
Formazione dei docenti su normative, metodologie didattiche e strumenti digitali	Coordinatori del centro e Instructional Designer	Docenti ed esercitatori

Selezione degli esercitatori	Coordinatori del centro	Coordinatori didattici, Amministrazione del dipartimento, Docenti
Progettazione didattica dei corsi	Instructional Designer	Docenti ed esercitatori
Produzione dei materiali didattici dei corsi	Instructional Designer e tecnici	Docenti ed esercitatori
Supporto didattico e tecnico	Segreterie e tecnici	Studenti, docenti ed esercitatori

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A livello di sistema l'Ateneo, coinvolgendo Consigli di CdS e di Dipartimento, Consiglio di Amministrazione e Senato Accademico, ha riconosciuto come prassi ordinarie regole e pratiche caratteristiche delle azioni amministrative e didattiche tipiche dei corsi blended. L'assimilazione di tali elementi nei regolamenti e nelle procedure standard comporta l'ammissione di tale modalità di erogazione dei corsi non come eccezione ma come regola. Seguono alcuni esempi in proposito che riguardano questioni didattiche, amministrative e tecniche:

- le Linee Guida ANVUR prevedono la registrazione della metà delle videolezioni nella percentuale erogata on line per motivi di riascolto da parte degli studenti. Accettando tale indicazione come prescrittiva, ai docenti dell'Università degli Studi di Modena e Reggio Emilia per gli insegnamenti erogati in CdL blended è riconosciuto il carico didattico completo, nonostante il conteggio delle ore di Didattica Erogativa effettivamente registrata corrisponda alla metà del totale previsto nella corrispondenza Crediti Formativi - Ore di didattica.
- si accetta che le videolezioni prodotte possano essere riproposte per più anni accademici.
- il Consiglio di Amministrazione ha deliberato la tipologia di tassazione aggiuntiva per gli studenti che frequentano corsi blended, rendendola comunque suscettibile di variazioni in base al calcolo dell'ISEE.
- nei codici di identificazione degli studenti che frequentano i corsi blended è inserita una coppia di cifre che semplifica il riconoscimento degli studenti nei sistemi di gestione delle carriere accademiche e facilita i meccanismi del single sign on nei portali dedicati agli stessi.

Fra le azioni da realizzare a livello di sistema vi sono le seguenti:

- è ancora in fase di ripensamento e aggiornamento il registro delle lezioni compilato dai docenti nel quale a ciascuna attività è collegata una data di svolgimento della stessa. L'indicazione di tale data non è completamente adeguata alla produzione di videolezioni per le quali almeno in questo momento i docenti si trovano ad indicare nei registri la data di messa a disposizione agli studenti o la data di produzione del materiale didattico.
- è stata avviata una riflessione sui quesiti presenti nei questionari di valutazione della qualità della didattica che, compilati obbligatoriamente dagli studenti al termine dello svolgimento dei corsi, richiedono una personalizzazione sulle tematiche legate alla

modalità di erogazione blended (es. funzionamento della piattaforma e-Learning, servizi di supporto tecnico, qualità del materiale audio-video).

## **Riflessioni conclusive**

Dall'esperienza pluriennale “sul campo” per la progettazione ed erogazione di corsi blended all'interno dell'Università di Modena e Reggio Emilia, oltre alle riflessioni sui processi produttivi descritti nel contributo, emerge un quadro di suggerimenti utili a un approccio didattico per corsi misti che, a meno di poche specificità, possono essere considerati accorgimenti efficaci per la progettazione di un qualunque percorso formativo:

- valorizzare le caratteristiche didattiche dei due momenti: l'aula e la piattaforma web, perseguendo la continuità e le sinergie fra le attività in aula e le attività on line;
- supportare il ruolo attivo degli studenti anche in lavori di gruppo, incoraggiando costantemente la partecipazione alle attività in presenza e a distanza e fornendo motivazioni sulla pertinenza di contenuti e attività;
- favorire l'utilizzazione di fonti numerose e diversificate, sia in formato cartaceo, che in formato digitale;
- perseguire il raggiungimento di competenze disciplinari ma anche di competenze trasversali in linea con gli sbocchi occupazionali del CdS;
- mettere in atto azioni di monitoraggio degli apprendimenti e dell'intero sistema.

Rispetto all'ultimo punto, il centro e-Learning si sta adoperando per la costruzione di questionari di monitoraggio specifici (a integrazione di quelli già previsti dall'ateneo) mirati a indagare l'efficacia e le eventuali criticità dell'intero sistema blended. In una recente ricerca svolta da Kristian Spring e Charles R. Graham, infatti, si evidenzia l'attenzione posta sui learning outcomes all'interno di corsi blended. Concentrarsi sui risultati degli studenti è comprensibile, in quanto un settore in crescita come quello in trattazione deve dimostrarsi utile attraverso quelle che gli autori definiscono “superior learning outcomes” (Spring & Graham, 2017). Le azioni di monitoraggio e raccolta del livello di soddisfazione degli studenti e dei docenti, oltre che l'analisi delle loro esperienze di apprendimento/insegnamento, sono pertanto elementi fondamentali nel processo di costruzione e nelle successive azioni di monitoraggio dei corsi (*ibidem*).

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## MAPPE DINAMICHE PER “NAVIGARE LA CONOSCENZA”

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### **Abstract**

In ambito e-learning, la mappa concettuale offre una rappresentazione grafica di un corso o, in generale, di un dominio di conoscenza, favorendo il discente nella comprensione dei legami logici tra i concetti che compongono tale dominio, stimolando l'esplorazione e la scoperta attraverso una opportuna interazione: in sintesi, migliorando i processi di apprendimento. La mappa è, quindi, un'interfaccia concettuale che lega gli oggetti di conoscenza descritta al dominio disciplinare, alla materia a cui fa riferimento. Spesso però, le sue stesse dimensioni, la molteplicità di contenuti collegati ai nodi o l'intreccio delle relazioni che la compongono, rendono tale strumento una complicazione più che un ausilio: la mappa risulta di difficile osservazione, la navigazione è scomoda, la comprensione è ardua, l'utente appare disorientato e confuso invece che aiutato.

L'idea che si è voluta sviluppare in questo lavoro è stata quella di realizzare ed integrare in una piattaforma di e-learning, un sistema di navigazione di mappe dinamiche, ovvero di mappe che, interagendo con l'utente, presentano, a partire da un nodo radice, in maniera reticolare e passo dopo passo, le relazioni, i nodi figli, le relative descrizioni ed i contenuti ad essi connessi. L'ordine di navigazione è definito dall'utente che *naviga* la mappa esplorando gli approfondimenti in base alla sua curiosità o alle proprie esigenze. La mappa diventa così uno scenario da esplorare, un insieme di concetti da scoprire in base alla curiosità e alle necessità specifiche di chi studia. Per fare ciò e tener traccia di quanto e come siano state utilizzate, è stato realizzato ed integrato in una piattaforma Moodle, un sistema che permette la gestione e la visualizzazione di mappe concettuali dinamiche. Il sistema ha un suo tracciamento che consente di monitorare la navigazione degli utenti ed offrire informazioni su quali siano stati i concetti e le relazioni più o meno visitati e, dunque, fornire utili feedback per riorganizzare e/o modificare i contenuti e, di conseguenza, migliorare l'efficacia dello strumento.

### **Contesto e motivazioni**

Il contesto di riferimento è la didattica a distanza ovvero, nello specifico, il supporto elettronico alla didattica in presenza. L'introduzione delle tecnologie nei processi formativi, non garantisce il miglioramento della qualità della formazione, ma, al contempo, rappresenta una potenziale “possibilità da sfruttare”; le tecnologie nei processi formativi dovrebbero riuscire a coniugare coerentemente, sia a livello teorico che tecnico-metodologico, le diverse esigenze dei vari attori coinvolti. Il lavoro qui descritto rientra nelle attività di ricerca del Laboratorio di Ricerca in

Media Education e Didattica @ttiva (RIMEDI@) dell’Università di Salerno. L’ambito di riferimento è quello dell’utilizzo delle tecnologie nella didattica, sia dal punto di vista della ricerca, sia per quanto riguarda le ricadute in termini di apprendimento. In particolare, si presenterà un’indagine sull’integrazione di mappe concettuali dinamiche in una piattaforma di e-learning per migliorare il processo di insegnamento-apprendimento che vede coinvolti i partecipanti al corso *di Sperimentazione scolastica e progettazione educativa* del Corso di Laurea in Scienze della Formazione Primaria negli anni accademici 2016/17 e 2017/18.

Le mappe concettuali dinamiche sono state specificamente progettate per favorire processi di sistematizzazione concettuale e di ricerca investigativa. Pertanto, è immediato pensare agli ipertesti quale giustificazione teorica e metodologica ovvero alle ricerche cognitive sulla rappresentabilità della conoscenza nella sua forma reticolare attraverso le mappe concettuali (Novak e Gowin, 1989) e all’apprendimento significativo descritto da Ausubel (1963, 1968). Secondo Novak e Gowin, infatti, rappresentare graficamente i concetti “*è un modo per far emergere i significati insiti nei materiali da apprendere*” stimolando gli studenti a riflettere sui concetti e sulle relazioni tra essi. “*Imparare qualcosa circa la natura e la struttura della conoscenza aiuta gli studenti a capire come essi stessi apprendono*”. In tal senso, i processi metacognitivi risultano centrali poiché offrono al discente la consapevolezza ed il controllo dei propri processi cognitivi. La metaconoscenza è infatti ritenuta la chiave per la personalizzazione degli apprendimenti (Cornoldi, 1995).

Nel caso specifico, vogliamo verificare quanto l’impiego delle mappe concettuali dinamiche possa essere ausilio efficace alla consultazione dei contenuti e degli approfondimenti on-line, oltre che verificare come queste rappresentazioni possano essere un mezzo per avere riscontro sulla qualità degli interventi formativi progettati e comprendere se e dove intervenire.

La piattaforma impiegata è e-LENA, il Learning Management System del laboratorio RIMEDI@ del Dipartimento di Scienze Umane, Filosofiche e della Formazione dell’Università degli Studi di Salerno. Essa è stata realizzata personalizzando la soluzione Moodle e integrandola con altri componenti realizzati ad hoc. Le motivazioni che hanno spinto gli autori alla realizzazione del lavoro sono anche di carattere tecnico e partono dalla constatazione che esistono alcune iniziative isolate di integrazione di ontologie e mappe concettuali in Moodle, ma che difficilmente rispecchiano le esigenze relative al citato corso, ovvero di aiutare i discenti a meglio comprendere i concetti e contenuti trattati, districarsi tra nodi e relazioni e navigare il dominio sotteso oltre che aiutare i docenti nella progettazione dei loro interventi formativi. I plug-in disponibili più completi risalgono a diversi anni fa e sono scarsamente integrati e utilizzabili. Molti non sono stati più aggiornati e non sono supportati dalle versioni più recenti.

## **La realizzazione della piattaforma**

La piattaforma realizzata è il risultato dell’integrazione dei seguenti componenti:

- e-LENA;
- Sistema server per le mappe concettuali dinamiche;
- Interfaccia client per le mappe concettuali dinamiche;

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- Database per le mappe concettuali dinamiche.

Il primo componente è e-LENA (Cfr. Marzano, 2017), una piattaforma Moodle personalizzata al fine di gestire tutte le esigenze connesse all’iniziativa in oggetto. Il secondo componente è il sistema server per le mappe concettuali dinamiche che è stato realizzato in PHP e consente la gestione di mappe concettuali. Il terzo componente è l’interfaccia client per le mappe concettuali dinamiche realizzata in JavaScript che consente l’interazione dell’utente con le mappe concettuali. L’ultimo componente è il database realizzato in SQL Server dedicato alla gestione di nodi, archi e contenuti relativi alle mappe concettuali, oltre che tutto il tracciamento delle azioni di fruizione compiute dagli utenti durante le loro attività didattiche. Lo schema dell’architettura è mostrato in Figura 1.

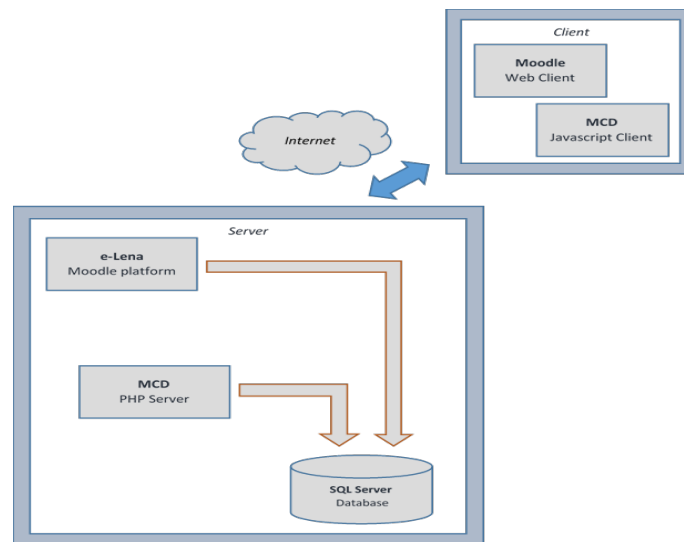


Figura 1. Architettura della piattaforma realizzata



Figura 2. Homepage della piattaforma e-Lena realizzata su tecnologia Moodle

The screenshot displays the Moodle course interface for '2017/18 Sperimentazione scolastica e progettazione educativa'. The main content area includes an introduction to the course, instructions for accessing dynamic conceptual maps, and links to 'Mappa concettuale n.1' and 'Mappa concettuale n.2'. The right-hand side features several utility panels: 'COMPLETION PROGRESS' with a bar chart and 'Overview of students' button; 'RICERCA NEL FORUM' with a search bar; 'ANNUNCI RECENTI' and 'PROSSIMI EVENTI' sections; and an 'AMMINISTRAZIONE' panel with options like 'Attiva modifica', 'Impostazioni', and 'Report'.

Figura 3. Il corso in Moodle con le mappe concettuali dinamiche come risorse

Il sistema prevede due differenti tipologie di accesso: l'accesso docente e l'accesso discente. L'accesso docente offre agli utenti la possibilità di creare nuove mappe concettuali specificando nodi, relazioni tra essi e associando contenuti. Ovviamente, ci sono anche funzionalità che consentono di modificare le mappe esistenti; l'accesso discente, invece, consente di navigare all'interno delle mappe concettuali aprendo i nodi e scoprendo di volta in volta nodi figli e le relazioni esistenti, oltre che accedendo agli eventuali contenuti ad essi associati. Tutta la navigazione degli utenti è tracciata sul database in modo da consentire analisi sia durante che dopo le fruizioni.

Le mappe possono essere aggiunte ai corsi presenti in e-Lena come risorse didattiche. Il sistema in automatico offre agli utenti i permessi di accesso in funzione del ruolo che essi assumono nel corso ovvero nella piattaforma di e-learning.

Gli utenti accedono alla piattaforma e-Lena e quindi, ai corsi dove le mappe create sono state aggiunte come risorse didattiche.

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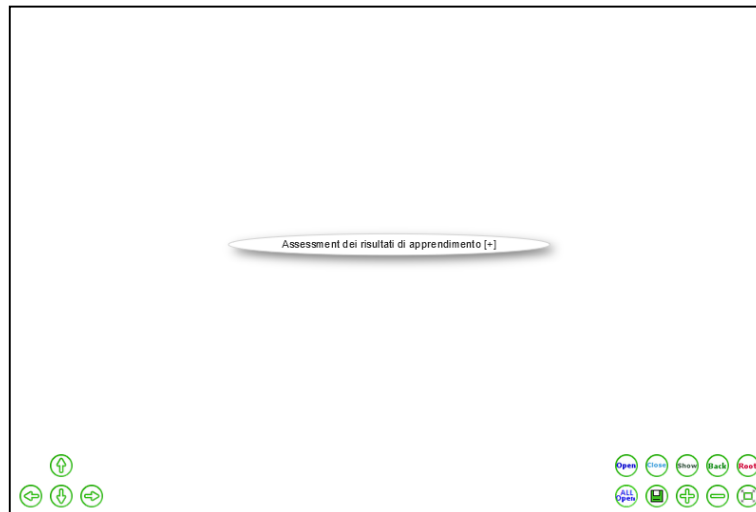


Figura 4. Una mappa concettuale dinamica al primo accesso

L’esperienza didattica inizia visualizzando il solo nodo radice della mappa concettuale. L’utente in fase di fruizione, può cliccarci su e visualizzare tutte le relazioni che partono da questo nodo e i relativi nodi “figli” collegati ad esso. Sui nodi visualizzati può ripetere le azioni di apertura delle relazioni e dei nodi figli oppure accedere ai contenuti associati a ciascuno di essi.

I nodi e le relazioni, infatti, vengono visualizzati un livello alla volta lasciando così l’utente libero nella navigazione e ponendo l’accento sulla scoperta della conoscenza durante la sua esperienza didattica.

Tutte le azioni compiute durante la fruizione sono tracciate dal sistema in modo che sia possibile sapere ogni utente quali nodi e relazioni ha scoperto, quali contenuti ha letto, quanto tempo ha speso su ciascuno di essi durante ogni sessione di navigazione.

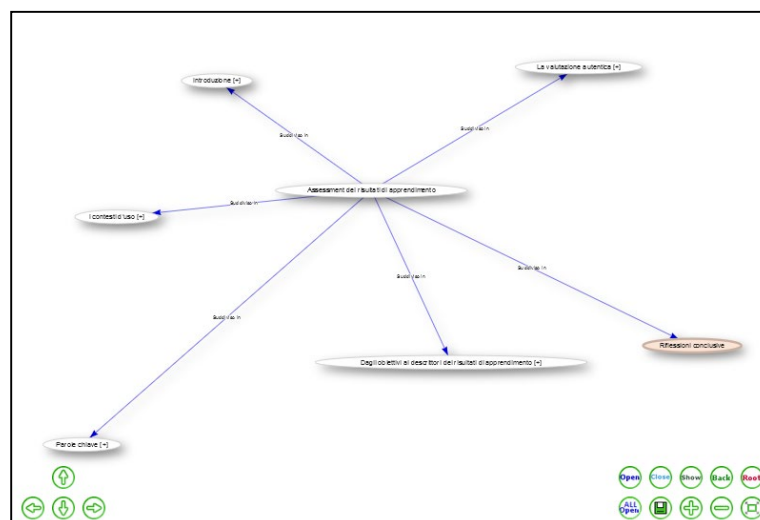


Figura 5. Una mappa concettuale dinamica durante l’esplorazione

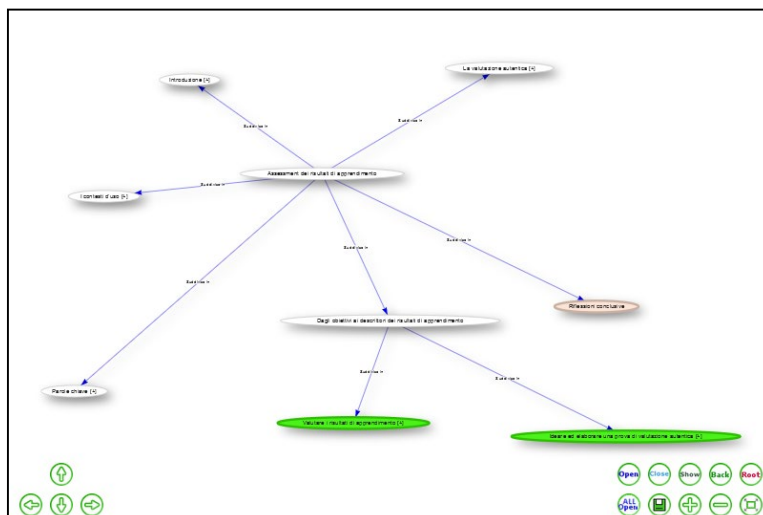


Figura 6. Una mappa concettuale dinamica con evidenza dei nodi figli aperti

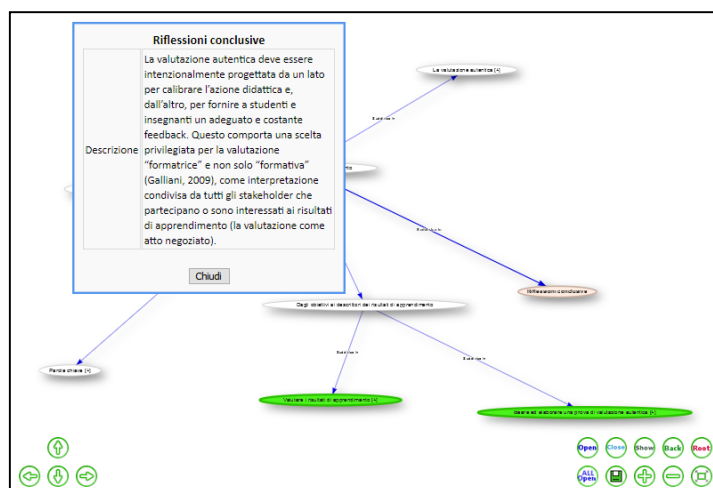


Figura 7. Una mappa concettuale dinamica con evidenza della descrizione di un concetto

## La sperimentazione e i risultati

La sperimentazione ha visto coinvolti 105 studenti nell'a.a. 2016/17 e 101 studenti nell'a.a. 2017/18 per un totale di 206 studenti. La fruizione è stata totalmente libera da vincoli ed ha accompagnato la didattica in presenza.

A fine attività, tutti gli utenti sono stati invitati a fornire feedback sull'esperienza condotta. La rilevazione è stata anonima ed effettuata per mezzo di questionari cartacei atti a raccogliere sia elementi quantitativi che qualitativi. Gli elementi quantitativi sono stati integrati con i dati raccolti direttamente on-line sulla piattaforma e confezionati in report di fruizione con i dati relativi al completamento dei percorsi, i tempi dedicati ai singoli concetti ed alle singole risorse.

Relativamente ad ogni specifica ontologia, per ciascun utente è stato tracciato sia un path di navigazione in cui sono riportati tutti i concetti visitati, sia un path di visualizzazione dei contenuti in cui sono presenti, appunto, tutti i contenuti collegati ai concetti che sono stati, di fatto, aperti dall'utente. Nei path, inoltre, è anche osservabile l'ordine con cui la visita dei nodi è avvenuta.

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Di seguito sono analizzati i dati relativi alla navigazione dell’ontologia del dominio “*Assessment dei risultati di apprendimento*” costituita da 55 nodi. Per la stessa, abbiamo ottenuto un’unica tabella in cui ogni riga corrisponde ad un’azione (di visita/apertura nodi figli, o visualizzazione contenuti) compiuta da ogni utente utilizzando la piattaforma a disposizione.

La tabella comprende in totale 9523 righe.

Domain	ID_User	Date	Path	Nodi aperti	ContentPath	Contenuti visti
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:41				
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:49	Assessment dei risultati di apprendimento	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:49	Assessment dei risultati di apprendimento	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:49	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)	2		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:49	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive	3		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:49	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	4		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:50	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	5		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:50	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	6		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:51	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	7		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:51	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	8		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:54	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	10		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:55	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	11		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:55	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	11		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:55	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	12		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:55	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	13		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:55	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	14		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:56	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	15		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:56	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	16		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:57	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	17		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:57	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	17		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:57	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	18		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:57	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	19		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:57	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	20		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 14:58	Assessment dei risultati di apprendimento(Dagli obiettivi a descriptori dei risultati di apprendimento)Riflessioni conclusive Valutare	21		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:16	Introduzione	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:17	Introduzione	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:17	Introduzione	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:34	Ipunto di partenza: la definizione delle performance Un esempio di costruzione di un obiettivo di apprendimento	2		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:35	Ipunto di partenza: la definizione delle performance Un esempio di costruzione di un obiettivo di apprendimento(Gli "standard di g	3		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:38	Ipunto di partenza: la definizione delle performance Un esempio di costruzione di un obiettivo di apprendimento(Gli "standard di g	3		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 17:40	Ipunto di partenza: la definizione delle performance Un esempio di costruzione di un obiettivo di apprendimento(Gli "standard di g	3		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:35	Riflessioni conclusive	1		0
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:40	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	2	Ideare ed elaborare una prova di valutazione autentica Fin	1
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:40	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	3	Ideare ed elaborare una prova di valutazione autentica Fin	2
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:40	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	4	Ideare ed elaborare una prova di valutazione autentica Fin	3
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:40	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	5	Ideare ed elaborare una prova di valutazione autentica Fin	4
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:41	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	6	Ideare ed elaborare una prova di valutazione autentica Fin	5
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:41	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	7	Ideare ed elaborare una prova di valutazione autentica Fin	6
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:42	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	8	Ideare ed elaborare una prova di valutazione autentica Fin	7
Assessmentdeiresultatiapprendimento	a.adinfo138@s	28/11/2016 19:42	Ideare ed elaborare una prova di valutazione autentica Finale e criteri validi Parole chiave Appendimento Autentic assessment	9	Ideare ed elaborare una prova di valutazione autentica Fin	8

Figura 8. I dati tracciati per ogni utente

Elaborando i dati presenti nella tabella riportata in Figura 8 è stato prodotto un primo report con l’obiettivo di individuare, per ciascuno dei 55 nodi dell’ontologia, se sia presente o meno nel path di navigazione e, nel caso in cui sia presente, in che posizione. Dal primo report sui concetti visitati è possibile sapere se un concetto sia stato visitato o no e vedere in che posizione nel path di navigazione sia stato visitato.

Aggregando tali dati è stato possibile calcolare, innanzitutto il numero delle occorrenze di ogni concetto in tutti i path di navigazione. È stato inoltre possibile calcolare la posizione media nei path di navigazione e la relativa varianza. Ovviamente questi dati possono essere messi in relazione con la proprietà del nodo stesso di essere un nodo foglia, cioè un nodo senza nodi figli.

Un dettaglio di questi riscontri sono riportati in Figura 9.

	Introduzione	I contesti d'uso	Dagli obiettivi ai descrittori dei risultati di apprendimento	La valutazione autentica	Affrontare/risolvere nuovi problemi/situazioni	Apprendimento	Approccio sistemico	Authentic assessment
Conta occorrenze nei path di navigazione	5727	4577	4882	5989	2890	5066	5269	4176
Posizione media nei path di navigazione	6	19	17	8	21	14	14	13
Varianza (max-min) visualizzazione concetti	64	132	137	37	115	115	45	66
Nodo foglia?	NO	NO	NO	NO	SI	NO	NO	SI

Figura 9. Dettaglio report sulle occorrenze dei concetti nei path di navigazione

Analogamente a quanto fatto nel primo report, sono stati analizzati anche i dati relativi alla visualizzazione dei contenuti ottenendo così un secondo report. La forma è praticamente identica al primo, la sostanza cambia poiché questo consente di individuare, per ciascuno dei 55 contenuti collegati ai nodi presenti nell'ontologia, se sia stato o meno visualizzato il singolo contenuto e in che ordine rispetto agli altri.

Da questo secondo report è possibile sapere se un contenuto relativo ad un concetto sia stato visualizzato o no e vedere in che posizione si trovi nel path di visualizzazione contenuti. Aggregando tali dati è stato possibile calcolare, innanzitutto il numero delle occorrenze di ogni contenuto in tutti i path di visualizzazione.

È stato inoltre possibile calcolare la posizione media nei path di visualizzazione e la relativa varianza. Ovviamente, anche questi dati possono essere messi in relazione con la proprietà del nodo stesso di essere un nodo foglia.



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	Introduzione	I contesti d'uso	Dagli obiettivi ai descrittori dei risultati di apprendimento	La valutazione autentica	Affrontare/risolvere nuovi problemi/situazioni	Apprendimento	Approccio sistemico	Authentic assessment	
13									
14									
15									
16	Conta occorrenze nella visualizzazione contenuti	1802	1173	943	1967	1912	2680	2452	2726
17	Posizione media nella visualizzazione contenuti	4	17	16	8	12	10	11	9
18	Varianza (max-min) visualizzazione contenuti	30	55	85	33	43	42	30	49
19									
20	Nodo foglia?	NO	NO	NO	NO	SI	NO	NO	SI
21									

Figura 10. Dettaglio report sulle visualizzazioni dei contenuti durante la navigazione

Elaborando i dati presenti nel primo report è stato possibile stilare una classifica sulle visite effettuate sui concetti e quindi identificare i concetti più visitati dagli utenti, ovvero quelli che hanno attirato più attenzione. Il concetto più visitato è “La valutazione autentica”. Due concetti su 55 non sono stati affatto visti dagli utenti.

Sempre elaborando i dati presenti nel primo report è stato possibile inoltre stilare una classifica sui concetti visti prima dagli utenti. Il concetto visitato prima è, ovviamente, il concetto “Assessment dei risultati di apprendimento” che è il nodo radice.

I risultati di tali elaborazioni sono riportate in Figura 11 e Figura 12.

Concetto	Presenza totale nei path degli utenti
La valutazione autentica	5989
Introduzione	5727
La valutazione	5276
Approccio sistemico	5269
Assessment dei risultati di apprendimento	5136
Apprendimento	5066
Dagli obiettivi ai descrittori dei risultati di apprendimento	4882
Il problema	4751
I contesti d'uso	4577
L'assessment come azione di controllo	4419
La conoscenza come risorsa strategica	4409
Azione attiva dello studente e valutazione	4224
La valutazione come processo	4220
Authentic assessment	4176
Gli strumenti di valutazione	3974
Parole chiave	3914
Ideare ed elaborare una prova di valutazione autentica	3810
Valutare i risultati di apprendimento	3782
L'approccio costruttivista socio-culturale	3624
Valutazione e progettazione per competenze	3486
Riflessioni conclusive	3344
Il problema capovolto	3326

Figura 11. Classifica sui concetti più visitati

Concetto	Posizione media nei path degli utenti	Varianza
Assessment dei risultati di apprendimento	3	63
Introduzione	6	64
La valutazione autentica	8	37
La valutazione	12	59
Il problema	12	125
Authentic assessment	13	66
L'assessment come azione di controllo	13	124
La conoscenza come risorsa strategica	14	121
Approccio sistemico	14	45
Apprendimento	14	115
La valutazione come processo	15	67
Gli strumenti di valutazione	16	61
Azione attiva dello studente e valutazione	16	65
Dagli obiettivi ai descrittori dei risultati di apprendimento	17	137
L'approccio costruttivista socio-culturale	17	63
Riflessioni conclusive	18	63
Valutazione e progettazione per competenze	18	77
Parole chiave	19	134

Figura 12. Classifica sui concetti visti prima nel ordine del path di navigazione

Analogamente a quanto fatto sul primo report, elaborando i dati presenti nel secondo report è stato possibile stilare una classifica sui contenuti più visualizzati dagli utenti e quindi identificare i contenuti visualizzati prima dagli utenti, ovvero quelli che hanno attirato più attenzione.

I risultati di tali elaborazioni sono riportate in Figura 13 e Figura 14.

Il contenuto più visualizzato è “Il problema”, mentre il contenuto visualizzato prima è “Contesti concreti per compiti di apprendimenti ‘autentici’”.

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Contenuto	Presenza totale nei path di visualizzazione contenuti degli utenti
Il problema	3334
L'assessment come azione di controllo	3275
La conoscenza come risorsa strategica	3252
Authentic assessment	2726
Apprendimento	2680
La valutazione	2552
Approccio sistemico	2452
Un equivoco da sciogliere	2117
La valutazione autentica	1967
Focus su chi apprende	1965
Affrontare/risolvere nuovi problemi/situazioni	1912
New assessment	1858
Compiti autentici e prove di profitto	1846
Le specifiche competenze dell'insegnante	1827
Introduzione	1802
La valutazione autentica come valutazione di processo	1801
La valutazione come processo	1787
Dalla valutazione formativa alla valutazione formatrice	1774
Assessment dei risultati di apprendimento	1738
Azione attiva dello studente e valutazione	1729

Figura 13. Classifica sui contenuti più visualizzati

Contenuto	Posizione media nella visualizzazione contenuti	Varianza (max-min) visualizzazione contenuti
Contesti concreti per compiti di apprendimenti "autentici"	1	0
Assessment dei risultati di apprendimento	4	42
Introduzione	4	30
Il problema	6	49
L'assessment come azione di controllo	7	48
La conoscenza come risorsa strategica	7	45
La valutazione autentica	8	33
Authentic assessment	9	49
Apprendimento	10	42
La valutazione	10	41
L'individuazione del compito di apprendimento	11	35
Approccio sistemico	11	30
Affrontare/risolvere nuovi problemi/situazioni	12	43
La valutazione come processo	12	42
Riflessioni conclusive	12	52
Focus su chi apprende	13	48
Finalità e criteri validi	14	52
Azione attiva dello studente e valutazione	14	30
Un esempio di profilo delle competenze	14	46
New assessment	14	47
Gli strumenti di valutazione	14	46
Un equivoco da sciogliere	15	57

Figura 14. Classifica sui contenuti visualizzati per primi durante la navigazione

Ad integrazione dei dati di dettaglio relativi alla visita dei nodi dell'ontologia e dei contenuti ad essi collegati, la piattaforma ha tracciato anche i tempi di accesso degli utenti coinvolti della sperimentazione. In particolare sono stati 206 gli utenti mentre il tempo medio di fruizione è stato pari a 2,5 ore.

In Figura 15 è riportato un dettaglio su tali dati, con massimo, minimo e media sul numero di azioni compiute dagli utenti e il tempo speso.

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studenti.unisa.it	28/11/16 10.17.51	27/11/16 20.45.57	15240	3:40:40
studenti.unisa.it	28/11/16 15.18.00	27/11/16 20.09.47	23861	6:37:41
studenti.unisa.it	28/11/16 7.44.15	27/11/16 11.24.54	9949	2:45:49
studenti.unisa.it	28/11/16 8.29.10	27/11/16 8.17.11	18259	5:04:19
studenti.unisa.it	28/11/16 17.47.05	27/11/16 9.12.55	2929	0:48:49
studenti.unisa.it	28/11/16 6.25.27	29/11/16 8.08.23	8283	2:18:03
studenti.unisa.it	27/11/16 9.33.02	27/11/16 15.34.04	9283	2:34:43
studenti.unisa.it	27/11/16 13.27.35	27/11/16 15.22.09	6964	1:56:04
studenti.unisa.it	28/11/16 13.19.25	28/11/16 19.42.34	3344	0:55:44
studenti.unisa.it	28/11/16 14.41.34	28/11/16 14.48.34	510	0:08:30
studenti.unisa.it	28/11/16 17.44.15	29/11/16 8.09.59	7616	2:06:56
studenti.unisa.it	27/11/16 9.06.18	27/11/16 10.01.08	3380	0:56:20
		<b>Minimo</b>	<b>90</b>	<b>0:01:30</b>
		<b>Massimo</b>	<b>39106</b>	<b>10:51:46</b>
		<b>Media</b>	<b>9077</b>	<b>2:31:17</b>

Figura 15. Report su accessi e tempi di fruizione

Con l'intento di raccogliere aspetti qualitativi relativi all'esperienza didattica avuta dai discenti, a fine attività è stato sottoposto loro il questionario riportato in Figura 16. Nel questionario (Cfr. Marzano, 2017), costituito da 13 item e rivolto ai soli studenti appartenenti al Gruppo Sperimentale (GS), sono state inserite affermazioni e domande che, coerentemente con gli obiettivi dell'indagine, potessero permettere l'analisi dell'oggetto di studio (in particolare, l'utilizzo delle mappe concettuali dinamiche, di seguito MCD). Le scale sono state costruite con la tecnica di Likert e gli intervistati sono stati invitati a valutare ciascuno degli item in una scala a 4 punti (*No, Più no che sì, Più sì che no, Sì*). Si è ritenuto utile, per rendere più evidente l'omogeneità delle valutazioni, aggregare le percentuali delle modalità estreme e contigue delle variabili considerate (*No con Più no che sì; Più sì che no con Sì*). In sintesi, emerge un quadro estremamente interessante. L'utilizzo delle MCD agevola l'organizzazione dei contenuti (C2) ed è efficace nella fase che precede lo studio da materiale cartaceo (C4). Le MCD, da sole, non favoriscono i processi di apprendimento (C11), ma il loro studio stimola ad approfondire gli argomenti con il libro (C9). Lo studio da materiale cartaceo migliora l'apprendimento se affiancato dall'utilizzo delle MCD (C7) ed è facilitato dopo la consultazione delle mappe dinamiche (C6). Le MCD, per finire, permettono una migliore organizzazione dello studio da effettuare con l'ausilio del libro (C5) e consentono di individuare i punti salienti degli argomenti da studiare (C8).

La maggior parte delle domande è servita a rilevare la percezione in merito all'uso delle mappe concettuali dinamiche ed al supporto che le stesse possano aver fornito durante il corso.

## Conclusioni e sviluppi futuri

Gli strumenti tecnologici e la loro integrazione nella piattaforma di e-learning sono stati, di fatto, funzionali e da stimolo all'apprendimento, consentendo ai discenti di individuare diversi percorsi cognitivi. L'introduzione delle tecnologie nei processi formativi, come già sottolineato in precedenza, rappresenta una “possibilità da sfruttare” in quanto “ogni tecnologia potenzialmente è in grado di generare occasione di apprendimento significativo” (Calvani & Vivianet, 2014).

I risultati complessivi sono decisamente positivi oltre che incoraggianti per ulteriori sviluppi. Mediamente circa l'80% degli utenti coinvolti ha ritenuto l'impiego delle mappe concettuali

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dinamiche valido e di reale ausilio nell'apprendimento. Le mappe concettuali dinamiche hanno pertanto dato un valore aggiunto rispetto allo studio tradizionale centrato sulla fruizione passiva dei contenuti didattici. Ogni utente ha avuto modo di costruire autonomamente il proprio percorso di navigazione e quindi rendere significativa la propria esperienza didattica.

Al di là di questo vantaggio notevole, la navigazione stessa, ovvero i dati tracciati in merito a quanto fatto dagli studenti rappresenta esso stesso un valore enorme per chi organizza il "dominio di conoscenza" ovvero prepara le lezioni ed organizza la presentazione degli argomenti trattati. Sapere quali sono gli argomenti che destano maggiore interesse, oppure quelli che ne destano meno, conoscere quali sono i concetti su cui gli studenti spendono più tempo o, al contrario, quelli su cui ne spendono meno, conoscere l'articolazione dei vari percorsi di apprendimento creati dagli stessi studenti, sapere in che ordine i vari contenuti vengono visti, sono, questi, tutti aspetti che rappresentano un valore aggiunto per i docenti e quindi un potenziale sul quale continuare a riflettere.

	No - Più no che sì	Più sì che no - Sì
<b>C1</b> Lo studio con le mappe dinamiche migliora l'apprendimento.	28.3	72.7
<b>C2</b> L'utilizzo delle mappe dinamiche agevola l'organizzazione dei contenuti.	14.1	85.9
<b>C3</b> Ho ritenuto opportuno approfondire i contenuti delle mappe dinamiche utilizzando anche il libro.	23.2	76.8
<b>C4</b> L'uso delle mappe dinamiche è efficace nella fase che precede lo studio da materiale cartaceo.	19.2	80.8
<b>C5</b> Le mappe dinamiche mi hanno consentito di organizzare meglio lo studio effettuato con l'ausilio del libro.	12.1	87.9
<b>C6</b> Lo studio su materiale cartaceo è facilitato dopo la consultazione delle mappe dinamiche.	12.1	87.9
<b>C7</b> Lo studio da materiale cartaceo (libro, dispense) migliora l'apprendimento se affiancato dall'utilizzo delle mappe dinamiche.	15.1	84.9
<b>C8</b> Le mappe dinamiche consentono di individuare i punti salienti dell'argomento da studiare.	6.1	93.9
<b>C9</b> Lo studio con le mappe dinamiche mi ha stimolato ad approfondire gli argomenti con il libro.	15.2	84.8
<b>C10</b> Lo studio da materiale cartaceo prima della consultazione delle mappe dinamiche favorisce l'apprendimento.	55.6	44.4
<b>C11</b> Lo studio delle sole mappe dinamiche migliora l'apprendimento.	77.8	22.4
<b>C12</b> È stato sufficiente studiare le mappe dinamiche senza consultare i materiali cartacei.	82.8	17.2
<b>C13</b> L'utilizzo delle mappe dinamiche agevola l'apprendimento.	22.2	77.8

Figura 16. Feedback raccolti dagli studenti

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## **FORMAZIONE DEI FUTURI INSEGNANTI E TECNOLOGIE: ATTEGGIAMENTI E PERCEZIONI DI APPRENDIMENTO IN UN PERCORSO BLENDED BASATO SULL'APPROCCIO TRIALOGICO**

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### **Abstract**

Il contributo intende esplorare la possibilità e il modo in cui cambiano gli atteggiamenti e le percezioni di apprendimento di specifiche competenze in un Laboratorio di formazione per futuri insegnanti di scuola elementare (n=37 partecipanti). La peculiarità del percorso laboratoriale, progettato rispettando i principi dell'Approccio Trialogico all'Apprendimento, viene considerato il terreno fertile attraverso cui accompagnare i futuri docenti nella conoscenza e sperimentazione pratica delle teorie pedagogiche capaci di sostenere un uso costruttivo e collaborativo della tecnologia.

Il corso ha avuto inizio a Marzo 2018 e termine il 28 maggio. Per rispondere alle domande di ricerca, abbiamo utilizzato un questionario anonimo somministrato agli studenti a inizio e fine corso. Il questionario si compone di due sezioni, una specificamente dedicata all'analisi delle competenze di knowledge work, l'altra all'indagine del senso di Self-Efficacy degli studenti. I risultati evidenziano già in entrata una buona percezione generale rispetto al possesso di competenze di lavoro collaborativo, ma gli studenti si sentono poco preparati ad utilizzare le tecnologie nella didattica come futuri insegnanti, pur usandole abitualmente nel proprio percorso di studi. Essendo il corso terminato da poco, la raccolta dei questionari finali è ancora in fase di completamento. I risultati su un campione parziale (60% dei partecipanti) mostrano un cambiamento in positivo nella percezione sia delle proprie competenze di knowledge work sia della capacità di utilizzare le tecnologie nella futura professione di insegnante.

In sede di presentazione del contributo, riporteremo gli esiti del questionario finale e del confronto tra pre- post-, utile a identificare l'impatto del laboratorio rispetto a percezioni e atteggiamenti.

### **Introduzione teorica**

L'uso delle tecnologie nella didattica è oggi ampiamente riconosciuto, oltre che incoraggiato dalle policy governative dei principali Paesi Europei e d'Oltreoceano. L'Italia stessa è appena stata protagonista di recenti e importanti decisioni politiche, con forti ricadute sul piano dell'introduzione e utilizzo effettivo degli strumenti digitali a scuola – si vedano il decalogo BYOD e il Piano Nazionale Scuola Digitale PNSD. Eppure, gli studi confermano come la maggior parte degli insegnanti usi ancora le tecnologie al servizio di una didattica tradizionale,

incapace di sfruttare il loro autentico potenziale (Harris, Mishra, & Koehler, 2009; Petrucco & Grion, 2015; Sipilä, 2014). Questa tendenza può essere sicuramente ricondotta alle modalità di apprendimento delle tecnologie cui sono esposti insegnanti in formazione e in aggiornamento. Tali percorsi didattici, infatti, si limitano spesso ad erogare training tutoriali su dati applicazioni e programmi, senza prevedere una sperimentazione pratica e diretta, riflessiva e problematizzata, che permetta agli insegnanti di mettersi alla prova come apprendisti capaci (Banas & York, 2016). Questo a scapito della percezione di poter usare efficacemente le tecnologie nella propria professione e, conseguentemente, di un impiego diverso delle stesse; fattori intrinseci come atteggiamenti personali, sistema di credenze e autostima, infatti, rivestono un ruolo preminente nella reale disponibilità degli insegnanti di mettersi in gioco con nuovi strumenti didattici (Ertmer et al., 2007). In tal senso, sperimentare le tecnologie e apprenderne il potenziale in modo critico, attivo e diretto è il primo passo per un apprendimento efficace che permetta di superare anche gli ostacoli interni della persona-insegnante.

In questo contributo descriviamo un percorso laboratoriale per futuri insegnanti basato sull'Approccio Trialogico all'Apprendimento (TLA: Paavola & Hakkarainen, 2005), da noi già sperimentato in numeri contesti di didattica universitaria e di formazione insegnanti (Sansone, Cesareni, Bortolotti, & Buglass, submitted). Il TLA è così chiamato perché integra l'approccio "monologico" all'apprendimento (la cui enfasi cade sui processi della conoscenza individuale e concettuale) e quello "dialogico" (con enfasi su cognizione distribuita, ruolo delle interazioni sociali e materiali), con un terzo elemento: i processi intenzionali implicati nel produrre collaborativamente artefatti di conoscenza condivisi e utili per la comunità. L'approccio trialogico viene applicato attraverso sei principi, i cosiddetti design principles, che guidano la progettazione delle attività. In sintesi, si tratta di impostare le attività in modo da rendere saldo il collegamento tra quanto apprende il singolo e quanto fa il gruppo, attraverso specifiche strategie didattiche, strumenti e ambienti tecnologici che garantiscano la reale collaborazione e interdipendenza, finalizzate alla realizzazione finale di un oggetto che sia utile e spendibile oltre la classe che lo ha creato. In particolare, le attività trialogiche sono favorite dall'impiego di ambienti e strumenti che permettono di creare e condividere, elaborare e trasformare, organizzare diversi artefatti, rendendo visibili, riflettendo e trasformando le pratiche di conoscenza.

## **La ricerca**

### **Contesto**

Il percorso oggetto di questo studio è il Laboratorio di Tecnologie Educative all'interno del Corso di laurea in Scienze della Formazione Primaria.

Come anticipato, il Laboratorio è disegnato attorno ai principi del TLA ed ha come obiettivo specifico quello di fornire ai futuri insegnanti l'opportunità di comprendere le potenzialità di un uso attivo e collaborativo delle tecnologie, per poter progettare attività culturalmente rilevanti e dotate di significato per gli studenti stessi. Perché questo obiettivo possa essere



## Formazione dei Futuri Insegnanti e Tecnologie: Atteggiamenti e Percezioni di Apprendimento in un Percorso Blended Basato sull'Approccio Triadologico

Nadia Sansone et al.

raggiunto, si è ritenuto necessario che i futuri insegnanti acquisissero, da un lato, competenze rispetto al possibile uso delle tecnologie e, dall'altro, conoscenze riguardo le teorie pedagogiche che ne sostengono un uso costruttivo e collaborativo. Il percorso didattico è strutturato in forma blended, prevedendo attività in aula e attività in rete. In particolare, le attività online del corso si sono svolte sulla piattaforma Moodle (<http://elearning2.uniroma1.it>). Il laboratorio è iniziato a Marzo ed è terminato a fine Maggio 2018, per un totale di 10 settimane divise in tre moduli didattici. Gli studenti partecipanti (N=37; M=3, F=34, età media 23) sono divisi in 5 gruppi di 7/8 componenti ciascuno, aventi uno spazio di lavoro dedicato, corrispondente a uno specifico corso su Moodle.

I Moduli didattici sono dedicati a specifici contenuti e prevedono attività diverse, come illustrato nella seguente tabella (Tabella 1):

Tabella 1: Contenuti e attività nei 3 diversi moduli didattici

	Tematica	Attività
Modulo 1	Le tecnologie nella didattica: Idee e normative	Discussione sull'uso delle tecnologie per la didattica e per la professione di insegnante. Studio in gruppo, discussione e presentazione del Piano Nazionale Scuola Digitale
Modulo 2	Indagine sull'uso delle tecnologie nella scuola	Costruzione di un'intervista sull'uso delle tecnologie nella didattica. Somministrazione dell'intervista al referente per le tecnologie nelle scuole in cui gli studenti svolgono tirocinio. Analisi dei dati
Modulo 3	Progettazione di un percorso didattico	Ricerca di esperienze significative di uso delle tecnologie nella didattica. Progettazione di un percorso didattico che preveda un uso attivo e collaborativo delle tecnologie.

Il punto di arrivo del Laboratorio consiste, quindi, nella progettazione collaborativa di un modulo didattico che preveda la costruzione attiva di conoscenza da parte degli studenti, mediata da un uso collaborativo delle tecnologie. Coerentemente con quanto previsto dal TLA, si tratta di un prodotto dotato di significato per i corsisti e realmente spendibile all'interno della propria professione. Per arrivare a questo risultato e per sostenere l'intero percorso, gli studenti sono chiamati a svolgere una serie di attività finalizzate a promuovere un reale scambio e a far sì che ognuno assuma la responsabilità della crescita della conoscenza del gruppo, col fine ultimo di sperimentare in prima persona le tecniche che potranno poi adottare, una volta divenuti insegnanti. In particolare, per sostenere l'agentività individuale e una reale collaborazione, in ciascun modulo sono attribuiti a turno alcuni ruoli, che invitano i partecipanti ad assumere specifiche responsabilità all'interno del gruppo (Cesareni & Cacciamani, 2015; Sansone, Ligorio & Dillenbourg, 2011; Strijbos & Weinberger, 2010). Coerentemente con le linee guida del TLA, poi, tutto il percorso è supportato da: (a) integrazione di diverse forme di conoscenza (implicita, esplicita, procedurale) e formati (lezioni, documenti, testimonianze), (b) iterazione di cicli di attività con scadenze, consegne e punti di passaggio ben definiti, (c) strumenti e compiti di supporto alla riflessione e all'auto-

monitoraggio, (d) scambi col mondo extra-formativo e collaborazione con contesti professionali reali, (e) uso di diversi strumenti di mediazione tecnologica.

### **Obiettivi**

Lo studio illustrato in questo contributo mira a verificare l'impatto del Laboratorio di Tecnologie Didattiche per Futuri Insegnanti qui descritto su attitudini e percezioni di sviluppo di competenze. Nello specifico, le domande di ricerca sono:

- È possibile osservare un cambiamento nella percezione degli studenti rispetto al possesso delle competenze indagate?
- Si rintraccia un cambiamento nell'atteggiamento dei futuri insegnanti rispetto all'uso delle tecnologie nella didattica?

### **Metodo e dati**

Per rispondere alle nostre domande di ricerca, abbiamo utilizzato un questionario anonimo somministrato agli studenti a inizio e a fine corso. Il questionario si compone di due sezioni: (a) Contextual Knowledge Practices questionnaire (CKP-q; Muukonnen, Lakkala, Toom, & Ilomäki, 2017). Il questionario comprende 27 items che chiedono agli studenti di valutare quanto ritengono di possedere determinate competenze (Scala Likert 1: per niente; moltissimo). Gli items sono organizzati in sette scale concettualmente collegate ai Design Principles dell'Approccio Trialogico: collaborare su oggetti condivisi (DP1); integrare lavoro individuale e collaborativo (DP2); miglioramento attraverso i feedback (DP3 e DP4); sviluppo continuo degli oggetti di conoscenza (DP4); comprendere varie discipline e pratiche (DP5); collaborare e comunicare interdisciplinariamente (DP5); imparare a sfruttare la tecnologia (DP6). (b) Self-Efficacy scale (Moore-Hayes; 2011), nella versione adattata e tradotta in Italiano dalle autrici di questo studio. La scala contiene sei item con cui si chiede di pensare all'uso delle tecnologie come futuro insegnante e posizionarsi rispetto alle seguenti affermazioni (Scala Likert 1: per niente; moltissimo): 1. Quanto ti senti competente nello scegliere e usare i diversi media per l'insegnamento e apprendimento? 2. Quanto ti senti preparato a valutare la capacità di un software di supportare insegnamento e apprendimento? 3. Quanto sapresti integrare la tecnologia in un programma di insegnamento? 4. Quanto sei capace determinare perché, quando e come utilizzare la tecnologia nella didattica? 5. Quanto ti senti preparato a selezionare e utilizzare tecnologie assistive? 6. Quanto hai usato la tecnologia per supportare il tuo apprendimento negli ultimi sei mesi?

Sui questionari raccolti (entrata N=35; 95% degli studenti partecipanti al corso; uscita N=22; 59% studenti partecipanti al corso) sono state calcolate le medie per ciascun item e quelle aggregate di scala; una volta terminata la raccolta dei questionari di uscita, i questionari pre- e post- verranno sottoposti ad opportuni test di significatività (Anova univariata).

### **Risultati preliminari**

Come anticipato, il Laboratorio ha avuto termine a fine Maggio, ed al momento della scrittura di questo contributo sono stati raccolti solo 22 questionari finali. I risultati sono quindi parziali,

## Formazione dei Futuri Insegnanti e Tecnologie: Atteggiamenti e Percezioni di Apprendimento in un Percorso Blended Basato sull'Approccio Trialogico

Nadia Sansone et al.

e solo in sede di convegno sarà possibile portare i risultati definitivi, con il calcolo della significatività delle differenze pre –post.

La Figura 1 riporta le medie delle scale che compongono il questionario CKP e indagano, quindi, la percezione di possesso di determinate competenze di Knowledge Work (Figura 1).

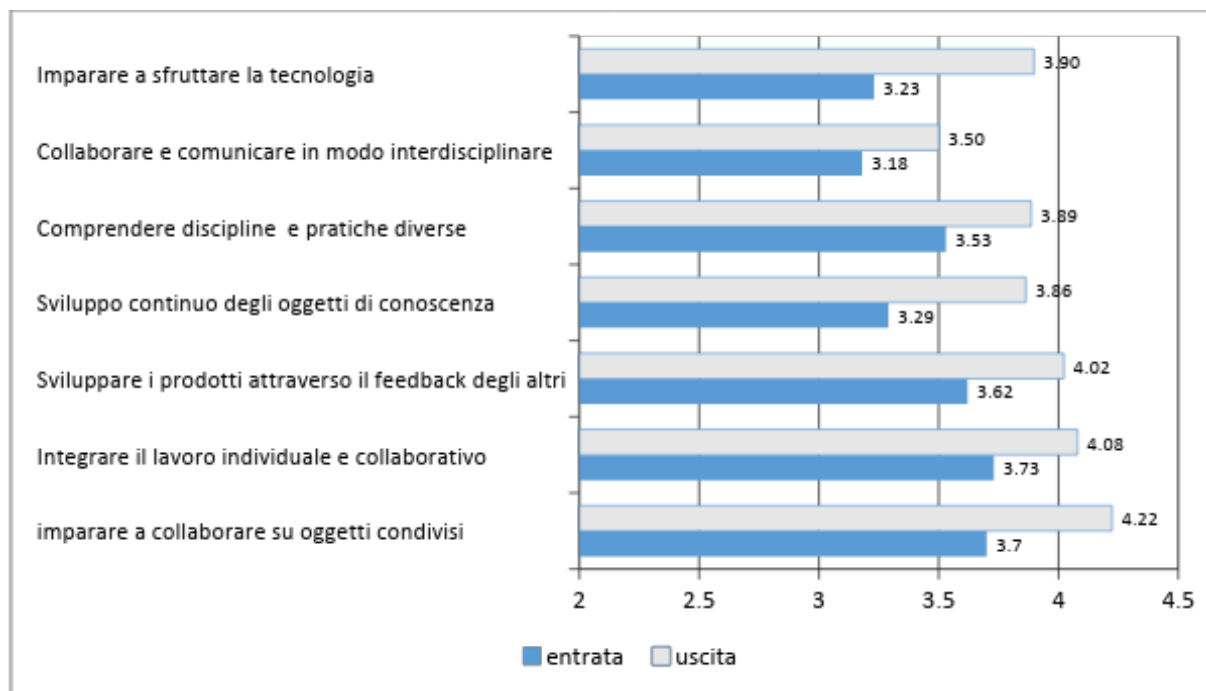


Figura 1. Percezione degli studenti in entrata riguardo alle proprie competenze di Knowledge Work, Scala likert 1-5

Come emerge dalla Figura 1, già all'inizio del corso gli studenti ritengono di possedere competenze più che sufficienti sia rispetto al sapere integrare il lavoro collaborativo con quello individuale (3,73 su 5), sia al lavorare in collaborazione con gli altri su oggetti di conoscenza (3,70 su 5). Si percepiscono anche abbastanza in grado di sviluppare i prodotti attraverso il feedback degli altri (3,62). Possiamo quindi dedurre si tratti di studenti già in parte abituati a considerare la collaborazione come aspetto positivo nella costruzione di oggetti di conoscenza ed ad aver sperimentato modalità analoghe di apprendimento.

Meno competenti si ritengono nell'utilizzare le tecnologie (3,23) e nel collaborare con persone appartenenti a campi disciplinari diversi (3,18), che rappresentano due aspetti distintivi dell'approccio trialogico, quando considerati insieme alla collaborazione e allo sviluppo continuo dei prodotti.

Tali competenze sembrano notevolmente aumentate in uscita, in particolare gli studenti affermano di aver migliorato le loro competenze di lavoro collaborativo finalizzato alla costruzione di oggetti condivisi (4,22), la loro capacità di integrare il lavoro individuale e collaborativo (4,08), sviluppando i prodotti grazie ai feedback forniti dai colleghi (4,02). Seppur la loro percezione fosse già alta all'inizio del corso (3,23), gli studenti affermano di aver imparato a sfruttare la tecnologia per la didattica (3,90).

Ogni sottoscala dell'analisi effettuata sembra dar prova di un cambiamento in positivo della percezione degli studenti rispetto al possesso delle competenze indagate. Non appena completata la raccolta dei dati in uscita, verranno effettuate analisi per verificare la significatività di ogni risultato.

Rispetto alle analisi relative alla scala di Self-Efficacy, i risultati ci danno conferma di una percezione iniziale di sé come non pienamente competenti nel campo di un uso professionale delle tecnologie: dovendo valutare la propria competenza nel campo delle tecnologie per la didattica, gli studenti si attribuiscono in entrata un punteggio medio di 3,15 su 6, che aumenta a 4,55 nel questionario di uscita (Tabella 2).

Tabella 2: Risposte degli studenti ai diversi item della scala di Self Efficacy (scala Likert 1-6)

Pensando all'uso delle tecnologie come futuro insegnante, rispondi alle seguenti domande	Media entrata	Media uscita
Quanto ti senti competente nello scegliere e usare i diversi media per l'insegnamento e apprendimento	3,15	4,23
Quanto ti senti preparato a valutare la capacità di un software di supportare insegnamento e apprendimento?	2,70	4,09
Quanto sapresti integrare la tecnologia in un programma di insegnamento?	3,15	4,55
Quanto sei capace a determinare perché, quando e come utilizzare la tecnologia nella didattica?	2,97	4,41
Quanto ti senti preparato a selezionare e utilizzare tecnologie assistive?	2,88	4,09
Quanto hai usato la tecnologia per supportare il tuo apprendimento negli ultimi sei mesi?	4,06	4,82

Guardando ai singoli item della scale, emerge il quadro di uno studente medio che già prima del corso utilizza in modo consistente le tecnologie per le proprie attività di studio (media 4,06 su un punteggio massimo di 6), ma che dichiara di non essere sufficientemente preparato a progettare, scegliere e valutare l'uso delle tecnologie per l'apprendimento. In uscita, coerentemente con gli obiettivi del corso di formazione, si può vedere un aumento consistente nella percezione riportata del sentirsi preparati ad integrare in generale le tecnologie nella didattica e, in particolare, a selezionare e utilizzare tecnologie che assistano le attività didattiche, nonché a valutare la capacità di un software di supportare insegnamento e apprendimento.

## **Conclusioni e direzioni future**

In questo contributo si descrive uno studio progettato nell'ambito di un Laboratorio di Tecnologie Educative per futuri insegnanti basato sull'Approccio Trialogico all'Apprendimento, i cui partecipanti sono chiamati a sperimentare in prima persona strumenti e metodologie didattiche che potranno in seguito utilizzare in classe, dopo averne approfondito le specifiche potenzialità e condizioni d'uso.

L'obiettivo dello studio è quello di verificare l'impatto del laboratorio sullo sviluppo di determinate competenze e sugli atteggiamenti nei confronti delle tecnologie. A tal fine ci siamo serviti di un questionario pre- post somministrato anonimamente. I risultati in entrata evidenziano da un lato una buona percezione generale rispetto al possesso di competenze di

lavoro collaborativo e miglioramento continuo dei prodotti, dall'altro, gli studenti si sentono meno efficaci e preparati ad utilizzare le tecnologie nella didattica come futuri insegnanti, pur usandole abitualmente nel proprio percorso di studi. I risultati parziali raccolti in uscita (sul 60 % dei partecipanti) mostrano un cambiamento in positivo nella percezione sia delle proprie competenze di knowledge work sia della capacità di utilizzare le tecnologie nella futura professione di insegnante.

In sede di presentazione del contributo, riporteremo gli esiti totali del questionario finale, calcolando la significatività statistica del confronto tra pre- post, utile a identificare l'impatto del laboratorio rispetto a percezioni e atteggiamenti. In ogni caso, lo studio qui presentato ha un valore esplorativo, considerato il numero esiguo di partecipanti e trattandosi di una prima edizione del Laboratorio. Tuttavia, questo primo studio unito ad altri che svolgeremo sui prodotti e processi del laboratorio, oltre che sui moduli di feedback raccolti in itinere, ci permetterà di raccogliere informazioni importanti ai fini di una successiva ri-progettazione.

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## SCENARI DEL LAVORO, FUTURO E FORMAZIONE 4.0

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### La sfida di Impresa 4.0

La connessione tra *capitale umano, ricerca e innovazione* è la pietra angolare della ripresa di competitività e dello sviluppo occupazionale nel Paese. Su questo postulato non possiamo che trovare consensi, ma la fotografia che ci offre l'OCSE nei due recenti documenti dell'ottobre 2017 ("*Education at a Glance 2017*" e "*National Skills Strategy Diagnostic Report – Italy*") sul tema *education e competenze* genera senza dubbio un "velo" d'ombra difficile da dipanare.

La *crescita del digitale* dei prossimi anni – come già preannunciato nel 2016 – costerà la perdita di *cinque milioni* di posti di lavoro (World Economic Forum, 2016). È evidente quanta urgenza si determini per le *strategie di formazione* se si vuole far fronte allo *tsunami* che lo *skill-shortage* potrà generare. Ma il tema non è tanto quello di *comprendere in anticipo* quali saranno le professioni e quali le conoscenze e le *skill* richieste e quindi oggetto di formazione, quanto di un'altra questione. Si tratta del tema relativo a quali *nuove* funzioni siano da attribuire alla formazione: non più adeguamento alla *società del lavoro* (ancora intesa nell'ottica sostanzialmente della seconda o terza industrializzazione), ma promozione *nelle* persone (giovani o adulte) delle capacità e dei talenti per *ricreare* il lavoro/i ed i lavori stessi. È naturale che in questo scenario si richieda alle politiche per l'occupabilità un *cambio di paradigma* tutto da discutere e reinventare: si tratta di innescare un nuovo ciclo di sviluppo e l'investimento nelle capacitazioni individuali e collettive può essere il fattore che restituisce energia e determinazione (Alessandrini, 2016; 2017).

Come far sentire la voce di un approccio di tipo "antropologico" al lavoro nel dibattito della "*New skill agenda*" e come rafforzare le *politiche di sviluppo della VET* (*Vocational Educational Training*)? In un nuovo volume miscelaneo di recente pubblicazione (Alessandrini, 2017) ci siamo chiesti quali dinamiche caratterizzano gli scenari della trasformazione del lavoro in prospettiva *Industry 4.0*. Quali responsabilità – in quanto intellettuali – hanno i cultori dei saperi pedagogici rispetto al tema della promozione di un *patto intergenerazionale* sul lavoro (sottolineato di recente *dalle Settimane dei cattolici italiani*)?. Quali sfide per l'Università nella dimensione sempre più sentita – in molti Atenei – di *apertura alla terza missione* non solo nel senso di nuova attenzione agli obiettivi di occupabilità degli studenti, ma soprattutto alle possibili forme didattiche idonee allo sviluppo di *mindset* in grado di interagire in modo creativo e propulsivo negli scenari del lavoro delineati dagli scenari della *Industry.4.0* (Schwab, 2017). Si veda su questi temi le conclusioni emerse dalla 48° Settimana Sociale dei cattolici italiani "*Il lavoro che vogliamo, libero, creativo, partecipativo, e solidale*" (Cagliari, 26-29 ottobre

2017). Tra le proposte emerse, al primo posto l'esigenza di "rimettere il lavoro al centro dei processi formative", e promuovere "un patto tra le generazioni per un lavoro degno e di qualità". La proposta complessiva individua trenta *passi* necessari per dare concretezza alle proposte (<http://www.settimanesociali.it/>) [ultima consultazione 31/10/2017].

Il lavoro e la formazione *a e con* il lavoro ha un *ruolo apicale* nel quadro che rende possibile lo *sviluppo umano* inteso al di là del primato della crescita quantitativa, dei valori efficientistici e funzionalistici. "Con il digitale cresce la complessità delle filiere produttive, la personalizzazione dei prodotti ed i servizi *on demand*", sosteneva in modo antesignano Enzo Rullani (2010) in un volume di qualche anno addietro. E quindi rivalutazione dell'ingegno e della creatività umana: questo è quanto postula lo scenario dell'*Industry4.0*. Per realizzare innovazioni *design-driven* è necessario trasformare l'impresa in *un'organizzazione che crea conoscenza*, come anticiparono, circa vent'anni fa Nonaka e Takeuchi, sostiene G. De Michelis in un recente Rapporto sul digitale in Italia.

Pur nella considerazione della specificità dei contesti in cui si realizzano le esperienze educativo-formative, si delinea un elemento comune agli scenari organizzativi propri di aree diverse (pubblico e privato): il bisogno di maggior coinvolgimento delle persone, del *carico di creatività e di intelligenza* critica di cui esse dispongono per anticipare scenari che sono *in divenire*. Si configurano bisogni più complessi da parte delle persone che lavorano: interpretazione dei contesti, analisi di culture diverse, capacità di integrazione e di dialogo, "pensiero produttivo", capacità di autoanalisi dei comportamenti, capacità di organizzare e creare *processi di crescita della conoscenza (knowledge management)*. L'innovazione è la forza motrice in virtù della quale, a partire dalla rivoluzione industriale, le economie occidentali sono potute crescere ad una velocità senza precedenti (Costa, 2016). Raramente le nuove idee nascono in un deserto; vari studi dimostrano che l'interazione sociale tra lavoratori creativi tende a produrre opportunità di apprendimento che favoriscono l'innovazione e la produttività. Quali sono, dunque, gli ambiti dell'innovazione oggi sostenibile? Tra i nuovi modelli di business correlati al digitale si scorgono ad esempio lo scenario del *crowdfunding* e dei *digital hub* verso la dimensione della realtà di ecosistemi territoriali (Costa, 2016).

L'economia dell'innovazione si basa indubbiamente sulla crescita del *valore del talento*. Le regioni d'Europa che non saranno in grado di richiamare innovazione e capitale umano conosceranno un inevitabile declino come è avvenuto nella "terza America", quella dei centri industriali in crisi (Moretti, 2017). Il pensiero e la creatività, incluso le abilità di *problem solving* e gli abiti *mentali creativi e collaborativi* saranno sempre più centrali. Queste competenze includono l'immaginazione e la curiosità, le capacità empatiche. Ed inoltre le *skill* comportamentali e sociali, incluso le skill come la *self confidence*, l'attitudine alla *leadership* ed al *management*, la capacità di collaborazione e di persuasione. Nel contesto del mondo globalizzato laddove l'innovazione è il *driver* fondamentale di una crescita di lungo termine, una delle chiavi per il cambiamento nell'educazione è cercare le strade efficaci per equipaggiare le persone con le skill richieste per l'innovazione nelle sue diverse forme, fin dalla formazione di base, secondaria e universitaria.



## **Master HR-Specialist – Professionisti per le risorse umane**

Nello scenario caratterizzato dall'evoluzione, pur se lenta e faticosa, verso *Industry 4.0*, si delinea una nuova domanda delle imprese ai professionisti HR: la richiesta (a) di generare motivazione per favorire la *retention* del personale; (b) creare le condizioni per sostenere l'innovazione e la crescita delle competenze; (c) migliorare la capacità di "lettura" dei cambiamenti. In una parola: *produrre valore* al di là del mero aspetto amministrativo-gestionale e delle questioni giuridico-legali, pur sempre importanti soprattutto rispetto ai quadri normativi dello *smart working* e del *welfare* aziendale. La qualità del capitale umano sarà fondamentale per accompagnare e sostenere la ripresa economica che caratterizza gli scenari più recenti anche del nostro Paese. Il ruolo della direzione risorse umane è il fondamentale fattore abilitante per sostenere i *trend* positivi in atto.

### **Un'analisi del fabbisogno**

Il ruolo dello specialista HR ha di recente subito profonde modifiche nella direzione di una maggiore attenzione alla dimensione culturale, interna ed esterna all'azienda. Esso si è spogliato degli aspetti tipicamente tecnico-amministrativi per acquisire dimensioni e competenze più ampie e complesse. Infatti, lo specialista HR dovrà offrire un valore aggiunto al proprio contributo attraendo, motivando, sviluppando e trattenendo le persone che sono "in grado di fare la differenza" nell'organizzazione. In particolare, si tratta di una figura, e di un ruolo, che faccia proprio un bagaglio multidisciplinare di conoscenze, al fine di garantire:

- generatività verso le persone e verso l'azienda;
- orientamento all'*empowerment* delle persone;
- facilitazione al *coinvolgimento* delle persone;
- facilitazione all'*interiorizzazione* dei valori aziendali;
- impegno in un approccio complessivo anche nei confronti delle politiche attive del lavoro (*outplacement*).

Da qui, la rilevanza e l'esigenza di una formazione universitaria di secondo livello. L'impatto tecnologico che l'esperienza del Master invita ad affrontare, come personale esperienza formativa, è un modo innovativo per sperimentare adesso opportunità che saranno praticate in futuro anche nell'attività professionale.

### **Struttura del corso di studio**

Il Corso, giunto ormai alla VI edizione, è svolto nella modalità didattica integrata (*blended*): in presenza e *on-line*. Il monte orario complessivo è di 1500 ore, suddivise tra ore di lezione e di autoapprendimento, con il riconoscimento di n. 60 CFU. Sul piano del metodo, il Master fa ricorso ad una metodologia di formazione – già implementata da oltre un decennio nella progettazione di corsi didattico-formativi ma continuamente aggiornata – con:

- lezioni e *workshop* in presenza in "sessioni *week end*" (venerdì pomeriggio e sabato mattina, 1 volta al mese per complessivi otto mesi);
- *panel* e *web conference* con testimoni privilegiati ed esperti;

- lezioni on-line e webinar;
- laboratori di gruppo e on-line (case study e case analysis, project work);
- partecipazione a gruppi di lavoro nelle aziende convenzionate (*stage*);
- forum *on-line*;
- community on-line/app dedicate;
- *mentoring, tutoring*;
- social bookmarking, social computing.

Il Master si avvale di sofisticate metodologie di *e-learning* grazie alle quali è consentito agli iscritti di acquisire parte della propria formazione da casa o dal posto di lavoro grazie ad una *Virtual School* dedicata. Il Corso prevede lo sviluppo di *guideline* e materiali didattici (*slide*, esercitazioni, bibliografia, sitografie) in formato multimediale, ad uso interno, per i partecipanti. Il percorso didattico prevede, inoltre, attività orientate al sostegno dei percorsi di apprendimento dei partecipanti nelle fasi iniziali e finali del percorso:

- *coaching* personalizzato;
- counselling per il placement.

La finalità del Corso è di trasferire un bagaglio di competenze multidisciplinare orientato ad una formazione *ad hoc* nel campo delle risorse umane. L'obiettivo del Master è quello di formare professionisti nell'area della gestione e sviluppo delle Risorse Umane, con particolare attenzione agli sviluppi innovativi ed agli strumenti metodologici nella specificità dei diversi "mestieri" chiamati in gioco nella gestione dell'area HR in aziende pubbliche e private. Nello specifico: (a) competenze per la gestione dei processi formativi (dall'analisi dei fabbisogni ai modelli di competenze), e degli elementi caratterizzanti le relazioni industriali e gli aspetti giuslavoristici correlati ai sistemi di people management (*capacità di apprendimento*); (b) capacità di comprensione delle problematizzazioni fondamentali della contemporaneità (le nuove "culture" del lavoro, le forme di flessibilità e precarietà, ecc) ed ambiti empirici di studio ed applicazione attraverso la metodologia dell'analisi dei casi, dei focus group, dei workshop, ecc., al fine di sviluppare capacità autonome di applicazione dei modelli e pratiche studiati in campo professionale (*conoscenza e capacità di comprensione*); (c) capacità di applicare le conoscenze e capacità di comprensione anche in riferimento ad un approccio professionale (con particolare riguardo ad alcune aree metodologiche fondamentali come i "modelli" di competenze, l'approccio alla comunità di pratica, i processi di analisi dei fabbisogni professionali, ecc.) e rispetto ai modelli teorici ed ai processi empirici di coordinamento in atto nelle organizzazioni (nelle diverse declinazioni rilevabili dalla pubblica amministrazione, alla grande e piccola impresa) rispetto alla selezione del personale, allo sviluppo delle carriere, alla valutazione delle risorse, alla gestione della leadership (*capacità di applicare conoscenza e comprensione*).

### **Una comunità di pratica**

Obiettivo della formazione nel Master è anche quello di costruire dei *team* professionali, che abbiano un interesse comune legato alle tematiche trattate, e che possano continuare a crescere, confrontandosi anche una volta terminato il Master. Il fatto che in alcune delle edizioni

realizzate ci sino stati gruppi che si sono addirittura uniti in associazione è la cartina di tornasole di quanto si possano costruire legami forti anche mediante una piattaforma *e-learning*.



Figura 1. Inserire Immagine

Approcci di azione formativa “leggeri”, orizzontali, cioè centrati sulla capacità riflessiva del gruppo di lavoro (inteso come comunità di pratica) possono essere visti anche come “allenamento” a scenari del lavoro destrutturati, discontinui e flessibili del futuro, ovvero allo *Smart Working*. Al di là degli strumenti e degli ambienti, in un contesto come quello della piattaforma HR Specialist, sono valori aggiunti, per il soggetto, le capacità di attivarsi, di comprendere su che cosa acquisire conoscenze, come trovarle, dove intrecciare relazione fiduciarie per “arrivare” alle conoscenze ed alle competenze che gli servono per perseguire l’eccellenza nello svolgimento del suo lavoro.

### **Un tutorship professionalizzante**

La presenza di un *e-tutor* è da ritenersi fondamentale per garantire *engagement* e interazione tra i partecipanti oltre che per “cementare” le relazioni all’interno della comunità di pratica. Il Master fa scuola anche in quanto alla selezione del *tutor*, visto che spesso questi è un ex allievo del corso, che conosce bene pertanto le dinamiche di formazione del gruppo e sa ricostruirle a ogni nuova edizione.

L’*e-tutor* HR è un facilitatore dell’apprendimento: promuove spazi di condivisione delle informazioni e di costruzione della conoscenza; favorisce lo scambio dei contenuti e crea un’interfaccia di dialogo con i docenti; promuove momenti di “interazione sociale”; è allo stesso tempo un *e-coach* ed *e-mentor*. Il suo ruolo nel Master è di proporre attività e supportare i diversi momenti socio-formativi tali da favorire la coltivazione “in gruppo” della comunità di pratica.

### **Sbocchi occupazionali**

L’inserimento occupazionale cui indirizza il Master universitario “HR SPECIALIST – Professionisti per le risorse umane” si trova nell’area della Funzione del Personale, nelle Risorse

Umane, nella Formazione e Sviluppo Organizzativo delle imprese e delle organizzazioni e della P.A. nazionale, dei Ministeri e degli enti locali, nel campo della ricerca e consulenza, nelle associazioni professionali, datoriali e sindacali e nelle agenzie per il lavoro in somministrazione. Consente altresì opportunità di riqualificazione professionale di personale già attivo nell'ambito specifico delle risorse umane e della formazione. Il Master – attivo presso il Dipartimento di Scienze della Formazione dell'Università degli Studi Roma TRE ([www.master-hrspecialist.com](http://www.master-hrspecialist.com)) dal 2011 – è una community prima di tutto di persone, e di professionisti, che nel corso delle diverse edizioni ha registrato una partecipazione massiva pari a 250 corsisti.

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## IL RUOLO DEI GESTI SIGNIFICATIVI DEL DOCENTE NEI VIDEO MULTIMEDIALI PER L'EDUCAZIONE

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### Introduzione

La ricerca che descriviamo ha preso spunto dai risultati di indagini compiute sulle risorse educative online. In particolare ci siamo interessati a una caratteristica comune a molti dei video inclusi negli OER e nei MOOCs: l'aggiunta, al materiale verbale e visivo della lezione, della figura del docente, il Talking Head (sotto forma di busto, viso o figura intera). L'interesse verso questo oggetto di indagine è stato motivato dalla crescita dell'utilizzo della risorsa video, considerata uno strumento efficace e ormai accessibile tecnicamente a tutti. Come ogni risorsa, anche il video pone problemi di progettazione in questo caso a causa dell'area limitata del display e delle richieste di integrazione di più fonti informative. Nonostante queste difficoltà si è diffusa la soluzione di implementare un Talking Head nel frame della lezione (vedi Figura 1, che esemplifica una delle nostre condizioni sperimentali).

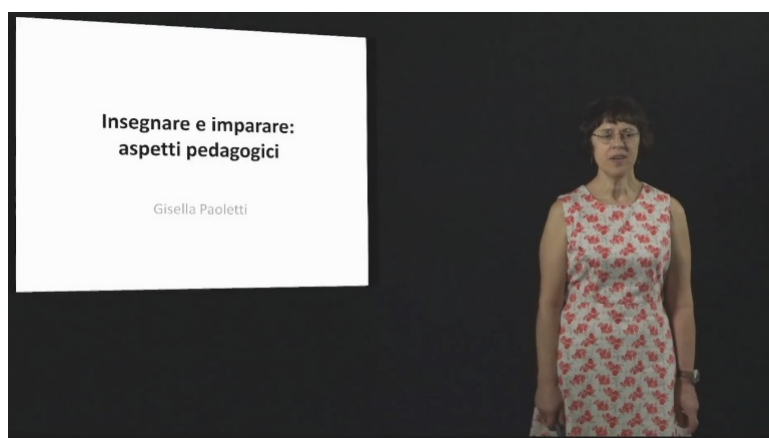


Figura 1. Talking Head nella presentazione della lezione

Viene affermato, e in parte è stato già provato, che un video dovrebbe essere breve, mostrare la faccia del docente e avere caratteristiche inclusive (il parlante dovrebbe rivolgersi frontalmente all'utilizzatore – Kizilcec et al. 2014; 2015; Mayer, 2005; Clark & Mayer, 2016; Beege et al., 2017). La presentazione della figura del docente – e cioè l'aggiunta di informazioni non verbali, in particolare i gesti – potrebbe rappresentare un'opportunità per l'insegnamento/apprendimento, in quanto la gestualità del docente che parla e spiega potrebbe migliorare la motivazione e l'apprendimento dello studente, fornendo una serie di suggerimenti sociali e cognitivi utili all'elaborazione della lezione (Mayer, 2005; Fattorini & Paoletti, 2017). Sotto l'aspetto sociale o parasociale (Beege et al., 2017), tramite il Talking Head e la personalizzazione della lezione, si intende agire sulla motivazione e collaborazione dello studente. L'ipotesi è che

il TH crei un senso di partnership tra chi impara e chi insegna, anche quando l'insegnante non è presente. La visualizzazione del docente sullo schermo avrebbe un effetto sulla percezione di aver appreso e sulla soddisfazione dell'utente (Kizilcec et al., 2015). Sotto l'aspetto cognitivo l'uso del Talking Head potrebbe migliorare la comprensione (attraverso strumenti di segnalazione delle informazioni importanti; ad esempio tramite l'indicazione/pointing) e d'integrazione di informazioni non presenti nel messaggio (cfr. per esempio Mayer, 2005b) evidenziati con i principi di signaling e image nell'ambito del multimedia.

## **Stato dell'arte**

Come spiegare però i risultati non sempre coerenti delle indagini che hanno fatto uso del Talking Head? Evidenzieremo, a tale scopo, gli aspetti esplicativi della letteratura che si è occupata degli effetti dei Talking Head nella comprensione e apprendimento (Kizilcec et al., 2014; Kizilcec et al., 2015). La presenza costante del Talking Head potrebbe costituire un elemento di disturbo, dannoso per l'elaborazione perché potrebbe distogliere l'attenzione dalle informazioni importanti, provocare superflui e frequenti switch/passaggi tra fonti di informazione, distrarre e rappresentare un sovraccarico cognitivo: richiede di dividere l'attenzione tra due fonti, non sempre congruenti, e di alternare l'elaborazione dell'una e dell'altra, provocando spostamenti frequenti verso la figura, che diventa lo stimolo primario anche quando l'informazione principale è contenuta nell'altra porzione dello schermo (Kizilcec et al., 2014). Inoltre, ipotizziamo che un ulteriore fattore vada esaminato: la significatività dei gesti prodotti dai docenti videoregistrati. La significatività del gesto, la sua coerenza rispetto al contenuto espresso oralmente o visivamente, può essere utile per l'ascoltatore ed anche per il parlante (Feyereisen, 2006; Cook et al., 2012). Facendo riferimento alla categorizzazione proposta da Poggi e Magno Caldognetto (1997), schematizzata nella Tabella 1, proponiamo una prima ipotetica distinzione tra gesti potenzialmente utili e gesti non utili nella presentazione online.

Tabella 1: Tipi di gesti nell'educazione secondo Poggi e Magno Caldognetto (1997)

Gesti espressivi	- Sono rilevatori dello stato emotivo del parlante e sono per lo più generati involontariamente; vengono espressi principalmente tramite il viso; - una funzione analoga è attribuita anche a gesti eseguiti con altre parti del corpo, come, per es. Picchiare un pugno sul tavolo, pestare i piedi in segno di rabbia etc.
Gesti illustratori	- Sono eseguiti contemporaneamente alla produzione verbale con la funzione di chiarire, accrescere, evidenziare il contenuto della comunicazione (per es. indicando forme di oggetti, direzioni di movimento etc.); - sono gesti illustratori: i gesti iconici, deittici, batonici.
Gesti simbolici	- Sono dotati di alta tipicità e di rilevante forza comunicativa; - sono prodotti volontariamente e sono ordinati secondo regole socialmente condivise (per es. il saluto, la preghiera).
Gesti regolatori	- Hanno la funzione di normalizzare la conversazione: dare e chiedere la parola, mostrare interesse etc.

La prima – i gesti illustratori – comprende i gesti che forniscono informazioni congruenti e di chiarificazione rispetto al messaggio audio e alle informazioni su schermo (iconici, deittici,

batonici). Chiariscono il contenuto della comunicazione (indicando, mostrando una caratteristica del referente o dell’organizzazione del discorso) e avrebbero un effetto positivo su preferenza e ricordo delle lezioni.

Nei gesti “iconici” la relazione tra gesto e significato è palese (per es. il gesto che indica la sigaretta, mimando l’azione del fumare). Rappresentano e narrano qualche caratteristica visiva o dinamica del referente, o sono simili al fenomeno di cui si parla referente (ad es.: allargare le mani per indicare quanto era grande il pesce? Quanto era faticosa la salita?). Talvolta forniscono informazioni non-ridondanti, che il parlato non menziona, altre volte sono ridondanti rispetto al parlato.

I gesti “deittici”, cioè ostensivi, con i quali il parlante indica il referente o la sua posizione nello spazio o nel tempo (per es. il gesto con cui si indica un oggetto preciso, mentre si dice “dammi quello!” o “guarda qui”); sono usati puntando il dito verso l’oggetto di cui si sta parlando, spesso accompagnati da termini deittici: qui, questo, io.

I gesti “batonici”, che accompagnano il parlato in modo quasi involontario, mettendo in rilievo una particolare parola o espressione, danno enfasi agli elementi sotto focus nel discorso, accompagnano, segnalano la struttura del discorso, in parallelo a frasi che contengono termini come “primo”, “secondo”; danno una struttura temporale o enfatica alla comunicazione (per esempio muovo la mano dall’alto in basso in corrispondenza del cambio di argomento, contandone le parti). Si tratta di gesti che segnalano le informazioni importanti, le organizzano, spiegano.

La contrapposizione è con la gestualità priva di informazioni che spesso accompagna il parlato e può svolgere un’azione diversa, dare enfasi, colore, riguardare aspetti emotivi, partecipativi.

La seconda macrocategoria comprende gesti con una funzione di tipo espressivo, emotivo, privi di informazioni di contenuto. Il “gesto” si riferisce a molti tipi di movimento, delle mani, delle braccia, ad aggiustamenti nella postura, il toccarsi i capelli, gli occhiali, i tic, il giocherellare con gli oggetti. Ma non sono questi movimenti a interessare la ricerca educativa. Questi agirebbero negativamente provocando risposte di orientamento, frequenti switch tra fonti di informazioni, causando un carico cognitivo senza un corrispettivo contributo nella elaborazione e con un peggioramento della performance, anche se forse non sulla preferenza degli studenti.

La ricerca è ancora in fase di svolgimento, i confronti possibili numerosissimi. Riteniamo che la partecipazione al Congresso possa essere utile nel definire e condividere ipotesi, contesti, esempi.

## **Metodologia**

I confronti pianificati riguardano molti contenuti e formati.

Solamente il primo confronto verrà presentato al Convegno, insieme con gli strumenti di misura e i primi risultati. Come primo step abbiamo considerato un confronto fra piano americano con slide vs piano americano senza slide.

Gli studenti sono stati divisi in due gruppi: Americano con slide 25 soggetti, americano senza slide 18 soggetti.

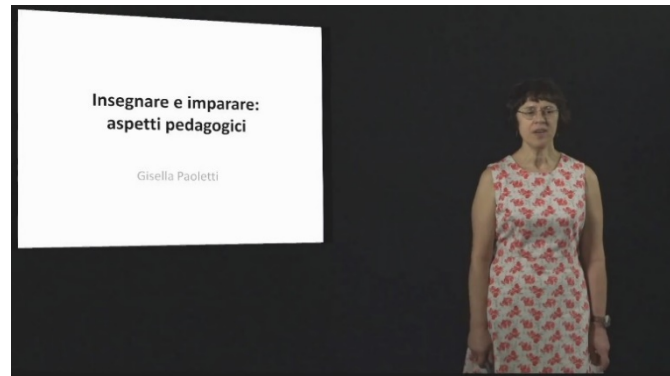


Figura 2. Piano americano con slide

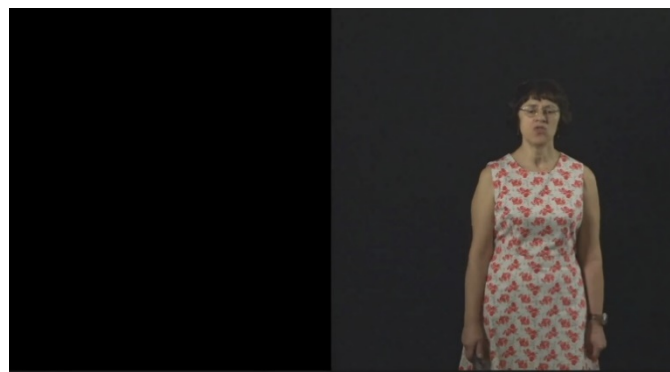


Figura 3. Piano americano senza slide

I gesti rappresentati nelle condizioni, venivano prodotti dai docenti seguendo le istruzioni di segnalare tramite la propria gestualità il contenuto e l'organizzazione del messaggio (Stull & Mayer, 2007).

I gesti sono stati sottoposti ad un'analisi con giudici indipendenti che ha permesso di inserirli nelle due categorie oggetto della sperimentazione.

Ogni condizione consisteva in 15' di fruizione.

Le variabili dipendenti oggetto di studio riguardano: (a) il ricordo delle informazioni contenute nel messaggio orale e/o nel PowerPoint. Il compito richiesto riguardava la produzione di un elenco di punti chiave/main points. (b) i giudizi sull'esperienza: piacevolezza, utilità, facilità, percezione di apprendimento. È stato richiesto di dare un giudizio delle varie fonti su quanto risulta facile elaborare il testo, quanto è facile elaborare il messaggio e quanto i movimenti e gesti del docente aiutavano nell'elaborazione del testo e messaggio (questi dati sono stati raccolti su una scala Likert 0-5).

## **Risultati e discussione**

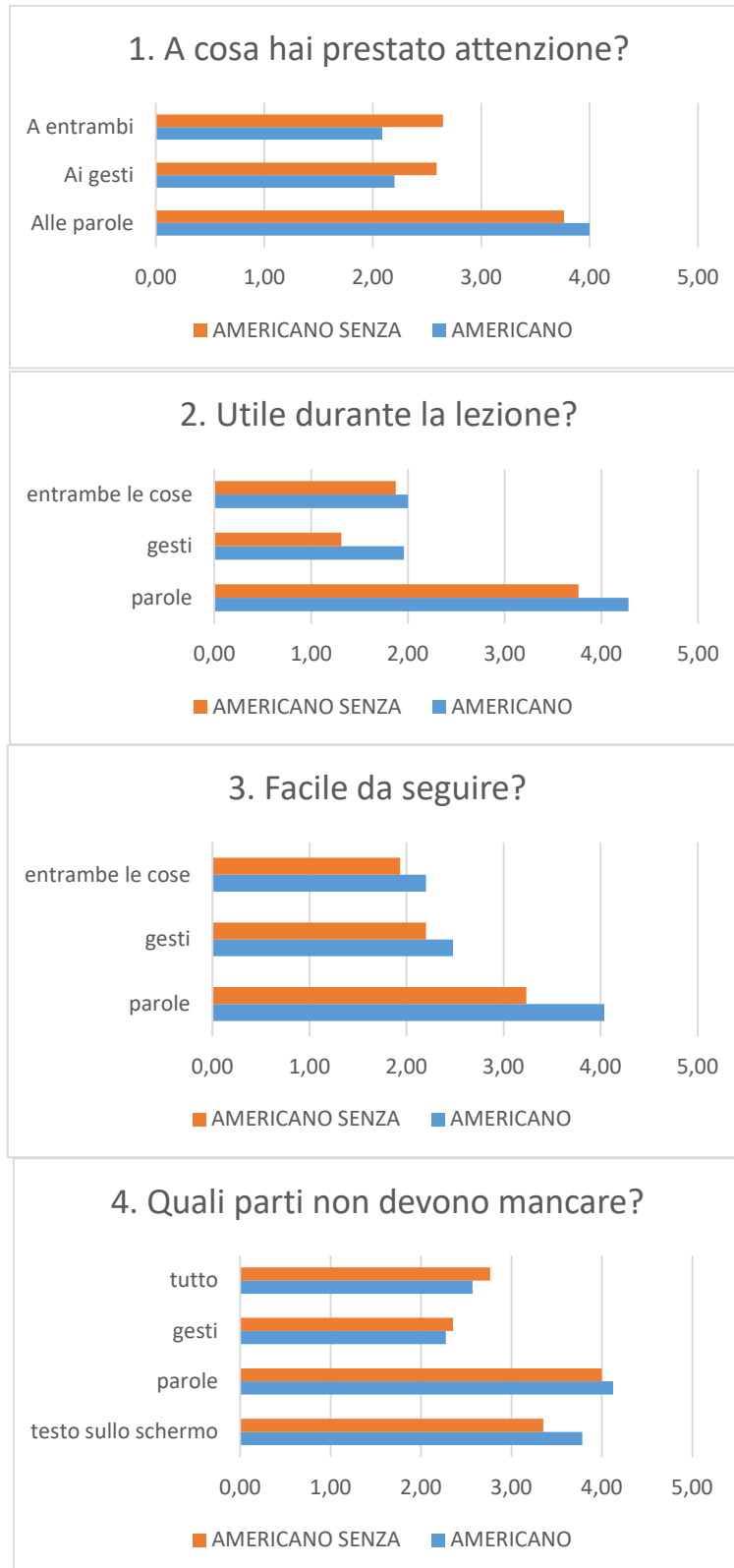
Abbiamo raccolto impressioni che sono di seguito riassunte. Veniva chiesto ai partecipanti di esprimere giudizi relativamente ad attenzione, utilità, facilità, suggerimenti, preferenze e fatica



## Il Ruolo dei Gesti Significativi del Docente nei Video Multimediali per l'Educazione

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d'uso delle varie fonti di informazione (gesti, messaggio, testo). Infatti, quella che può essere considerata una dimensione adeguata per il successo in un dato settore, potrebbe essere del tutto insufficiente in un altro contesto. I dati, riassunti nella successiva figura 4, indicano una tendenza preferenziale per il parlato del relatore.



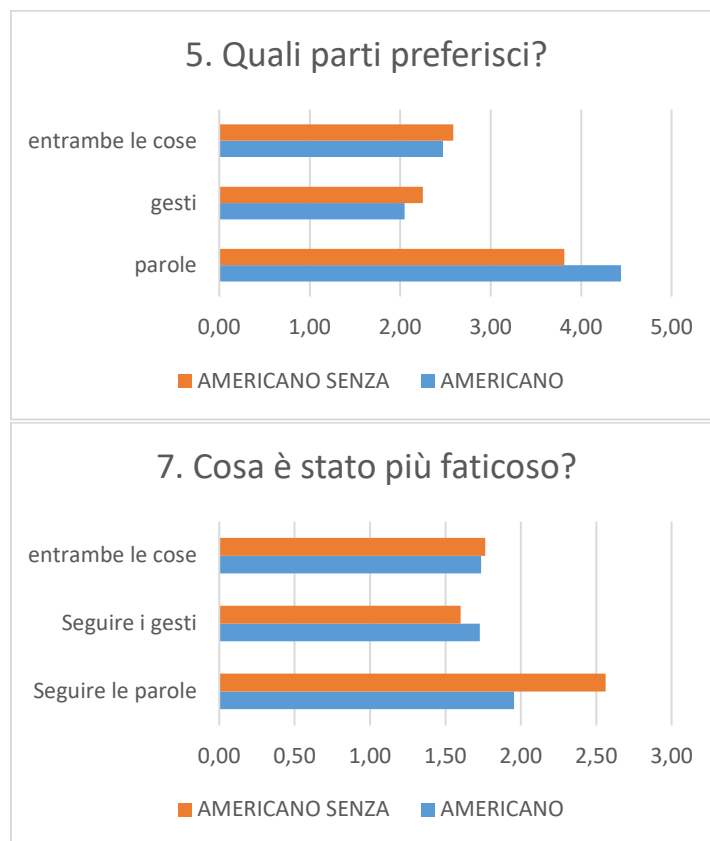


Figura 4. Dati raccolti all'esperimento pilota con ripresa del relatore in piano americano

## Conclusioni

I Gesti possono essere portatori di informazioni congruenti e chiarificatrici relativamente al messaggio audio e alle informazioni sullo schermo, possono avere un effetto positivo su preferenza e ricordo delle lezioni. Le condizioni che presentano maggior apporto informativo dovrebbero risultare quelle che producono esperienze d'uso più ricche e livelli di apprendimento maggiori. L'efficacia sarà tuttavia collegata alla qualità del contenuto informativo dei gesti accompagnatori, che potrebbe variare molto da lezione e lezione, e all'impegno necessario per elaborare il materiale. Come risulta dalle risposte degli studenti che hanno fin qui partecipato, la ridondanza tra messaggio, testo e schermo viene percepita come meno utile, facile e meritevole di attenzione. Ci aspettiamo che gesti con una funzione meramente di tipo espressivo, emotivo, privi di informazioni sul contenuto o sull'organizzazione del messaggio agiscano ancor più negativamente, generando risposte di orientamento, con conseguente carico cognitivo senza un corrispettivo contributo nella elaborazione e con un peggioramento della performance. Relativamente all'ultima affermazione non si può escludere che comunque la gestualità, anche se non portatrice di informazione, faccia risultare più piacevole la fruizione.

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## **IMPARARE AD INSEGNARE IL PENSIERO COMPUTAZIONALE: UN'ESPERIENZA DI VERA ALTERNANZA SCUOLA-LAVORO PRESSO L'UNIVERSITA' DI GENOVA**

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### **Imparare ad insegnare: come nasce uno stage di Alternanza scuola-lavoro in ambito universitario**

La legge 107/2015 nota come la Buona Scuola ha reso obbligatoria l'Alternanza scuola-lavoro in tutti gli indirizzi di studio della Scuola secondaria di II grado, per un minimo di 200 ore nel triennio dei Licei e di 400 ore negli Istituti Tecnici e Professionali.

Il Corso di Studi in Informatica dell'Università di Genova, che proponeva da anni stage di orientamento alla scelta universitaria per studenti della scuola secondaria, si è trovato – come tutti gli altri Corsi di Studio in Italia – a dover gestire e possibilmente soddisfare le richieste delle scuole di riconoscere gli stage di orientamento come stage di Alternanza scuola-lavoro, per ottemperare a tale obbligo.

Sebbene la “Carta dei diritti e dei doveri delle studentesse e degli studenti in alternanza”, emanata dal MIUR il 16 dicembre 2017 preveda in modo esplicito che le attività di orientamento agli studi universitari possano rientrare in attività di Alternanza scuola-lavoro (“[...] allo scopo di dare ai medesimi studenti l'opportunità di conoscere ambiti professionali, contesti lavorativi e della ricerca, utili a conseguire e integrare le competenze curriculari, al fine di motivarli e orientarli a scelte consapevoli, nella prospettiva della prosecuzione degli studi o dell'ingresso nel mondo del lavoro”), la Commissione Promozione, Orientamento e Tutorato del Corso di Studi in Informatica ha deciso di fare propria la finalità principale dell'Alternanza scuola-lavoro (d'ora in poi indicata con “alternanza”), modificando, a partire dal 2016, il formato del proprio stage di orientamento.

Lo stage nella nuova versione propone infatti una reale esperienza di avvicinamento al lavoro. Non potendo insegnare agli stagisti a “fare il mestiere del Docente Universitario in Informatica” in una settimana, lo stage si propone di insegnare loro come fare tutorato a teen-ager che vogliono avvicinarsi al Pensiero Computazionale (Wing, 2006), usando strumenti didattici con un'alta curva di apprendimento quali Scratch (Resnick et al, 2009), si veda anche <https://scratch.mit.edu/>. Tale impostazione è coerente non solo con le intenzioni della Buona Scuola, ma anche con le linee guida del progetto MIUR Programma il Futuro (<https://www.programmailfuturo.it/>). Le riflessioni che hanno guidato la ristrutturazione dello stage sono principalmente tre:

1. Come rappresentato dalla *learning pyramid* (Wilda, 2013) e come sappiamo bene dalla nostra esperienza di docenti universitari, il metodo migliore per assimilare nozioni è insegnarle.
2. Il pensiero computazionale è un processo mentale per la risoluzione di problemi, costituito dalla combinazione di metodi e strumenti tipici dell'informatica. Il MIUR riconosce l'opportunità di introdurre il pensiero computazionale nella scuola perché si ritiene che i metodi e gli strumenti da esso previsti siano indispensabili non solo per chi lavora con i calcolatori, le reti, i sistemi e le applicazioni software, ma anche per chi dovrà affrontare problemi in altre discipline come l'economia, la biologia, l'architettura, ecc. (Ancona et al, 2015).
3. Ci sono svariate occasioni nelle quali servirebbero giovani tutor in grado di seguire attività sul pensiero computazionale e sul coding. Purtroppo non è sempre facile trovare ragazzi adeguatamente preparati per questo tipo di tutorato. In molte scuole primarie e secondarie di primo grado, i docenti vorrebbero inserire ore di coding ma non ne hanno il tempo, le conoscenze, gli strumenti. Inoltre, anche le attività di divulgazione rivolte ai teen-ager organizzate dal nostro Corso di Studi trarrebbero grande vantaggio dall'aiuto di ragazzi e ragazze entusiasti e brillanti. Questi tutor, però, dovrebbero essere stati adeguatamente formati.

La proposta scaturita da tali osservazioni consiste in un percorso di formazione inizialmente diverso per chi ha basi di informatica e per chi non ne ha. Gli stage di orientamento organizzati dal Corso di Studi in Informatica non hanno mai previsto alcuna conoscenza tecnica pregressa e questa prerogativa è stata mantenuta anche nello stage di alternanza. Gli stagisti digiuni di nozioni di informatica vengono avvicinati al pensiero computazionale con una "full immersion" in Scratch durante la prima giornata di stage. Nel frattempo, chi ha già basi di informatica segue seminari divulgativi e svolge altre attività di orientamento. Quando i ragazzi e le ragazze privi di basi informatiche raggiungono una competenza su Scratch sufficiente ad affrontare lo sviluppo di un semplice programma, tutti gli stagisti vengono divisi in gruppi eterogenei e iniziano a sviluppare un proprio progetto. I progetti vengono valutati da una commissione di docenti, dottorandi e studenti universitari e i migliori vengono premiati.

Molte scuole secondarie di secondo grado implementavano già iniziative di tutorato, con i propri studenti impegnati a trasferire conoscenze e competenze a ragazzi e ragazze delle scuole primarie e secondarie di primo grado nello stesso comprensorio. L'idea di poter formare dei tutor nell'ambito del pensiero computazionale e del coding e di poter estendere il tutorato a tali discipline ha subito suscitato l'interesse dei nostri interlocutori.

La prima edizione dello stage impostato in questo modo è stata organizzata a febbraio 2017. L'interesse è stato tale da non poter accogliere tutti i candidati che avrebbero voluto partecipare e abbiamo pertanto proposto una seconda edizione a luglio 2017. La terza edizione si è svolta a febbraio 2018, con alcune migliorie rispetto alle precedenti. Nelle prossime sezioni illustreremo l'edizione del 2018 fornendo dati qualitativi e quantitativi sulla partecipazione, sul gradimento, e sulla disponibilità degli stagisti a partecipare ad altre iniziative di divulgazione organizzate dal

Corso di Studi in Informatica. Per quanto riguarda le due edizioni precedenti, alcuni stagisti che avevano partecipato a febbraio e luglio 2017 come discenti sono stati successivamente impiegati come tutor in laboratori di coding organizzati sul territorio da noi o direttamente dalla loro scuola. Questa attività, nuovamente riconosciuta come alternanza, dimostra l'efficacia del modello di "avvicinamento al lavoro" individuato.

### **Dal pensiero computazionale alle macchine che pensano, edizione 2018**

Lo stage 2018 si intitola "Dal pensiero computazionale alle macchine che pensano". Oltre alla parte di vera alternanza relativa a "imparare ad insegnare il pensiero computazionale", esso prevede infatti attività relative alle "macchine che pensano", coperte da seminari auto-contenuti su attività tipiche dell'intelligenza artificiale e non solo. L'edizione 2018 è stata – a unanime giudizio della Commissione Promozione, Orientamento e Tutorato che l'ha organizzata, nonché degli stagisti che vi hanno preso parte – una delle migliori degli ultimi 10 anni. Crediamo che la struttura individuata possa rappresentare un modello per chiunque intenda svolgere attività di alternanza nel campo dell'Informatica. La descrizione che forniamo è a un livello di dettaglio tale da permettere di essere replicata ed è corredata di riflessioni sulle lezioni apprese, su quali erano le eventuali alternative alle scelte che abbiamo fatto, e sulla loro fattibilità.

Lo stage si è svolto nei giorni 12, 13, 14, 15 e 23 febbraio 2018 con orario 8.30-16.30. L'inserimento di una pausa di una settimana tra i giorni di stage e l'ultimo giorno di presentazione dei progetti e premiazione è stata la principale novità di questa edizione e si è dimostrata un'idea vincente sia per i ragazzi, sia per i docenti. Il programma è stato il seguente.

Lunedì 12 febbraio: gli stagisti sono stati divisi in gruppo A (Advanced, 41 stagisti su 130) e gruppo B (Beginners, 89 stagisti) in base alle conoscenze pregresse di informatica. Tutti gli stagisti hanno seguito un'introduzione allo stage, dopodiché gli stagisti del gruppo B hanno fatto una full immersion in Scratch per il resto della giornata mentre gli stagisti del gruppo A hanno seguito tre seminari divulgativi tenuti da docenti del Corso di Studi: "Macchine che si guidano da sole", "Realtà virtuale e aumentata: le attuali applicazioni e i possibili sviluppi", "Macchine che ragionano". La divisione in due gruppi ha avuto valore solo per la prima giornata perché abbiamo assunto che una full immersion di un giorno in Scratch portasse anche i Beginners a un livello tale da poter lavorare proficuamente ad un progetto accanto agli Advanced.

Martedì 13 febbraio: gli stagisti sono stati divisi in 12 gruppi (G1, G2, ..., G12), ciascuno formato da 10-11 studenti. Ogni gruppo ha svolto lo stesso progetto, che illustreremo nella prossima sezione. La formazione dei gruppi è stata guidata dalle informazioni raccolte in fase di candidatura. In particolare, abbiamo assicurato che ogni gruppo: (a) non avesse studenti provenienti dalla stessa scuola; (b) avesse un numero omogeneo di studenti con competenze pregresse e di neofiti; (c) avesse un numero omogeneo di ragazze (due o tre per gruppo).

La formazione di gruppi eterogenei per quanto riguarda la provenienza scolastica, ma omogenei in termini di competenze pregresse, era già stata sperimentata nelle edizioni del 2017 ed è una delle caratteristiche dello stage maggiormente apprezzata. Costringe infatti a lavorare in gruppo adottando schemi più flessibili e dinamici rispetto a quelli che si adottano quando i membri del gruppo si conoscono già e permette a ragazzi e ragazze di confrontarsi su esperienze scolastiche che possono essere molto diverse. Il secondo giorno dello stage è stato in larga parte dedicato alla presentazione del progetto da svolgere e alla sua progettazione; in questa giornata è anche iniziata la fase di implementazione. Per non sovraffollare i laboratori informatici abbiamo nuovamente diviso gli stagisti in due macro-gruppi: mentre un macro-gruppo lavorava all'implementazione, l'altro seguiva la presentazione del Corso di Studi e partecipava ad un incontro con gli studenti universitari. Il giorno successivo abbiamo invertito le attività dei macro-gruppi in modo da permettere ad ogni stagista di seguire esattamente le stesse presentazioni degli altri, ma in momenti diversi.

Mercoledì 14 febbraio: nel terzo giorno di stage è stato anche organizzato un mini-workshop sulle “macchine che ragionano”. Sono stati infatti proposti cinque seminari divulgativi in parallelo, ciascuno ripetuto per due volte, e ogni stagista ne ha seguiti due. La scelta dei seminari da seguire non è stata lasciata agli stagisti: abbiamo preferito un'organizzazione “dall'alto” per garantire che il numero dei partecipanti ad ogni seminario fosse sempre lo stesso (22 studenti al massimo). I commenti a posteriori fanno emergere che in questa occasione i ragazzi avrebbero preferito poter scegliere ma, per ragioni logistiche, riteniamo che soddisfare questa richiesta potrebbe generare confusione e sbilanciamento tra seminari più gettonati di altri. Inoltre, se studenti di una stessa scuola partecipano a seminari diversi, la diffusione dei contenuti risulta più ampia. I seminari hanno toccato temi diversi, riportiamo i titoli per dare un'idea degli argomenti trattati: “(Quanto) Mi interessa questo documento? Dalla rilevanza sintattica alla rilevanza semantica”; “Informatica a Manovella (ovvero Macchine di Turing: Un Vero Supercomputer!)”; “Macchine che vedono”; “Vivere immersi nella Rete”; “Sviluppo e testing di applicazioni Web, Mobile e IoT”.

Giovedì 15 febbraio: la mattina del quarto giorno è stata dedicata a due seminari organizzati in parallelo e ripetuti due volte: “Immagini per le applicazioni mediche ed astronomiche” e “Insegnare alle macchine”, ai quali hanno partecipato tutti gli studenti a rotazione. Il pomeriggio è stato dedicato alla prosecuzione dell'implementazione del progetto e alla compilazione del questionario finale. La giornata si è conclusa con un arrivederci alla settimana successiva per l'incontro finale che si è svolto nell'Aula Magna del Rettorato, al mattino, e presso l'Albergo dei Poveri al pomeriggio.

Venerdì 23 febbraio: nell'edizione 2018, per la prima volta, abbiamo lasciato ai gruppi la possibilità di completare il progetto “off-line”. Durante la mattina del quinto giorno di stage ogni gruppo ha presentato il proprio progetto in 15 minuti. La presentazione, insieme alla valutazione condotta il giorno prima da una commissione, ha concorso alla scelta del gruppo vincitore e dei gruppi meritevoli di una menzione speciale. Il pomeriggio del quinto giorno, infine, tutti gli studenti hanno partecipato ad una conferenza di due docenti universitari di

Informatica, Linda Pagli (Università di Pisa) e Pierluigi Crescenzi (Università di Firenze) che hanno tenuto un seminario intitolato “Svelare le Magie dell’Informatica”, al termine del quale è stato premiato il gruppo vincitore, concludendo lo stage in un’atmosfera di contagioso entusiasmo.

## **Imparare ad insegnare: la “meta-didattica” del pensiero computazionale e coding**

Il progetto finale presentato agli stagisti doveva rispettare alcune “regole del gioco”. Ad ogni gruppo è stato infatti chiesto di affrontare tre task, pensati per introdurre la progettazione e lo sviluppo di attività finalizzate a insegnare il pensiero computazionale e il coding. Ricordiamo che ogni gruppo era composto da 10-11 studenti e che la maggior parte dei gruppi si sono organizzati in sottogruppi di 3-4 stagisti, ognuno dei quali dedicato a un task specifico. A tutti sono state presentate le “regole del gioco” seguenti.

### **Task 1: Computational Thinking for Everyone**

Scopo del primo task è l’ideazione di uno schema di esercizio *plugged* (ovvero con Scratch) o *unplugged* (ovvero, svolto senza l’ausilio del calcolatore) per l’introduzione dei concetti di base del pensiero computazionale (problem solving, decomposizione in sottoproblemi, efficienza di una soluzione, ecc). Esempi di attività *unplugged* sono giochi (caccia al tesoro, labirinto,...), attività con materiali fisici che simulano blocchi di istruzioni (blocchi di legno, Lego,...), lezione su coding o Scratch. Esempi di attività *plugged* sono invece percorsi per introdurre i costrutti di programmazione per neofiti (ad esempio, completare un programma con alcuni blocchi, migliorare una soluzione, scegliere dei parametri di un ciclo, ecc). La descrizione che corredo l’attività proposta deve chiarire la fascia d’età dei destinatari dell’esercizio, il tempo richiesto e l’obiettivo (il concetto da apprendere) dell’attività stessa.

### **Task 2: Fun with Coding**

Scopo del secondo task è l’ideazione di uno schema di esercizio in Scratch e la realizzazione di una sua soluzione finalizzata all’introduzione dei concetti di base del coding (cicli, variabili, procedure e modularità, oggetti, concorrenza, messaggi, ...) attraverso attività divertenti come lo sviluppo di un videogioco. Nella descrizione che corredo la consegna dell’esercizio proposto devono essere specificate in maniera chiara le associazioni tra le caratteristiche del gioco e gli elementi di interesse del coding (es. posizionamento di uno sprite sullo schermo per assi di riferimento, spostamento per capire cicli, punteggio del gioco per introdurre le variabili, duplicazione di sprite per introdurre le procedure, interazione e collisione tra sprite per eventi e messaggi, ...).

### **Task 3: Learning with Coding**

Il terzo task ha come scopo la dimostrazione del possibile uso del coding e di strumenti stile Scratch come supporto per l’insegnamento di altre materie (matematica, fisica, italiano, inglese, disegno, ecc). In questa attività si deve quindi creare un progetto Scratch che possa aiutare la



comprensione o la pratica di un tema o di un concetto di una materia scelta a piacere tra quelle della scuola. Alcuni esempi sono l'animazione di algoritmi notevoli (ad esempio, algoritmi di ordinamento), la traduzione e la comprensione di testi, la visualizzazione di diagrammi di funzioni matematiche, la comprensione di teoremi, la balistica, la composizione musicale, la geometria.

I progetti sono stati valutati in accordo ai seguenti criteri:

- adeguatezza rispetto alla richiesta;
- originalità dell'idea;
- qualità della realizzazione, inclusa chiarezza e completezza della documentazione;
- qualità della presentazione;
- presenza di un filo conduttore tra i tre sotto-progetti sviluppati per i tre task;
- coinvolgimento attivo di tutti i componenti del gruppo (valutato dai mentor e dai tutor che hanno seguito le attività svolte durante lo stage).

Il gruppo che ha vinto con il progetto *Antoine goes to the party* è riuscito a comprendere appieno la finalità meta-didattica dei task proposti ottenendo il massimo punteggio rispetto a tutti i criteri individuati. L'idea del progetto vincitore è incentrata attorno alla figura di Antoine (un membro del gruppo, elevato al ruolo di protagonista suo malgrado!). Nel progetto, Antoine è un giovane adolescente che vuole partecipare alla festa organizzata da alcuni suoi amici. Purtroppo i suoi genitori glielo proibiscono perché non va molto bene a scuola. Ma Antoine è un osso duro e non vuole rinunciare a divertirsi, così decide di scomporre il problema primario (andare alla festa) in 3 compiti più facili da portare a termine. Ogni compito corrisponde ad uno dei task proposti ed è stato affrontato con un programma Scratch in cui l'utente (il ragazzino o ragazzina che, interagendo con Scratch, deve imparare i principi del pensiero computazionale e del coding) aiuta Antoine.

Nell'esercizio 1, "Aiuta Antoine a vestirsi" (Figura 1), viene affrontato il problema dell'avvicinamento alla pianificazione e all'uso delle istruzioni condizionali e delle variabili per raccogliere nel giusto ordine gli indumenti di cui ha bisogno Antoine.



Figura 1. Aiuta Antoine a vestirsi

Nell'esercizio 2, "La fuga di Antoine" (Figura 2), sono stati introdotti costrutti quali i cicli, gli eventi, gli spostamenti sul piano cartesiano e le collisioni tra sprite per permettere ad Antoine di uscire da casa senza sbattere contro i muri o farsi toccare dai genitori e dal cane.



Figura 2. La fuga di Antoine

Infine, nell'esercizio 3, "Il ritorno a casa con Pitagora" (Figura 3), si propone di comprendere il Teorema di Pitagora e le sue formule inverse per calcolare come posizionare la scala sul balcone e rientrare a casa non visto dai genitori.



Figura 3. Il ritorno a casa con Pitagora

## Alcuni riscontri

Alla fine dello stage, abbiamo chiesto ai partecipanti di rispondere ad alcune domande sul gradimento e sulla loro intenzione di iscriversi al Corso di Studi in Informatica. Riportiamo di seguito le risposte ottenute, insieme a un confronto con le due edizioni precedenti svolte in modalità alternanza: quella di febbraio 2017 (105 studenti provenienti da 28 scuole) e quella di luglio 2017 (57 studenti provenienti da 14 scuole). L'edizione di febbraio 2018 ha visto la partecipazione di 130 studenti provenienti da 30 scuole diverse.

D1: Lo stage è stato utile per chiarirti le idee su cosa fare dopo le scuole superiori?

- Avevo già le idee chiare sul fatto di NON voler studiare informatica e non le ho cambiate: 11% (edizione febbraio 2017: 13%; edizione luglio 2017: 21%).
- Avevo già le idee chiare sul fatto di voler studiare informatica e lo stage ha confermato queste mie idee: 44% (edizione febbraio 2017: 55%; edizione luglio 2017: 55%).
- Credevo che l'informatica non mi interessasse invece ho scoperto che mi piace: 37% (edizione febbraio 2017: 23%; edizione luglio 2017: 18%).
- Credevo che l'informatica mi piacesse e invece ho capito che non fa per me: 8% (edizione febbraio 2017: 9%; edizione luglio 2017: 6%).

D2: Quanto è stato interessante lo stage (a prescindere dal fatto che sia stato utile per le tue scelte future)?

- Voto medio: 8.1 (edizione febbraio 2017: 8; edizione luglio 2017: 7.7).

D3: Ti sei trovato a tuo agio con i docenti e i tutor?

- Voto medio: 8.8, su una scala da 1 a 10 (edizione febbraio 2017: 8.6; edizione luglio 2017: 8.9).

D4: Se ti iscrivessi all'Università, quanto saresti deciso a iscriverti al Corso di Studi in Informatica?

- Voto medio: 7.1, su una scala da 1 a 10 (edizione febbraio 2017: 6.9; edizione luglio 2017: 6.2).

Il dato che riteniamo più significativo per valutare il successo dell'edizione 2018 è rappresentato dal 37% di stagisti che, dopo avere seguito i primi quattro giorni di stage, hanno affermato "Credevo che l'informatica non mi interessasse invece ho scoperto che mi piace". Nelle edizioni precedenti il numero di studenti "convertiti all'Informatica" era stato percentualmente inferiore.

Inoltre, 57 studenti su 130 hanno dichiarato di essere interessati a partecipare come mentor in laboratori di coding aperti alla città o nelle scuole, organizzati da noi o da altri; 26 studenti non sembrano interessati al ruolo di mentor ma dichiarano di essere interessati a svolgere altre attività di alternanza per preparare esercizi e progettare percorsi di avvicinamento al coding.

Ricordiamo infine che anche lo stage di quest'anno è stato aperto ai docenti delle scuole superiori che potevano seguire le attività seminariali chiedendone il riconoscimento come attività di aggiornamento; hanno partecipato in 8 e, dalle mail ricevute al termine delle giornate, sono rimasti tutti soddisfatti.

## **Conclusioni**

Concludiamo osservando che tutto ha un costo, e uno stage come questo costa moltissimo.

L'aspetto organizzativo/burocratico ha coinvolto principalmente il referente per l'alternanza scuola-lavoro del Corso di Studi, per un totale di 60 ore-uomo (contatti con le scuole, selezione degli studenti da ammettere tra i candidati, gestione dei progetti formativi, prenotazione e gestione delle aule dove svolgere le attività, contatti con i colleghi per organizzare l'erogazione delle varie attività spesso svolte in parallelo, valutazione degli studenti a stage concluso e chiusura dei progetti formativi). C'è poi stata l'erogazione vera e propria dello stage, che ha coinvolto 14 docenti strutturati per un totale di 90 ore-uomo, e 8 dottorandi e studenti tutor che hanno impegnato per lo stage 60 ore-uomo pagate dal Consiglio del Corso di Studi. Il materiale didattico fornito agli studenti (cartelline, spille, penne), seppure economico, va ugualmente considerato nel "costo" dello stage. A tutto questo va aggiunta la responsabilità anche legale che i 14 docenti si sono presi nei confronti dei propri stagisti. L'obbligo di garantire 1 tutor ogni 12 stagisti è stato introdotto con la Carta dei Diritti e dei Doveri emanata a dicembre 2017 e ha costretto gli organizzatori a cercare in tempi rapidissimi colleghi disponibili a fare da tutor responsabile per i vari gruppi, reperibili per tutta la durata dello stage.

A fronte di un tale impegno, affermazioni quali “Decisamente lo stage meglio organizzato che io abbia mai fatto”, “Considero tale stage come la miglior esperienza alternanza scuola-lavoro fatta fino ad adesso; non mi aspettavo assolutamente di rimanere così soddisfatto”, “Ho adorato il fatto di trovarmi con gente di scuole diverse che non conoscevo per nulla: smistare il più possibile gli studenti e farli conoscere per lavorare in team credo sia stata la chiave di questo progetto” ripagano della fatica e del costo, ma una burocrazia più snella e un supporto amministrativo e tecnico da parte del MIUR si dimostrano quanto mai necessari se si vogliono intraprendere, o continuare, attività di questo tipo.

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## GLI OPEN LEARNERS DI EDUOPEN: NUMERI E PROSPETTIVE

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### Abstract

EduOpen, portale italiano per l'erogazione dei MOOC nato nel 2016 da un progetto ministeriale, raccoglie attualmente 17 Atenei, più di 35.000 utenti, circa 200 fra instructor e tutor con un catalogo di oltre 150 corsi e 20 pathway.

A due anni dall'inizio delle attività, è stata avviata un'indagine presso gli utenti registrati al portale attraverso la somministrazione di un questionario. Quest'ultimo, composto da 35 domande di cui 33 a risposta chiusa e 2 a risposta aperta, è stato progettato per identificare le caratteristiche più rilevanti dei learner iscritti al portale (formazione, situazione lavorativa e familiare, bisogni formativi) e per indagare al tempo stesso le modalità di partecipazione alle attività formative on line, le motivazioni di iscrizione o abbandono dei corsi, le proposte di miglioramento legate alla progettazione di corsi, percorsi e ambiente di apprendimento digitale.

Il contributo presenta l'analisi preliminare dei risultati ottenuti collocandoli nel contesto dell'alta formazione in ambito nazionale; traccia, inoltre, possibili prospettive di sviluppo della piattaforma e del progetto EduOpen dal punto di vista degli utenti ipotizzando modalità di attuazione e di impiego dell'open education nel contesto italiano.

### Introduzione

Nel 2015 la CRUI (Conferenza dei Rettori delle Università Italiane) ha effettuato un'analisi sulle prospettive e sulle opportunità legate ai MOOC per l'Università italiana, anche attraverso la somministrazione di un questionario rivolto agli atenei del nostro Paese. Un elemento di criticità emerso dall'analisi ha riguardato l'assenza di dati e informazioni relative agli studenti che partecipano ai corsi a livello nazionale e la mancanza di "un sistema informativo in grado di monitorare le necessità, gli obiettivi e le strategie utili ai nostri Atenei per programmare interventi formativi MOOCs" (ivi, p.18).

Lo studio e la raccolta dei dati relativi all'utenza non possono essere sottovalutati, poiché sono strettamente collegati alle azioni di monitoraggio dei corsi in termini di soddisfazione, qualità delle risorse formative e (ri)progettazione didattica. Tali dati possono essere utili per la comprensione di fenomeni diversi legati, ad esempio, alle percentuali di completamento dei corsi, ai livelli di partecipazione e alla progettazione e programmazione di attività di insegnamento basate anche sulle necessità formative degli utenti; in una riflessione più ampia

possono definire i bisogni educativi della popolazione che decide di formarsi utilizzando ambienti digitali e modalità di accesso a piattaforme open.

A livello internazionale, le review presentate da Class Central (Shah, 2017) condividono informazioni sull'utenza delle maggiori piattaforme produttrici di MOOC:

- *FutureLearn*: con 7,1 milioni di studenti, è la quinta piattaforma MOOC più grande al mondo. Il 61% degli utenti di FutureLearn è di sesso femminile, il 51% lavora a tempo pieno/parziale e l'83% ha un'istruzione terziaria. Il 68% degli studenti ha un'età compresa tra i 26 e 64 anni e per il 56% degli stessi la partecipazione ai MOOC di FutureLearn rappresenta la prima opportunità di frequentare un corso on line.
- *Coursera*: nel 2017 contava oltre 30 milioni di studenti iscritti, 7 milioni in più dell'anno precedente. Fra le informazioni più interessanti sulla piattaforma vi è quella riguardante il numero di utenti paganti, cresciuto del 70%.
- *EdX*: attualmente raccoglie 14 milioni di studenti che hanno età media pari a 28 anni; il 62% di questi è di sesso maschile. L'età della popolazione di riferimento è compresa tra 7 e 96 anni; il 65% è costituito da insegnanti di età superiore a 25 anni, il 28% da studenti universitari (19-24 anni), il 7% da studenti delle scuole superiori di età compresa fra 13 e 18 anni.

L'OCSE (2017a), nella pubblicazione "Education at a Glance 2017: OECD indicators" dedica un box (ivi, p.324) alla descrizione dei MOOC presentandoli come "the most visible form of open learning in higher education". Nel documento oltre a prendere atto dell'aumento considerevole del numero di utenti registrati alle piattaforme che offrono MOOC, si definisce l'utenza composta da una popolazione istruita, economicamente stabile, con un'età superiore ai trent'anni. I MOOC continuano ad essere considerati come una risorsa che può portare alla progettazione e allo sviluppo di nuovi programmi per l'alta formazione con l'obiettivo di renderla accessibile a chiunque, sia che si tratti di studenti tradizionali che di adulti nei percorsi di lifelong learning.

Quali sono le caratteristiche degli utenti che frequentano i MOOC nel contesto italiano? Il contributo, a partire dalle risposte a un questionario somministrato agli utenti del portale per i MOOC del network universitario EduOpen prova a individuare tali caratteristiche ponendole in relazione con le statistiche nazionali e internazionali.

## Metodi

Per definire le caratteristiche degli utenti dei MOOC nel contesto italiano, è stato scelto come portale di riferimento EduOpen piattaforma aperta al pubblico nell'aprile 2016. Ad oggi il network comprende la partecipazione di 17 atenei italiani impegnati nella produzione di MOOC e interessati all'innovazione didattica e all'implementazione di strumenti digitali di collaborazione e comunicazione per una formazione longlife e longwide. A questi, da gennaio 2018, si è aggiunta la Rete Universitaria Italiana per l'Apprendimento Permanente (RUIAP). La piattaforma conta oltre 35000 utenti, con 150 corsi erogati e 20 pathway (gruppi di corsi che finalizzati al raggiungimento di un unico obiettivo formativo, consentono ai learners di

formarsi in maniera più completa su un tema specifico). È frequentata principalmente da utenti di lingua italiana che hanno trovato in EduOpen un'alternativa ai grandi colossi internazionali produttori di MOOC.

L'indagine è stata condotta attraverso la somministrazione di un questionario on line nel febbraio del 2018 ai membri della newsletter di EduOpen identificabili con learners registrati alla piattaforma. Il questionario è costituito da 35 domande prevalentemente a risposta chiusa ad eccezione delle ultime due a risposta aperta relative a osservazioni generali. Finalità del questionario è quella di rilevare il profilo, le specificità e i bisogni formativi degli utenti iscritti al portale. La rilevazione, inoltre, consente di comprendere le opinioni dei learners sulla piattaforma EduOpen e, in genere, sui sistemi di open education a partire dalla definizione delle modalità di partecipazione e utilizzazione dei MOOC disponibili sulla piattaforma. Pertanto, ad una prima sezione che contiene domande sull'anagrafica degli utenti (età, scolarizzazione, residenza, situazione familiare e lavorativa) seguono domande sull'uso di EduOpen, sulle motivazioni che hanno spinto ad iscriversi al portale, sulla compresenza di iscrizioni su altre piattaforme simili.

Nel presente lavoro sarà condotta una riflessione sulle risposte alle prime 8 domande relative alle questioni anagrafiche; queste saranno confrontate con indagini del contesto italiano, europeo, internazionale, in particolare in riferimento alla popolazione in formazione.

## **Risultati**

L'invito a compilare il questionario è stato rivolto a 29.943 utenti. Hanno risposto all'indagine 1982 learners, ossia il 6,62% della popolazione di riferimento. L'elevata numerosità del campione supporta qualitativamente l'ipotesi che esso sia significativo nell'indagine e rappresentativo dell'intera popolazione sebbene non sia stato effettuato, al momento, alcun test di significatività campionaria.

### ***Genere, età, professione***

La presenza di donne nel campione di riferimento è superiore a quella degli uomini (Tabella 1). La distribuzione delle risposte rispecchia parzialmente le statistiche sulla distribuzione per genere della popolazione italiana residente (ISTAT, 2017), della popolazione europea (EUROSTAT, 2018a) e della popolazione universitaria (MIUR, 2018). Infatti, il rapporto fra le percentuali relative ai due generi è di poco superiore a 1 per le popolazioni italiana ed europea, mentre raggiunge valori pari a 1,24 per la popolazione universitaria e 1,65 per gli utenti di EduOpen. Le rilevazioni Eurostat (2018b) sugli adulti in formazione nella popolazione compresa fra i 25 e i 64 anni (Tabella 2) dimostrano in ambito europeo una prevalenza di presenze femminili rispetto a quelle maschili. Isolando nel campione indagato per EduOpen le unità nell'intervallo di pari età rispetto a quella della rilevazione europea e considerando i rapporti fra le due quantità nelle tre diverse serie, il valore riferito agli utenti del portale si conferma nuovamente superiore agli altri due.

Tabella 1: Distribuzione per genere di EduOpen, della popolazione italiana ed europea, degli iscritti presso le Università italiane

Genere	EduOpen	Popolazione italiana	Popolazione europea	Isritti nelle Università italiane (a.a. 2016/17)
Uomo	37,77%	48,6%	48,9%	44,6%
Donna	62,23%	51,4%	51,1%	55,4%
Rapporto Donne/Uomini	1,65	1,06	1,04	1,24

Tabella 2: Distribuzione per genere riferita all'età fra 25 e 64 anni degli utenti di EduOpen e degli adulti in formazione nel contesto italiano ed europeo

Genere	Utenti EduOpen	Adulti in formazione – Italia	Adulti in formazione – Europa
Uomo	38,1%	7,5%	10,0%
Donna	61,9%	8,4%	11,8%
Totale	100,0%	7,9%	10,9%
Rapporto Donne/Uomini	1,62	1,12	1,18

Tabella 3: Distribuzione per età in relazione a genere, titolo di studio e formazione degli utenti di EduOpen (percentuali)

Età	Genere		Titolo di studio				Formazione attuale		
	Uomo	Donna	Diploma	Laurea I livello	Laurea II livello	Titolo post-laurea	Non studente	Laurea I livello	Laurea II livello
< 26 anni	28,27	71,73	67,02	18,09	6,38	1,77	12,60	54,58	22,14
26-60 anni	37,79	62,21	31,26	11,54	29,83	20,62	75,02	7,30	5,80
> 60 anni	57,89	42,11	31,11	4,44	40,74	17,78	81,82	3,03	1,52
Totale del campione	37,77	62,23	36,37	12,01	27,30	17,63	66,72	13,66	7,80

Tabella 4: Distribuzione per età in relazione a stato civile e attività lavorativa degli utenti di EduOpen (percentuali)

Età	Stato civile		Figli a carico			Attività lavorativa	
	Coniugato/ convivente	0	1	2	Non occupato	Lavoro stabile*	Lavoro a tempo determinato o occasionale
< 26 anni	5,70	99,24	0,38	0,38	49,80	6,42	31,72
26-60 anni	67,29	50,57	21,27	21,52	9,75	73,78	13,24
> 60 anni	82,58	70,68	16,54	11,28	1,52	44,71	3,04
Totale	59,76	58,74	18,42	17,84	14,49	62,72	14,97

\* Comprende lavoro a tempo indeterminato, libera professione, imprenditore/imprenditrice.

Distinguiamo tre fasce di analisi del campione in relazione alla variabile dell'età, in base alle quali si rilevano aspetti connessi al genere, titolo di studio, stato civile e occupazione (Tabelle 3 e 4).

Dall'analisi degli intervalli individuati sulla base dell'età si può ipotizzare la descrizione di tre profili di utenti:



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- età inferiore a 26 anni (14,40% del campione): percentuale prevalente di donne (71,73%) di cui il 76,72 impegnata in un percorso di alta formazione (laurea di I o II livello), senza vincoli familiari e coinvolta nel mercato del lavoro soltanto per impieghi occasionali o a tempo determinato (31,72%);
- età compresa fra i 26 e i 60 anni (78,73% del campione): percentuale prevalente di donne (62,21%) con un titolo di studio oltre la laurea di I livello (61,99%), coniugato/convivente per il 67,29% e con condizione lavorativa stabile (73,78%);
- età superiore ai 60 anni (6,87% del campione): utenti prevalentemente di genere maschile (57,89%), fuori dal sistema dell'istruzione formale (81,82%), coniugati (82,58%), liberi da impegni lavorativi.

Al termine di questa fase di studio preliminare, tra le motivazioni che possono giustificare la rilevante presenza di utenti di genere femminile nei primi due intervalli d'età presentati nelle Tabelle 3 e 4, emergono le seguenti:

- la percentuale di donne fra gli adulti in formazione e fra gli studenti universitari è prevalente rispetto ai soggetti in formazione di sesso maschile. Su EduOpen delle persone che dichiarano di essere coinvolte in un percorso di alta formazione, il 66,11% è di genere femminile. Dati del 2014 dell'OECD (2016) forniscono il seguente scenario sulle percentuali di presenze femminili per livello d'istruzione terziaria: partecipazione a laurea di I livello, 59%; laurea di II livello, 60%; dottorato, 52%. Anche il Miur (2017; p.5) afferma che rimane predominante tra gli immatricolati la presenza femminile (55%).
- il 50% delle donne iscritte a EduOpen svolge l'attività di insegnante (si veda la Tabella 5). Tale presenza può essere giustificata in ragione dell'accREDITAMENTO di EduOpen da parte del Miur per la formazione dei docenti. L'OECD (2017b; 2017c) conferma che il lavoro delle insegnanti è svolto prevalentemente da donne nelle istituzioni pubbliche e private (istruzione primaria, 96%; istruzione secondaria, 66%, istruzione terziaria, 37%).

Tabella 5: Distribuzione per genere in riferimento alle attività lavorative maggiormente rappresentate su EduOpen (percentuali)

Genere	Operaia/operaio	Impiegata/impiegata	Quadro o Funzionaria/ Funzionario	Insegnante	Libero professionista	Altro
Donne	1,99	20,16	4,65	50,28	6,98	15,94
Uomini	4,65	31,66	11,27	18,25	15,92	18,25
Totale	2,99	24,64	7,13	38,02	10,32	16,9

### **Partecipazione degli adulti alla piattaforma per età e titolo di studio**

Nella Tabella 6 si confrontano i livelli di partecipazione degli adulti su EduOpen con i valori individuati nelle statistiche Eurostat (2018c), sia a livello europeo che italiano, su quattro intervalli di età. L'andamento delle tre distribuzioni differisce: nel quadro italiano ed europeo di formazione degli adulti circa il 40% degli utenti si colloca nella fascia di età compresa fra 24 e 34 anni; per gli utenti di EduOpen la moda della distribuzione è nel range compreso fra i 45 e i 54 anni.

Considerando invece la distribuzione del campione in relazione al titolo di studio (Tabella 7), si verifica un'alta percentuale (60,59%) di partecipanti a EduOpen con un titolo di alta formazione (i livelli di istruzione sono definiti in base all'ISCED2011, International Standard Classification of Education 2011).

Se consideriamo, invece, secondo la sintesi del rapporto "Education at a Glance" (OECD, 2016), la partecipazione dei 25-64enni nell'istruzione formale e/o informale in base ai livelli definiti dall'ISCED97 (International Standard Classification of Education 1997), si evince un'assenza completa su EduOpen della popolazione con titolo di studio inferiore alla scuola secondaria e una sovrarappresentazione di utenti che hanno concluso percorsi di alta formazione. Si può ipotizzare che la modalità formativa proposta attraverso il portale non riesca a influenzare la popolazione a bassa scolarizzazione.

Tabella 6: Distribuzione per età della partecipazione alla formazione degli adulti. I dati sulla popolazione europea e italiana sono relativi all'indicatore: "Participation rate in education and training (last 4 weeks) by sex and age" (EUROSTAT, 2018c)

	24-34 anni	35-44 anni	45-54 anni	55-64 anni
Europa	40,0%	25,0%	21,6%	13,4%
Italia	40,3%	22,8%	23,0%	14,0%
EduOpen	17,2%	25,2%	34,5%	23,0%

Tabella 7: Distribuzione per titolo di studio (classificazione ISCED 2011) della popolazione europea, italiana e di EduOpen

Livello di istruzione (ISCED 2011)	Europa	Italia	EduOpen
ED0-2	26,0%	40,9%	1,4%
ED3-4	46,1%	42,6%	37,5%*
ED5-8	27,9%	16,5%	60,6%**

\* il 30% dei rispondenti all'indagine appartenente a questa categoria frequenta un corso di laurea.

\*\* nel dettaglio: 12,0% Laurea di primo livello, 27,3% Laurea di secondo livello (oltre alle Lauree magistrali e specialistiche, rientrano in questa categoria Diploma di laurea – vecchio ordinamento, 4/6 anni, e Lauree specialistiche a ciclo unico – nuovo ordinamento, 5/6 anni), 17,6% Titoli di studio post-laurea (Master di primo e secondo livello, Corso di perfezionamento, Scuola di specializzazione), 2,8% Dottorato di ricerca.

Tabella 8: Distribuzione per titolo di studio (classificazione ISCED 1997) per i soggetti di età compresa fra i 25 e i 64 anni di EduOpen e della popolazione italiana

Livello di istruzione (ISCED 97)	Italia (dati 2012)	EduOpen
Livello inferiore alla scuola secondaria superiore	12%	0%
Scuola secondaria superiore o postsecondaria non terziaria	31%	33%
Terziaria	59%	67%

## Riflessioni conclusive

L'esposizione, necessariamente sintetica, del processo di indagine condotto rappresenta un primo passo nell'analisi dei dati raccolti. Emergono alcuni punti su cui soffermarsi: gli utenti di EduOpen sono per i due terzi di genere femminile, in parte per il maggiore coinvolgimento

delle donne nel sistema formativo sia come fruitrici delle attività didattiche che come erogatrici nella veste di insegnanti; su EduOpen gli utenti iscritti di età compresa fra 45 e 64 anni e titolo di studio di alta formazione sono rappresentati in percentuali superiori rispetto al sistema di formazione italiano formale e non formale; la percentuale di occupati su EduOpen è superiore a quella dei soggetti in cerca di un'occupazione. Questi dati sono coerenti con le osservazioni dell'OCSE presentate in apertura e mostrano uno scenario più vicino a quello della piattaforma FutureLearn di cui sono stati riportati i numeri precedentemente.

Altre future aree di indagine sono evidenti già in questa prima descrizione del lavoro. Solo per fare alcuni esempi: questo contributo descrive in minima parte le caratteristiche degli utenti in base allo stato civile (coniugati e con o senza figli a carico), all'occupazione (inoccupati, pensionati, lavoro stabile o precario) e all'attuale condizione formativa. Proseguendo nell'analisi dell'intero questionario sarà possibile mettere in relazione tali considerazioni con altri elementi che riguardano la partecipazione ai MOOC, gli strumenti digitali utilizzati per la fruizione, le opinioni sull'open education.

Il completamento dell'analisi restituirà un quadro completo dei risultati dell'indagine. Non si esclude la possibilità di avviare sin da ora uno studio degli strumenti e delle modalità di formazione rivolte alle fasce della popolazione italiana che al momento risultano escluse dalla popolazione di EduOpen, per definire i bisogni formativi di tali categorie e proporre al network l'attivazione di MOOC e strategie di comunicazione che, proprio secondo i principi della filosofia dell'open education, permettano la diffusione della conoscenza come bene condiviso da tutti.

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## DEVELOPING COMPETENCE ASSESSMENT SYSTEMS IN E-LEARNING COMMUNITIES

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### Abstract

This paper presents the development of systems for helping a community of educator to share and reuse digital learning materials, and for enabling learners to enhance their online formative assessment. This educational design research is conducted iteratively toward dual goals: fostering competency-based assessment and proposing new structured knowledge for practitioners facing similar issues. Two main products respectively related to the research goals are presented, to be used as the core of the systems integrated to virtual learning communities: a methodology for planning automatic assessment units as parts of adaptive learning paths, and an ontological scheme about the relations between cognitive processes and disciplinary contents defining learning objectives. The outcomes are discussed considering results obtained from some experimentation.

### Introduction

The spread of Technology Enhanced Learning and the growth of Virtual Learning Communities (VLCs) rely deeply on the efficiency of the processes of finding, sharing, reusing, and analysing educational contents. Considering the scope of automatic assessment, the present research proposes methodologies and tools for supporting the assessment of competences in VLCs. The research involves the development of a system integrated in Learning Management Systems (LMSs) hosting the VLC: it serves as engine for the automatic generation of digital maps from the collection of resources shared by the community of instructors. The maps will generate “learning object trajectories” (or “learning paths”), which are paths composed of nodes and edges: a node is a reference to a resource available in the LMS, while an edge between two nodes is created by matching commonalities between learning intentions and success criteria related to the two learning objects identified in the nodes. The system’s usage will be twofold: to support teachers to design e-learning units for competence assessment and to enhance their usage by the students for self-assessment. More specifically, the system will serve as an information retrieval system for the instructors, and as a recommender system for the students. It will be *adaptive* in the sense that it will provide materials according to success criteria compared to students’ results. Furthermore, it will provide the community of teachers with aggregate analyses on the results of the community of students, to foster discussions on the effectiveness of the materials and methodologies proposed among the community of

instructors. This paper presents the development process and the results obtained from a mixed qualitative and quantitative analysis conducted by our University in few projects.

## State of the art

There is no universally shared definition of competence (or *competency*). *Competence* means the ability to cope with a task, or a set of tasks, managing to activate and orchestrate internal, cognitive, affective and willful resources, and to use the external resources available in a coherent and fruitful way. Series of progressive specific objectives can compose the set of targets toward the competences expected at the end of a scholastic path. Several taxonomies have been published and largely used for the design and interpretation of both learning objectives and achievement tests. Examples are Bloom's Taxonomy (1956) and Anderson and Krathwohl's revision of Bloom's taxonomy (2001). Focusing on mathematics education, and assuming that all cognitive levels could be tested using objective test questions (Beever & Paterson, 2003), the use of an Automatic Assessment System can efficiently support the preparation of activities aimed at obtaining, managing and monitoring performance results to validate the achievement of learning objectives (Barana & Marchisio, 2016; Barana, Marchisio, & Rabellino, 2015). The extension of the taxonomical models for automatic assessment can be enriched if implemented as semantic technologies. Taxonomy differs from other formalizing knowledge resources by their degree of formalization (Navigli, 2016). Higher-formalized instrument are Ontologies, which have been used for many different tasks (Elizarov et al., 2014). Considering the contest of virtual communities, semantic technologies integrated with automatic assessment tools can have great impact on formative assessment. Formative assessment is the way learners use information from judgments about their work to improve their competence. Since the nineties, the concern about formative assessment has grown to cover one of the major issues in the educational research. Paul Black and Dylan Wiliam conceptualized formative assessment through five key strategies (2009). The present research is conceived to implement Black and William' five strategies into five innovative actions in VLCs. The implementation strongly relies on Natural Language Processing (NLP) techniques. The work is carried within communities of practice that have certain characteristics of innovativeness, responsiveness to evidence, connectivity to basic science, and dedication to continual improvement (Spector et al., 2014). The research seeks to understand how designs function under different conditions and in different contexts, which however share the common characteristic of constituting a Virtual Learning Community (VLC) (or a "community of communities") (Pardini et al., 2013). A VLC is a system where

- instructors (experts in the disciplines to be learned) manage one or more courses dedicated to a group of learners;
- tutors (discipline and ICT experts) help instructors in experimenting innovative methodologies for teaching, creating digital materials, peer collaboration, sharing resources and best practices, using advanced tools integrated to the LMS that hosts the online courses;
- instructors and tutors agree upon a framework of competences expected to be achieved by the learners at the end of the learning process.

The research is conducted with VLC at local, national and European level. The VLCs involved have in common the technologies available: a Virtual Learning Environment (VLE) integrated with an Advance Computing Environment an Automatic Assessment System and a web conference system. The asset developed and proposed has proved to be an essential tool both to allow collaborative learning among teachers and to promote problem posing and problem solving as learning methodologies, to the extent of revolutionizing the teaching of scientific subjects (Brancaccio et al., 2015), also in different European countries (Barana et al., 2017; Brancaccio et al., 2016). It is also effective for reducing scholastic failures (Barana & Marchisio, 2015).

### Methodology

The research investigates the possibility to create an innovative *information retrieval* (for instructors) and *recommender* (for learners) system. The system shall enable a process for:

- automating the organization of materials for automatic assessment according to learning objectives;
- support instructors in retrieving materials from a search by natural language descriptions;
- adaptively providing materials to the learners for activating a process of formative assessment;
- aggregate students' results to foster instructors' discussion on top of advanced analysis.

The system is designed to automatically organize shared digital materials providing that the creators publish their contents jointly with natural language descriptions of the intended learning objectives. To build such system integrated to an LMS, two outputs have been created: (a) a model for the association of learning materials with natural language descriptions related to the implied competences; (b) an ontology for enabling the automatic interpretation of the descriptions.

As primary practical contribution, the methodological principles for descriptors are used in several projects at national and local scale by instructors and tutors working within VLCs. The research involves a mixed qualitative and quantitative analysis. The methods used are: observations, synchronous online interviews, online questionnaires, document analyses, online content analysis, web-based experiments. The research methodology follows the three-interacting phases model of McKenney and Reeves (Spector et al., 2014): analysis/orientation, design/development and evaluation/retrospective phases. Furthermore, it is characterized as follows:

- *Adaptive*: the intervention and research design are adjusted in accordance with insights emerging from inquiries on instructor.
- *Grounded and oriented by theory*: firstly, the work is guided by educational theory about formative assessment, learning tasks and cognitive processes, empirical findings from learning communities, and craft wisdom generated by investigation. Moreover, the design and development work is undertaken to contribute to a broader scientific

understanding of cognitive processes activated during online assessment, and how it can contribute to evidence competence.

- *Interventionist*: the experimentation is undertaken to make a change in the particular educational context of virtual learning communities for STEM education.
- *Collaborative*: the research requires the expertise of multidisciplinary partnerships, instructors, experts in education and experts in Computer Science and in particular of NLP.
- *Pragmatic*: it is concerned with generating ontologies usable by the semantic web community, and solutions for automatic formative assessment.
- *Iterative*: research evolves through multiple cycles of design, development, testing and revision.

### **Associating of learning materials to natural language descriptions related to competencies**

A triple of student-centred descriptors (*Performance, Requisites, Objectives*) is proposed to strengthen instructors' reasoning on the selection of contents, development of an instructional strategy, and construction of tests and other instruments for assessing competencies. The triple to be included as metadata of a shared material for automatic assessment is defined as follows.

- *Performance* (also known as *instructional objectives, behavioural objectives* or *learning objectives*) is a specific statement of the observable behaviour required to who attempts performing the material.
- *Requisites* (or *prerequisites*) states the instructor's belief of the necessary and sufficient condition to attempt performing the material.
- *Objectives* (or *goals*) specifies what learners are required to be able to do as a result of the learning activity related to the material.

*Performance* is proposed to activate a reflection on the structure of the materials used online, therefore should be useful to the teacher both in the design phase, and during the research and afterwards. A well-written performance should meet the following criteria: describe a learning outcome (what the student will be able to do, that *can be observed* directly), be student-oriented (describing the conditions under which the student will perform the task), be observable (indicating criteria for evaluating student's performance). Optionally, a degree of mastery needed can be explicated. *Requisites* indicates the learning goals that should be acquired before attempting to answer. It connects to the essential objectives that are supposed to be mastered. *Objectives*, differently from *Performance*, does not depend on the type of response field. The statement should not simply describe a list of topics, that being too abstract, too narrow, nor being restricted to lower-level cognitive skills.

### **Ontology for enabling the automatic interpretation of natural language descriptions**

Materials' descriptors express which student's performance is required in terms of activated cognitive processes and types of knowledge on which these processes operate. The adoption of a taxonomic model is proposed as the main reference effecting both instructors and learners:



during the design phase, it is important to “space” in the definition of learning tasks; moreover, automatically subsuming cognitive processes and knowledge types implicit in a material is the key for adaptively advising students with variegated resources. The ontological implementation of Anderson and Krathwohl’s taxonomy, to be used together with an Italian translation of OntoMath<sup>PRO</sup>, is proposed for clustering resources according to their similarity with respect to the thinking skills and types of knowledge involved. The possibility of matching similarities among digital materials is crucial for building mapped data sets of entities and relationships across entities useful for automatic formative assessment strategies.

Anderson and Krathwohl proposed a classification of cognitive processes and knowledge types: 11 types of knowledge organized into 4 categories (Facts, Concepts, Procedures, Metacognition), and 19 basic processes organized into 6 categories (Remember, Understand, Apply, Analyse, Evaluate, Create) ordered by ascending cognitive complexity. Cognitive complexity should not be confused with difficulty: for each cognitive process it is possible to design material that vary from easy to challenging. In fact, the defined epistemological categories are deeply interrelated and dependent on each other: cognitive processes activated in resolving learning tasks often operate in a coordinated manner. Cognitive processes “operate” on types of knowledge, which are considered both as objects and as a product of cognitive processes.

Considering Anderson & Krathwohl’s taxonomy, a material can be linked to a set of concepts’ couples referring to a 4×6 matrix: the first dimension of the matrix represents the types of knowledge while the second dimension represents the cognitive processes involved. The connection between a material and a matrix’s element is established by identifying cognitive processes and knowledge type from its content or metadata. Clues to be found are the following:

- one or more *action verbs*, each being a synonym of a single cognitive process;
- one or more disciplinary terms, each related to a single knowledge concept;

The presence of an action verb (leaf element) is considered as an indicator of a cognitive process as defined by Anderson & Krathwohl.

Considering the previous observations, this research uses an ontological version of Anderson & Krathwohl taxonomy, to be integrated with the domain-specific OntoMath<sup>PRO</sup> ontology (Elizarov et al., 2014). OntoMath<sup>PRO</sup> is a bilingual (Russian/English) ontology of mathematical knowledge, geared to be the hub for math knowledge on the Web of Data. The developers share the sources with the Semantic Web community. This research proposes the adoption and translation of OntoMath<sup>PRO</sup> also in the Italian panorama. The modelling principles for building Anderson & Krathwohl’s ontology follow the ones of OntoMath<sup>PRO</sup> ontology:

- *Only classes, no individuals*. Since the ontology provides a linguistic resource for text processing, individuals shall be found in concrete occurrences of named entities in descriptors.

- *ISA vs. whole-part.* Since there are only classes instead of individuals, hierarchies are modelled in accordance with ISA relation. Whole-part semantics is expressed through ISA relation considering its interpretability according to the set theory.
- *Validating classes and relations.* Terms to be added to the ontology require a reference from a refereed publication. Establishing correct relation instances relies on their validation by experts involved in the development.
- *URI naming convention.* The ontology is bilingual (Italian/English), Italian and English labels and comments are added for each concept, providing respectively their human-readable terminology and description. Surrogate URIs are used.
- *Multiple inheritance.* Multiple inheritance with respect to ISA-relationships is permitted.
- *Synset as label.* Synonyms are represented by labels of the same class.

## Results and discussion

The model for associating natural language descriptions was firstly experimented by two experts. A first collection of 196 digital *units* for automatic assessment was selected from the group of problems created with Maple TA by secondary school instructors and shared within the Italian community of “Problem Posing and Solving” (Barana et al., 2018). The units were extracted from 98 questions for automatic assessment: a *unit* is identified as a response field and the text that precedes it. The questions belong to “disciplinary” groups, which give the following partition on the collection of units: Contextualized problem about Algebra (4), Monomials (68), Polynomials (38), Special products (24), Contextualized problem about Probability (7), Statistics (36), Probability (13), Contextualized problem about Statistics (6). This 8-feature partition (that will be referred as D) is compared with the results from a clustering algorithm operating on the PRO descriptors, setting to 8 the number of clusters to be generated.

The clustering algorithm is executed on the similarity matrices constructed by calculating the similarity for each pair of vectors representing respectively Performance (P), Requisites (R) and Objectives (O) of each unit. The process is done for the first author (1) and the second author (2). To construct a vector from an input string representing a descriptor, the following phases are performed: tokenization, stop words removal, stemming, bag-of-words representation. The corpus of vectors is used to initialize the *transformation model*. The “training” consists in going through the supplied corpus once and computing document frequencies of all of its features. The transformation model is used to convert any vector from the bag-of-words representation to the representation based on the term frequency–inverse document frequency statistic (tf-idf). The similarity matrix is constructed by calculating the cosine similarity for each pair of vectors. Mini Batch k-Means is the clustering algorithm chosen (Pedregosa et al., 2011). It returns a list of 196 labels: each unit is labelled with one out of k clusters, where k (set to 8) is the number of clusters to be generated.

Clusterings generated from different collections of input strings are compared as follows, in two experiment phases. Firstly (phase 1), the clustering process was repeated 10 times following the previously described phases, setting to 8 the number of clusters that the Mini Batch k-Means

algorithm has to generate. To estimate the correlation between different clusterings, the *v\_measure* homogeneity metric is used, which expresses how successfully homogeneity and completeness criteria have been satisfied between two clusterings (Rosenberg & Hirschberg, 2007). The experiment was repeated (phase 2) attempting *noise reduction* using the structured ontological knowledge. The parsing step is affected by the following rules for tokens' filtering:

1. Words that appear in less than 2 input strings are filtered out.
2. Words that appear in more than the half of the input strings are filtered out.
3. Words are kept regardless the previous rules, if they belong to the set of concepts contained in the ontologies.
4. After the previous rules, only the first *n* most frequent words are kept.

These rules are proposed to enhance the influence of semantically relevant concepts. The experiment was repeated with the value of *n* between 7 and 15 in steps of 2. The range for number *n* was chosen considering the average lengths of vectors. On average, the length of vectors generated from Requirements and Objectives is 6. Considering the Performance, the value of the length of the vectors generated it is 14 for the first author and 10 for the second author.

Figure 1 shows the mean of the *v\_measure* values obtained comparing each of the 6 clusterings generated from the units' descriptors of each given author (1P, 1R, 1O, 2P, 2R, 2O) to respectively the "ground truth" labelling by disciplinary area (D): the first experiment results are represented as dots on the line, while the results from the experiment repetitions for different values of *n* are represented as bars. The standard deviation values are about two orders of magnitude smaller than the means.

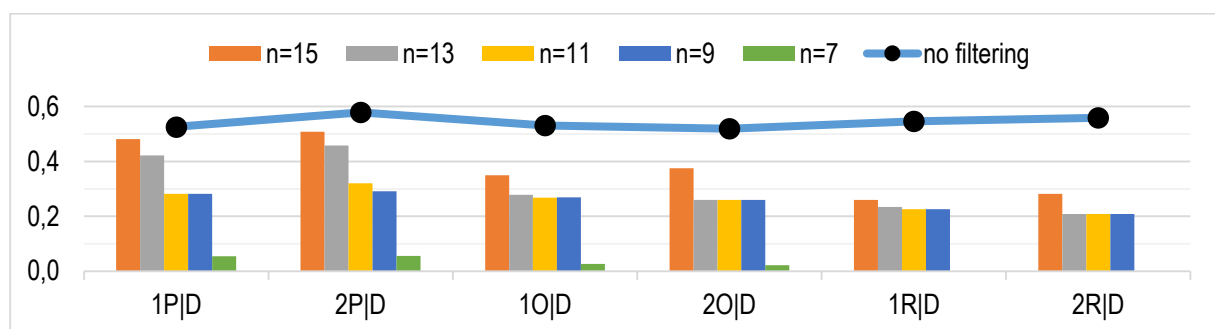


Figure 1. Mean values of the *v\_measure* comparing 1P, 1R, 1O, 2P, 2R, 2O to D, from phase 1 and phase 2.

The results from the two authors tend to reach an approximate level of symmetry, which suggest that a good level of inter-annotation agreement can be achieved from different authors. Phase 1 results show that there is high mutual information among each pair of clustering. The *v\_measure* mean values decrease with the decreasing of *n*, Performance is the only descriptor which maintain alignment with the "disciplinary" labelling for values of *n* close to its average vector length. Phase 2 results suggest that filtering enables to generate clusters which express concepts slightly different from the disciplinary grouping. The D clustering was generated by the *questions* partition. Using an ontology can effectively extract meaningful terms referring to

concepts more related to the descriptors. Adopting ontologies as semantic-proxies will enable to capture those semantic related concepts.

The model for associating natural language descriptions is also experimented with instructors. Teachers, tutors, and experts are involved in creating new collection of materials whose design starts from the PRO descriptors. Those will be tested with similar clustering analysis. Before explaining to a group of 26 teachers the PRO methodology, they were asked to submit answers to a questionnaire inquiring whether they think about similar design aspects before starting to realize a question (*design* phase), during the creation (*realization* phase), in the phase of administration to the students (*use* phase). Table 1 shows that teachers' dedication to the specification of descriptors while designing materials is natural (Likert scale from 1 to 5).

Table 1: mean and standard deviation to the answers from the questionnaire

Question	Phase	Mean	Std dev.
How much do you reflect on the way in which the question allows you to measure the achievement of the objectives set in the following phases?	design	3.926917566	0.755928946
	realization	3.844344152	0.683461909
	use	2.734386367	1.305838972
How much do you reflect on the requirements necessary to answer a question in the following phases?	design	3.598758769	0.920908553
	realization	3.51227498	0.890870806
	use	3.0873379	1.083791112
How much do you reflect on the requirements necessary to answer a question in the following phases?	design	4.066593604	0.773717943
	realization	3.759259106	0.832993128
	use	3.019007314	1.160576915

## Conclusions

The investigation continues collaborating with various University projects activated with the different VLCs at local, national and European level. Qualitative analysis on these materials helps to refine the methodology. The system's development continues with the implementation of a web-based tool integrated to the LMS hosting the VLCs involved. This will lead to experimenting the system with students.

The research project is part of a three-year PhD program in apprenticeship, in Pure and Applied Mathematics, conducted in partnership with leading providers of software based on Computer Algebra System engine.

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## UN SIGNIFICATIVO ISOMORFISMO LA “CLASSE DI BAYES” TRA TEORIA PRATICA

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### **Abstract**

The aim of this article is to sketch a possible design for the new digitally augmented education, based on a social-constructivist approach. The analysis of data and evidences related to behavioral and cognitive styles of the younger generations led us to identify the logic of scientific discovery (in this case, understood in terms of Bayesian epistemology) as one of the best suited cultural matrix to develop a model of augmented education. In order to illustrate our proposal, we describe the design of our methodological and technological approach, and outline its three step-structure: Tool box, Cooperative problem-solving and Situation room. Finally, we provide some remarks about tolerance and learning within the bayesian approach.

### **Un orizzonte culturale**

La rivoluzione digitale sta progressivamente imponendo una revisione della configurazione del setting didattico: sia rispetto agli spazi fisici sia rispetto alle infrastrutture, ai device e ai contenuti. Il contributo metodologico, in tale fase di cambiamento delle modalità e dei contesti dell'apprendimento, pare sempre più determinante ai fini di una integrazione costruttiva e sostenibile delle tecnologie in un orizzonte didattico. Senza questa riflessione metodologica diventa concreto il rischi precipitare nell'equivoco che l'arricchimento digitale degli ambienti didattici possa ridursi a un aggiornamento informatico delle infrastrutture e delle competenze degli attori di quella scena (Moriggi, 2014; Ferri & Moriggi, 2014; 2016).

Nel presente articolo, pertanto, ci si concentrerà con particolare attenzione sull'illustrazione della nostra proposta metodologica – la Classe di Bayes – sviluppata e sperimentata a partire dal nucleo concettuale alla base dell'epistemologia propria del calcolo soggettivistico delle probabilità. Tale ipotesi di ricerca si inserisce nel solco della tradizione storica dell'attivismo, del costruttivismo (Bruner, 1990; Gardner, 1983; Brown & Campione, 1994; Papert, 1980; 1993; Rogoff, 2003) e, oggi, del costruttivismo sociale digitale (Papert, 1983; Calvani, 2007; Rivoltella & Ferrari, 2010; Ferri & Moriggi, 2014; Cao, Laanpere, Leung, Tang, & Våljataga, 2014). Il tutto facendo però tesoro dell'euristiche bayesiana quale modello utile e appropriato a rimodellare dinamiche e relazioni in contesti didattici digitalmente aumentati.

Obiettivo principale del presente intervento è pertanto quello di delineare uno scenario plausibile in cui l'“aumento” della didattica sia da cogliere, nella teoria come nella pratica sperimentale, nella (continua) ricerca di una equilibrata compatibilità tra metodologie e infrastrutture. Nel solco della tradizione socio-costruttivista l'ipotesi che formuliamo è dunque

quella di individuare nella logica della scoperta scientifica (riletta nei termini epistemologici sopra indicati) la matrice culturale più adatta per progettare un ecosistema della didattica effettivamente aumentato dalle tecnologie digitali.

Non deve sfuggire, in quest’ottica, il significativo isomorfismo tra didattica costruttivista e diffusione “ragionata” delle tecnologie digitali nella scuola. Il web e i contenuti digitali per l’apprendimento condividono e implicano dinamiche che inducono ad abbandonare un approccio esclusivamente “nozionistico” e “enciclopedico” al sapere. L’imporsi, al di là delle sfumature e delle preferenze epistemologiche, di una didattica “laboratoriale” ed esperienziale va colta e indagata proprio nel solco culturale dell’isomorfismo sopra accennato. Ed è proprio in questa direzione che, a nostro modo di vedere, è possibile iniziare a concettualizzare in modo concreto ed efficace un reale “aumento” dell’esperienza didattica attraverso la tecnologia – irriducibile all’adozione di questo o quel dispositivo in uno spazio deputato all’apprendimento, ma funzionale piuttosto a irrobustire lo spessore sociale, relazionale e cooperativo dell’apprendimento.

## **Tempi e spazi**

Secondo la nostra ipotesi, il tempo-scuola di insegnanti e studenti risulterebbe suddiviso in tre fasi di lavoro tra loro distinte, ma al contempo intimamente connesse tra loro:

- Tool box;
- Problem solving cooperativo;
- Situation room.

Il tempo da dedicare a ciascuna delle fasi indicate è (relativamente) flessibile e va dunque attentamente calibrato in relazione agli argomenti da trattare, alle necessità della programmazione e al contesto situato della classe. Tuttavia, il Problem Solving Cooperativo (PSC) – ossia, il secondo momento del modello didattico in oggetto – dovrebbe comunque rimanere predominante nel rispetto del carattere pragmatico ed esperienziale della nostra proposta.

Ma si analizzi ora più nel dettaglio la scansione logica e cronologica (esemplificata nello schema che segue) funzionale alla costruzione di una Classe di Bayes, procedendo a una sintetica descrizione delle tre fasi che la costituiscono.



Figura 1.

### **Tool box**

Consiste nella fase di progettazione del percorso didattico. Una volta individuati con chiarezza gli obiettivi formativi e le competenze richieste agli studenti, l’insegnante si vedrà impegnato



nella costruzione di griglie di lavoro, svolgendo le quali, gli allievi potranno attivamente realizzare un “prodotto” che dimostri il loro livello di appropriazione delle metodologie, delle competenze e dei contenuti indagati. Ovviamente, l’insegnante dovrà precisare anche l’arco di tempo entro il quale l’attività dovrà essere svolta e le caratteristiche del “prodotto” che verrà concretizzato. Il tutto prestando la massima attenzione ai nessi tra la tipologia del “prodotto” richiesto e le metodologie, le competenze e i contenuti necessari per realizzarlo. Incoerenze o discrepanze a questo livello dell’elaborazione progettuale si ripercuoterebbero inesorabilmente sulle condizioni/potenzialità di sviluppo dello stesso da parte degli studenti. È importante altresì precisare come, insieme alle griglie di lavoro e alle indicazioni metodologiche, l’insegnante dovrà predisporre all’interno dell’ambiente virtuale di apprendimento (Virtual Learning Environment, LCMS/VLE) adottato testi, materiali digitali e contenuti multimediali che si riveleranno utili (ma non sufficienti) per gli studenti al fine di procedere in autonomia nel lavoro che - come vedremo - si svolgerà prevalentemente in piccolo gruppo. Tali contenuti potranno essere attinti sia dalle piattaforme che gli editori hanno l’obbligo predisporre come componente strutturale dei “libri digitali” (Ferri, 2013), sia da canali Internet (quali YouTube, Slideshare, Kahn Academy, TED, Google Books, Wikipedia, ecc). Oppure, da librerie, biblioteche o altri data base.

Questa fase di progettazione va concepita, avviata e preparata (incluso l’allestimento dell’ambiente virtuale di apprendimento) utilizzando tutto l’anticipo necessario rispetto al suo avvio (o, meglio ancora, rispetto all’inizio dell’anno scolastico). Correggere o modificare in fase di attuazione progetti di didattica digitalmente aumentata può rivelarsi molto difficile per i docenti e, soprattutto, può ingenerare confusione e smarrimento tra gli allievi.

Le infrastrutture tecnologiche minime e necessarie per lo svolgimento delle attività progettate nella Tool box sono: a. una connessione wifi a banda larga (che copra tutte le classi dell’istituto scolastico); b. un notebook/tablet per l’insegnante; c. un video proiettore (auspicabilmente interattivo) o - se già presente in classe - una lavagna interattiva multimediale (LIM); d. un ambiente virtuale per l’apprendimento (Learning Management System/Virtual Learning Environment) che permetta di gestire i contenuti digitali e le attività didattiche che si svolgeranno on line; e. device digitali (tablet, notebook) destinati al lavoro attivo degli studenti.

### ***Problem Solving Cooperativo (PSC)***

Si tratta dell’avvio del percorso didattico insieme agli studenti. L’insegnante dovrà, anzitutto, illustrare agli studenti la Tool box. Il che significa metterli concretamente nelle condizioni di lavorare in autonomia (per quanto monitorati dal docente medesimo, sia in presenza che on line). Tale introduzione alla “cassetta degli attrezzi” prevede anzitutto la condivisione con i discenti dei diversi obiettivi individuati dal docente, un’analisi partecipata delle griglie di lavoro (e dunque degli approcci metodologici selezionati) e una rassegna ragionata dei contenuti e delle fonti messe a disposizione nel VLE per innescare l’attività.

Da questo momento gli studenti saranno organizzati dall’insegnante in piccoli gruppi e - come si è detto - verranno abilitati a lavorare all’interno della classe virtuale (VLE). Quindi, sulla base delle griglie di lavoro selezionate coerentemente agli obiettivi prefissati, dovranno approfondire

e sviluppare questioni e problemi che scandiranno il loro percorso di lavoro all'interno dell'unità di tempo stabilita.

Gli studenti dovranno agire come piccoli ricercatori, sostituendo lo studio tipicamente concepito come sforzo mnemonico con un'indagine razionale e cooperativa modellata – come si vedrà meglio in seguito – sulla logica della scoperta scientifica, implementata (e resa possibile) dagli strumenti di simulazione digitale dell'esperienza e/o di esplorazione e documentazione di fenomeni reali all'interno o all'esterno della scuola.

Durante questa porzione del “tempo scuola” l'insegnante, per lo più, assumerà una funzione di supporto, di *scaffolding* e di *tutoring*. Vestendo i panni di un direttore (o di un consulente esperto) di una serie di piccoli gruppi di ricerca (i gruppi di lavoro), il docente dovrà pertanto affiancare e sostenere i suoi “ricercatori” nelle loro attività di indagine e revisione razionale delle varie ipotesi ed evidenze di volta in volta emerse dal lavoro dei gruppi medesimi. Nello specifico, si tratterà soprattutto di illustrare – nella pratica e con esempi – a. le modalità di formulazione di un'ipotesi di ricerca e b. come si procede, problema per problema, alla sua revisione (corroborazione, correzione o confutazione, logica e/o empirica) all'interno di quella dialettica cooperativa che, sempre di più, deve costituire la forma e la sostanza dei gruppi e l'abito mentale dei singoli.

La nostra ipotesi, pertanto, è che in questa direzione sia possibile una progressiva ridefinizione dello stesso concetto di classe nei termini di una rete di gruppi di lavoro bayesiani, resi possibili oggi anche grazie all'infrastrutturazione tecnologica del lavoro in aula e nell'extrascuola. Con il termine “gruppi di lavoro bayesiani” si allude quindi a gruppi cooperativi in presenza e on line che siano in grado di imparare scoprendo insieme, massimizzando al contempo il valore della creatività soggettiva e del talento individuale di ciascun membro del gruppo medesimo (vedi paragrafo 3). Questa specifica potenzialità, implicita nella logica bayesiana, nella sua estensione didattica rappresenta un potente mezzo di valorizzazione dell'atteggiamento critico e della capacità degli studenti di impostare e risolvere problemi ricorrendo non solo alle nozioni apprese in classe, ma anche valorizzando e mettendo al servizio del gruppo di ricerca specifiche attitudini e talenti individuali (*personalizzazione dell'apprendimento*).

Inoltre, tale strategia di cooperazione razionale – che contribuisce a trasformare l'aula tradizionale in una Classe di Bayes – trova il suo “naturale” prolungamento nelle possibilità che le protesi cognitive e digitali (Moriggi & Nicoletti, 2009) hanno di favorire la simulazione, la rappresentazione, la gestione condivisa e la disseminazione della conoscenza e dei saperi (Gee, 2007; Parisi, 2001).

### **Situation room**

In questa terza fase l'insegnante allestisce di fatto una *Situation room* (digitalmente aumentata) per l'analisi e la valutazione delle conoscenze e delle competenze acquisite e/o raffinate nel corso del PSC. Si tratta di un momento di discussione in cui si condividono e si approfondiscono i risultati del lavoro dei singoli team di ricerca, anche attraverso l'utilizzo delle fonti e degli strumenti disponibili on-line come elemento di critica e controllo dei risultati e delle congetture

degli altri gruppi. È la fase più “dialettica” della nostra proposta di setting didattico, quella in cui vengono resi pubblici i “prodotti” dei lavori cooperativi.

Gli esiti dei gruppi si rendono, pertanto, disponibili alla critica e alle potenziali obiezioni degli altri “ricercatori”, i quali – a loro volta impegnati su ricerche affini e contigue – hanno tutto l’interesse a capire, mettendo alla prova con richieste di chiarimento e osservazioni nel merito, evidenze e conclusioni esposte dai “colleghi”. Anche perché gli approcci e gli esiti degli altri gruppi potrebbero utilmente integrare o approfondire il proprio lavoro. In questo modo, al di là dell’acquisizione di competenze tematiche e contenutistiche, gli studenti si abituano: a. al lavoro di gruppo; b. all’onestà intellettuale di sottoporre al controllo pubblico le proprie idee e congetture sul mondo e sui saperi; c. a chiedere conto delle ragioni altrui, esercitando come un diritto/dovere il pensiero critico nell’interesse proprio e collettivo; d. a valutare i traguardi conseguiti dal proprio gruppo (ma non solo dal proprio) a partire dagli obiettivi inizialmente assegnati e illustrati dal docente.

Questo processo di confronto pubblico e di revisione razionale dei risultati è di fatto reso possibile dall’opportunità di lavorare simultaneamente all’interno di una classe reale e di un ambiente virtuale per l’apprendimento (VLE). Un tale ambiente, pensato per la gestione condivisa della conoscenza (*Knowledge Management*) e per il supporto alla conduzione del processo didattico, rende infatti praticabile una serie di operazioni irrealizzabili (nei modi sopra indicati) in un contesto tradizionale. Più nel dettaglio, l’interazione reale/virtuale all’interno di un contesto formativo ripensato sul modello della *Classe di Bayes* apre un orizzonte di opportunità oltre che sul fronte della didattica anche su quello della valutazione (e dell’autovalutazione). L’elaborazione critica all’interno della classe virtuale dei materiali selezionati dal docente (a integrazione dei contenuti forniti dagli editori) consente tra l’altro la tracciabilità dei vari progetti di ricerca elaborati via via dai diversi gruppi (*Diario di Laboratorio*) – e dunque non solo rende visibili i risultati finali ottenuti, ma documenta anche i processi metodologici e creativi a essi sottesi. In quest’ottica – di (auto)valutazione e di confronto reciproco - tale dimensione pubblica della ricerca obbliga altresì i singoli gruppi a documentare (e dunque a riflettere nuovamente su) ogni passaggio del lavoro svolto.

Definite, per quanto sinteticamente, le tre fasi costitutive della Classe di Bayes e le loro caratteristiche operative; si tratta a questo punto di approfondire alcuni dei nuclei epistemologici che sostanziano e articolano la proposta in oggetto, accennando al contempo alle potenziali ricadute culturali e sociali eccedenti lo specifico contesto della didattica abilitata dalle tecnologie. Una prospettiva, questa, funzionale anche a ripensare il ruolo e la rilevanza della scuola nei termini di una agenzia culturale in grado di concepire e sviluppare effettivi progetti di cittadinanza.

### **Per una tolleranza epistemologica**

Di seguito si procederà alla disamina di alcune tra le principali prerogative culturali che, a nostro parere, rendono la “logica dell’incerto” (de Finetti, 1989) – ovvero, la reinterpretazione della logica della scoperta scientifica nel solco della tradizione del calcolo soggettivistico delle

probabilità – uno tra i più raffinati strumenti epistemologici per concepire e realizzare quel significativo isomorfismo da cui abbiamo preso le mosse. In questa sede basterà soffermarsi su qualche aspetto squisitamente euristico del cosiddetto “teorema di Bayes”; e quindi tratteggiare le modalità della sua applicazione al nostro modello di didattica aumentata dalla tecnologia – anche se in termini esclusivamente qualitativi.

Tale formula, conosciuta anche come “teorema della probabilità delle cause”, è stata ottenuta nel XVIII secolo dal reverendo protestante Thomas Bayes (1702-1761) - il quale l’ha derivata da altri due importanti teoremi: il teorema della probabilità composta e il teorema della probabilità assoluta (Hacking, 2001). In generale, la “formula” di Bayes costituisce un potente strumento di critica e di crescita della conoscenza utile per discriminare tra ipotesi alternative (o in conflitto) attraverso una revisione razionale delle ipotesi stesse. In questo senso, l’approccio soggettivistico al calcolo delle probabilità può rappresentare una potente matrice concettuale attraverso cui correggere o raffinare le nostre congetture (e dunque il nostro grado di fiducia in esse – *degree of belief*) alla luce di un qualche supplemento di informazione o di indagine.

Pertanto, la formula del reverendo se debitamente “calata” in una prassi didattica “educa” studenti e insegnanti a quell’atteggiamento critico che il fisico Carlo Rovelli (facendo tesoro degli sviluppi tecnici e concettuali consentiti dai contributi del matematico Bruno de Finetti) non ha esitato a definire una “gestione oculata e razionale della nostra ignoranza” (Rovelli, 2013).

Ma entriamo più nel dettaglio di tale orizzonte epistemologico. Tale prospettiva euristica prevede anzitutto che non sia possibile assegnare agli eventi/ipotesi probabilità oggettive (*scetticismo bayesiano*). In altre parole, le probabilità devono essere intese come gradi soggettivi di fiducia del ricercatore (*degrees of belief*). Il che è di per sé sufficiente per lasciare intendere come l’epistemologia bayesiana consenta di tener conto del seguente dato di fatto, tutt’altro che trascurabile specie all’interno di gruppo di ricerca (o di studio). Ovvero, che è sommamente improbabile che individui tra loro diversi, relativamente a un tema o a un problema dato, muovano dallo stesso grado di confidenza soggettiva iniziale. In altre parole, molto difficilmente i soggetti in questione sarebbero disposti a scommettere su una stessa ipotesi/congettura (di ricerca o di lavoro) con lo stesso grado di fiducia nei suoi confronti. È proprio l’adozione di una pratica euristica come quella bayesiana che può *educare a imparare dall’esperienza, facendo tesoro delle evidenze disponibili e dei loro limiti*. A fronte di dati e nozioni acquisite nelle fasi di ricerca, infatti, si apprende come rivedere (corroborare, correggere o confutare) il grado di fiducia nelle ipotesi su cui si era disposti a scommettere in partenza. Il che consente e agevola una selezione ragionata del ventaglio di opzioni da cui il gruppo (di ricerca o di lavoro) aveva preso le mosse. Del resto, per quanto i soggetti coinvolti nel gruppo possano aver avviato un’indagine con gradi di fiducia soggettiva (*a priori*) molto differenti, un numero sufficiente di osservazioni (e revisioni) guida gli attori della ricerca verso probabilità *a posteriori* tra loro sempre più vicine.

Un secondo aspetto, strettamente connesso al primo, consiste nel fatto che i ricercatori (gli studenti) non possano rigettare *a priori* le ipotesi alternative (o avversarie) alle loro. Non si tratta semplicemente di una tolleranza etica, ma anzitutto epistemologica. Nessun componente di un gruppo (di lavoro, di ricerca o di studio), infatti, può in alcun modo escludere o scartare alcuna ipotesi in assenza di dati o argomenti sufficienti. La capacità di gestione da parte dell'insegnante dei gruppi di lavoro durante il Problem solving cooperativo consiste proprio nell'accompagnarli nei processi di revisione razionale delle ipotesi, abituando gli attori di tale apprendimento attivo a un confronto basato sul suddetto principio di tolleranza epistemologica. E da un punto di vista euristico (oltre che etico) tale pratica induce – nell'esercizio di apprendimento critico – a ottimizzare all'interno delle dinamiche del gruppo i talenti dei singoli, più o meno eccentrici che siano.

Inoltre, una buona conduzione da parte del docente dei gruppi (e, dunque, dei singoli all'interno dei gruppi) è la condizione necessaria all'avvio del pubblico processo di esposizione e di confronto dei risultati ottenuti nella *Situation room* – ove la conoscenza è concepita – sulla base di quanto fin qui affermato – come una “cosa pubblica” risultante da una libera cooperazione di individui mossi da obiettivi e utilità comuni e condivisi.

Sulla base di quanto osservato, pare opportuno ribadire due aspetti legati - e tra loro connessi - a un percorso ragionato di digitalizzazione della didattica. Se, infatti, da un lato è sempre più evidente come un setting gutemberghiano si mostri insufficiente, per non dire incompatibile con gli stili di apprendimento sviluppati dai nativi digitali; d'altro canto, pare evidente che il progetto di digitalizzazione della scuola (e dell'insegnamento) non possa esaurirsi nei termini di un aggiornamento informatico dell'istituzione e del personale docente. Proprio alla luce di tale consapevolezza – ovvero della necessità di ripensare e riplasmare le dinamiche (oltre che gli spazi) dell'apprendimento, ci è parso di cogliere in quella che poteva sembrare – e che per molti versi di fatto è – una fase critica della scuola, una grande opportunità. La nuova scuola digitalmente aumentata, nello scardinare l'assetto tradizionale della lezione frontale, apre un orizzonte fisico e concettuale funzionale a una effettiva riabilitazione della didattica attiva. E non solo di una generica ripresa di un antico, per quanto opportuno, “*imparare facendo*”. L'esternalizzazione delle fonti del sapere nel contesto allargato della rete richiede infatti sempre più che quel *fare* di antica memoria venga riproposto, ma ridefinito sulla base di quella metodologia che, come nessun'altra, consente – come si diceva – una *gestione oculata e razionale della nostra ignoranza*. Ovvero, in altre parole, l'acquisizione di un metodo di analisi e di critica mutuabile solo dalla logica della ricerca scientifica. Inoltre, la scelta di ricorrere alla logica dell'incerto come prospettiva epistemologica attraverso cui calare le dinamiche della ricerca nella pratica della didattica va cercata, di certo, nell'efficacia di tale approccio euristico, ma anche (anzi, soprattutto) nelle sue potenzialità di definire una ricerca cooperativa in cui i vantaggi del lavoro di gruppo non rischiano di sacrificare le qualità dei singoli. È nostra convinzione che proprio all'interno di queste dinamiche della ricerca potranno germogliare le concrete premesse di una cittadinanza attiva non riducibile alle buone intenzioni del volontariato e dell'associazionismo.

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## **Un Significativo Isomorfismo la “Classe Di Bayes” Tra Teoria Pratica**

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## **IL NUMERO 0 DEL PRIMO GIORNALE ONLINE DELLA CATTEDRA UNESCO IN “ANTROPOLOGIA DELLA SALUTE. BIOSFERA E SISTEMI DI CURA”**

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### **Introduzione**

Il presente contributo intende raccontare l'origine e lo sviluppo di un progetto di promozione della diversità culturale, di dialogo interculturale e di accesso alla cultura (Decisione UE 864/2017, Art. 2.1.a). Un progetto che mira a fortificare, direttamente e indirettamente, processi di pace (Decisione UE 864/2017, Art. 2.2.k), facilitando la creazione di contatti tra i gruppi etnici e religiosi, rafforzando l'identità culturale e l'apertura verso il prossimo, eliminando stereotipi spesso causa di tensioni sociali, etniche o religiose, e garantendo a tutti il diritto di accedere alla cultura (Decisione UE 864/2017, Art. 2.2.d), in accordo con le Linee Guida della Cooperazione Italiana su Patrimonio Culturale e Sviluppo.

La medicina tradizionale e la cura di sé, rientrando tra le pratiche sociali, i rituali, le conoscenze e gli usi relativi alla natura e all'universo rappresentano un interessante settore per l'implementazione di interventi pilota a favore della promozione del dialogo interculturale e pertanto della prevenzione dei conflitti su molteplici livelli: (a) trasmissione generazionale e conservazione del patrimonio tradizionale all'interno delle comunità indigene, (b) salvaguardia e tutela delle risorse naturali necessarie alla medicina tradizionale, (c) diffusione di usi e costumi tra i vari gruppi etnici che compongono la popolazione di un paese al fine di meglio comprendere e accettare l'altro diverso da me (Art. 2, Convenzione UNESCO sulla Salvaguardia del Patrimonio Culturale).

La Cattedra UNESCO in *Antropologia della Salute. Biosfera e sistemi di cura* ha avviato nel 2017 il progetto di creazione del primo giornale della Cattedra rivolto al mondo della scuola e alla cittadinanza intera con la finalità di promuovere il dialogo interculturale attraverso riflessioni guidate sulla medicina tradizionale e la cura di sé e stimoli provenienti dalle collezioni del Museo di Etnomedicina A. Scarpa dell'Università degli Studi di Genova (Figura 1).





Figura 1. Museo di Etnomedicina A. Scarpa

È stato scelto come strumento divulgativo il giornale scolastico (Freinet, 1969), perché attraverso il giornale, attribuendo valore ai pensieri e alle opinioni dei giovani, si può far nascere nei ragazzi lo spirito critico, diffondere tra loro il sentimento della tolleranza e iniziarli alla democrazia. Come ben evidenziato da Korczak (1987), è uno strumento di liberazione del pensiero infantile e di affermazione dei ragazzi, i quali vengono spronati a raccontare le loro storie, i loro pensieri, le loro preoccupazioni e a condividerle. Rappresenta anche un'importante occasione di educazione sociale, sia per i contenuti che vengono affrontati, sia per l'attività in sé. Insegna, infatti, a compiere con coscienza, responsabilità e onestà un dovere non imposto, ma liberamente scelto; impone di pianificare un lavoro fondato su uno sforzo comune teso a un fine comune. In una redazione si colgono concretamente il significato e le potenzialità del lavoro di gruppo, dello stare assieme finalizzato al raggiungimento di un obiettivo comune.

Nella storia scolastica le esperienze di giornalismo scolastico realizzate sono state innumerevoli. Nell'era digitale il giornalino non può che essere multimediale: non solo semplici articoli corredati da immagini o fotografie, ma anche video e podcast che possono essere realizzati utilizzando le applicazioni disponibili gratuitamente online. È indubbio che le ICT hanno costituito un valore aggiunto perché hanno permesso di rinnovare questa attività collettiva incrementandone l'aspetto cooperativo e comunicativo.

La realizzazione del numero 0 del primo giornalino della Cattedra UNESCO in *Antropologia della Salute. Biosfera e Sistemi di cura*, intitolato “Mondi e modi di prendersi cura”, ha coinvolto in modo trasversale diverse discipline insegnate nelle scuole medie (lettere, storia, geografia, tecnologia, arte), cercando di costruire un ponte tra le varie materie scolastiche e il mondo che ci circonda al fine di facilitare l'apertura verso l'altro diverso da noi.

### **Scopo del progetto**

Obiettivo generale del progetto è quello di promuovere nei giovani e nei loro familiari l'inclusione sociale incrementando i canali di conoscenza relativi al proprio patrimonio culturale etnografico materiale e immateriale, con particolare attenzione alle medicine tradizionali dei popoli e alla conservazione della loro pratica.

Il progetto ha inteso perseguire inoltre i seguenti obiettivi specifici:

- stimolare l'apprendimento e lo sviluppo di competenze linguistico – espressive, attraverso la promozione di attività di gruppo su tematiche correlate all'obiettivo del progetto;
- favorire l'interazione e la socializzazione tra alunni, promuovere le dinamiche relazionali tra docenti e allievi, responsabilizzare l'allievo, stimolare l'attività creativa, sviluppare l'azione didattica in direzione della interdisciplinarietà tematica;
- contribuire alla formazione di lettori attenti della realtà territoriale, capaci di orientarsi nella complessità del presente e nella comprensione di alcuni problemi fondamentali del mondo contemporaneo;
- promuovere l'uso di conoscenze e abilità utili a padroneggiare in modo corretto i diversi linguaggi multimediali, in modo creativo e collaborativo, con particolare attenzione alle tecnologie informatiche e alle nuove possibilità offerte dal web.

## **Metodologia**

Sono stati coinvolti i ragazzi della II media dell'Istituto Comprensivo di Cogoleto, Genova (Liguria, Italia).

Ai fini di un corretto sviluppo delle capacità individuali sono stati alternati momenti teorici (incontri, brevi seminari) e pratici (didattica laboratoriale) e sono state utilizzate le seguenti metodologie d'apprendimento:

- Apprendimento collaborativo ossia la modalità di apprendimento che si basa sulla valorizzazione della collaborazione all'interno di un gruppo di allievi.
- Apprendimento cooperativo ossia la modalità di apprendimento che si basa sull'interazione all'interno di un gruppo di allievi.
- Peer tutoring basato su un approccio cooperativo dell'apprendimento.

Nelle varie fasi gli alunni hanno lavorato prevalentemente in piccoli gruppi; alunni meno esperti sono stati affiancati da alunni più esperti per favorire il lavoro.

Fase introduttiva:

- Incontri in presenza con antropologie e sociologi della Cattedra UNESCO per condividere le linee guida, programmare contenuti, monitorare le attività;
- Seminari di introduzione all'argomento: Uno sguardo socio-antropologico al concetto di salute;
- Visita del Museo di Etnomedicina dell'Università degli Studi di Genova;
- Realizzazione di un modello di giornalino cartaceo e on line in collaborazione con il grafico di Ateneo;
- Proposta e scelta del nome e del logo del giornalino;
- Suddivisione dei ragazzi in 3 gruppi di lavoro.

Fasi operative per realizzare il “magico numero 0”:

- Lancio dello stimolo: un oggetto del Museo di Etnomedicina;

- Attribuzione dei compiti ai tre gruppi di lavoro:
  - un gruppo ha cercato di capire a cosa serviva/serve quell’oggetto, da quale area geografica proviene, etc. attraverso letture guidate e ricerche su web (la scienza);
  - un gruppo ha indagato sui materiali di cui è composto, su come è stato realizzato, etc. (la tecnica);
  - un gruppo ha raccontato una storia legata a quell’oggetto, come immagina possa essere stato o essere parte integrante di una cultura diversa dalla nostra (la fantasia);
- Condivisione dei contenuti con i ricercatori della Cattedra UNESCO;
- Trasmissione dei contenuti alla redazione del giornalino per la pubblicazione.

Il progetto del giornalino ha fatto registrare un interesse e una partecipazione molto elevata degli alunni. I risultati dell’esperienza ci hanno indicato un aumento delle capacità di attenzione, di coinvolgimento, di auto-interrogazione. Il processo di valutazione e di monitoraggio ha avuto un ruolo fondamentale per il buon esito dell’intervento ed ha consentito di rilevare le competenze acquisite dai partecipanti. La valutazione è stata divisa in tre fasi:

### ***Fase I – Valutazione iniziale, competenze in entrata, dei partecipanti***

Ha consentito la valutazione dei profili in entrata e sulla base di questi ha permesso di rilevare miglioramenti, successi, acquisizione di competenze dei ragazzi/e nelle fasi operative del percorso.

Ha previsto l’adozione di alcuni strumenti:

- Il questionario in entrata - Elaborazione ed erogazione di schede informative mirate alla verifica delle motivazioni al corso e delle aspettative dei partecipanti.
- Definizione del quadro dei saperi reali dei partecipanti in modo da conoscere le loro abilità e competenze iniziali in merito agli argomenti trattati.

### ***Fase II – Valutazione in itinere dei partecipanti***

Questa fase consiste nella rilevazione e valutazione del processo di apprendimento dei singoli corsisti, circa il loro coinvolgimento, la loro motivazione, le abilità acquisite, il clima d’aula. La valutazione in itinere ha fornito anche elementi di nuova progettazione in grado di migliorare l’andamento dell’azione formativa, sulla base anche dei bisogni emersi dai partecipanti.

### ***Fase III – Valutazione finale, in uscita, dei partecipanti***

Questa fase consiste nella valutazione finale effettuata al termine del processo di apprendimento. Tale valutazione ha tenuto conto di:

- acquisizione concettuale;
- capacità di comprensione del linguaggio informativo;
- capacità di scrittura e lettura del testo;
- nonché degli obiettivi e finalità previsti del progetto.

Per la valutazione dell'esperienza è stata utilizzata una scheda di autovalutazione somministrata agli alunni, intesa ad approfondire il giudizio dell'alunno sull'esperienza, il gradimento del metodo di lavoro, il coinvolgimento e il livello di comunicazione del gruppo.

Per la pubblicazione del giornalino è stata scelta CMS WordPress, una piattaforma per la realizzazione di siti Internet e per l'amministrazione di contenuti testuali, grafici e multimediali Open Source. Si tratta di uno strumento abbastanza facile da utilizzare e altamente personalizzabile mediante l'uso di svariati plugin.

Il prodotto finale, nella versione cartacea ed on line, sarà presentato all'UNESCO e offrirà l'occasione per una riflessione sulla buona riuscita del corso e permetterà di comprendere, in modo più puntuale, il grado di partecipazione, anche emotiva, dei ragazzi e delle ragazze al nostro percorso assistito dalle tecnologie.

## **Risultati**

Hanno partecipato attivamente 19 studenti della II media dell'Istituto Comprensivo di Cogoleto, Genova, e tre professori, di Lettere, Arte e Tecnologia.

I ragazzi hanno tutti espresso giudizi molto positivi sull'esperienza vissuta. Alcuni si sono sentiti fortunati di avervi potuto partecipare ed anche i ragazzi che avevano già fatto parte di una Redazione di giornalino della scuola lo scorso anno scolastico hanno trovato l'esperienza di questo anno più coinvolgente.

Dalle risposte è emersa anche la soddisfazione di aver potuto essere in qualche modo utile alla scuola, nonché un aumento del senso di responsabilità individuale e di appartenenza alla scuola tutta. Per quanto riguarda l'apprendimento cooperativo tutti lo hanno trovato molto interessante, utile e motivante. Ai ragazzi è piaciuto in quanto hanno potuto lavorare sia individualmente e in gruppo. Tutti hanno detto di aver avuto la possibilità di esprimere le proprie idee e di confrontarle con quelle degli altri; inoltre affermano di aver imparato a confrontarsi con i compagni in maniera corretta, rispettando i turni, parlando a bassa voce, non giudicandoli, non facendo prevalere la propria opinione su quella degli altri. Molti studenti hanno espresso il desiderio di veder esteso questo metodo di apprendimento anche ad altre attività scolastiche curriculari e non, e molti di loro ritengono applicabile questo metodo di lavoro nella vita quotidiana: a scuola, a casa, nel gioco e in futuro anche nel lavoro.

## **Conclusioni**

Il progetto coniuga assieme tre aspetti chiave, dialogo, cultura, educazione alla cittadinanza globale, attraverso l'utilizzo di uno speciale “veicolo culturale” rappresentato dai musei e dalle collezioni etnografiche locali e individua quale tematica trasversale “pilota” il concetto di salute, di benessere e, più genericamente, del prendersi cura.

Le collezioni e i musei etnografici, quali preziosi centri di documentazione scientifica sulla vita e la cultura delle popolazioni locali, rappresentano un forte stimolo all’esplorazione di culture “altre” e consentono di approfondirne l’intersezione con mondi umani differenti.

L’idea di valorizzare i musei come veicolo di dialogo interculturale ci consente di riflettere su come superare il modello di società “multiculturale”, per approdare a un modello di società “interculturale”, dove culture, tradizioni e saperi diversi collaborano nello spirito del dialogo e di una responsabilità condivisa. Il tutto in linea con la tendenza da tempo in corso nella comunità museale internazionale a “democratizzare” i musei, rendendoli più accessibili a pubblici diversi, più incisivi sotto il profilo sociale, più attenti alle nuove esigenze e interessi della collettività.

Un grande aiuto allo sviluppo di questa idea è stato offerto dal superamento della visione ormai obsoleta di museo come spazio emblematico finalizzato al consolidamento dei valori e dell’identità della società che li ha costruiti e alla trasmissione di “monologhi incontestabili”. Questa visione ci ha permesso di muovere intorno alla capacità del museo di articolare discorsi e suggerire inferenze, e, quindi, di ricoprire il ruolo di piattaforma di riflessione su saperi, credenze, valori, atteggiamenti degli individui che compongono la società in cui esso si colloca.

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## L'USO FLESSIBILE DEL TEMPO A SUPPORTO DEI PROCESSI DI INNOVAZIONE DIDATTICA E ORGANIZZATIVA DELLA SCUOLA

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### Abstract

Il paper presenta un percorso di ricerca che prende avvio dall'idea Compattazione del calendario scolastico, una delle esperienze promosse da Avanguardie educative, movimento culturale nato a novembre 2014 dalla collaborazione fra Indire (Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa) e ventidue scuole (capofila). Il Movimento si pone l'obiettivo di descrivere e diffondere le esperienze più significative di innovazione organizzativa e didattica per promuovere il superamento del tradizionale modello di insegnamento-apprendimento basato sulla lezione frontale. La ri-configurazione e ri-organizzazione del tempo-scuola, la trasformazione degli ambienti di apprendimento (spazi) e dei modelli didattici sono le tre dimensioni rispetto alle quali le esperienze di innovazione sono state individuate e descritte per essere proposte alle scuole aderenti al Movimento (adottanti). Il percorso di approfondimento dedicato alla variabile del tempo-scuola parte dall'ipotesi che il suo uso flessibile nei processi di insegnamento e apprendimento rappresenti un fattore abilitante per l'avvio di percorsi di trasformazione e rinnovamento complessivo della scuola. In questo contributo saranno descritte le principali soluzioni sperimentate dalle scuole capofila e adottanti del Movimento: da una diversa distribuzione delle ore disciplinari nell'arco dell'anno scolastico, alla riconfigurazione dei contenuti fondanti le discipline fino all'abilitazione di percorsi didattici per competenze, trasversali alle discipline stesse.

**Parole chiave:** innovazione scolastica, tempo-scuola, esperienze di innovazione

### Introduzione

In una scuola italiana strutturata intorno al concetto di competenza e abilità (*Indicazioni Nazionali per il curriculum della scuola dell'infanzia e del primo ciclo d'istruzione*, 2012; *Piano Nazionale Scuola Digitale*, 2015), il tradizionale modello educativo centrato unicamente sul doppio tempo 'spiegazione-interrogazione' mostra una grande debolezza. Le molteplici esperienze didattiche che come Indire abbiamo osservato in questi anni, ci restituiscono uno scenario in grande trasformazione, in cui, ad esempio, all'interno della tradizionale ora di lezione si è sentito il bisogno di utilizzare contemporaneamente più metodologie didattiche, anche direttamente improntate all'attivismo pedagogico, dal cooperative learning alla flipped classroom, dal debate allo spaced learning.

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In questo scenario, anche la dimensione del tempo acquista un valore pedagogico centrale, su cui dirigenti scolastici e docenti possono fare leva per dare vita a un ambiente di apprendimento centrato sullo studente e sui propri ritmi di apprendimento, sul docente e sui propri stili di insegnamento. Il progetto pedagogico del docente, e la conseguente scelta delle metodologie didattiche, appaiono sempre più connessi alla dimensione del tempo che, assieme alla configurazione degli spazi di apprendimento, agiscono come veri e propri 'abilitatori di cambiamento'. Quando si va a modificare il cuore del modello formativo prendendo le distanze dall'erogazione di contenuti in favore della promozione di competenze, l'ora di sessanta minuti può diventare stretta. Se il docente sta facendo lavorare gli studenti in gruppi alla risoluzione di un problema o alla ricerca di risorse in Rete, e suona la campanella del cambio ora, occorrerà tempo per confrontarsi con i compagni, montare e smontare ipotesi da condividere con la classe. In questi casi l'interruzione rischia di spezzare un processo di apprendimento e l'unità oraria non è in grado di dare spazio a tutte le attività didattiche.

La società contemporanea ci spinge a un'accelerazione in tutti i campi, ci propone sollecitazioni parallele (multitasking), ci sottopone a una molteplicità di stimoli. In questo scenario la dimensione del tempo assume un ruolo significativo anche nei processi di apprendimento e insegnamento che, fra l'altro, sempre più accolgono al loro interno nuove dimensioni, come quelle della relazione educativa, dell'ascolto e del benessere. Per questa ragione diventa sempre più urgente per i dirigenti scolastici e i docenti conoscere strumenti e strategie per valorizzare la dimensione del tempo che, nelle sue modulazioni lente o accelerate, può favorire il raggiungimento degli obiettivi di apprendimento e supportare il docente nell'organizzazione della didattica in classe.

Un filone di studi che fa capo a Domenec Francesch (2011), promotore del tema dell'educazione lenta, prende le distanze dalla quantificazione minuziosa di tempi uguali per tutti (quale personalizzazione per l'apprendimento?) nell'organizzazione delle discipline, degli obiettivi di apprendimento, delle valutazioni. Il tempo rischia di diventare una variabile di natura prevalentemente organizzativa che appesantisce l'azione formativa ed educativa e non si configura come una risorsa per dare cittadinanza alle diversità di crescita cognitiva, di ritmi e stili di apprendimento. Anche i nostri processi mentali prevedono un alternarsi di tempi brevi e lunghi che corrispondono all'attivazione di emisferi cerebrali diversi (Maffei, 2014): il ragionare, l'argomentare, lo sperimentare, alla base dell'acquisizione della conoscenza, poggiano neurobiologicamente su tempi lunghi. I tempi brevi sono propri delle risposte istintive ed emozionali, che afferiscono all'altro emisfero, quello destro, del cervello. «Oggi (...) la struttura tradizionale dell'insegnamento contraddice tutto ciò che la ricerca pedagogica da più di un secolo ha scoperto sulle modalità cognitive con cui si impara: rende passivi bambini e ragazzi curiosi, [...] ricorre quasi esclusivamente a modalità frontali di insegnamento, [...], crea un fossato tra lo studio scolastico e il sapere digitale, [...] impone tempi rigidi quando si dovrebbe lasciare spazio allo spirito di ricerca e adattarvi luoghi e orari della scuola» (Santerini, 2014; pp.181-9). Zavalloni delinea una serie di modalità finalizzate "a perdere tempo", le cosiddette "strategie educative di rallentamento" (2008) che hanno la funzione di mettere in

pausa quando serve: «a ben poco servono la rigida suddivisione delle discipline in unità didattiche o d'apprendimento, a seconda delle riforme, nonché i ritmi d'apprendimento scanditi da orari cronologici fissi».

## **Il contesto della ricerca**

Il contributo si colloca all'interno delle attività del Movimento delle Avanguardie educative e rappresenta un approfondimento sull'uso flessibile del tempo-scuola, considerato come una variabile pedagogica che assume la funzione di catalizzatore e promotore dell'innovazione. Spazio, tempo e didattica delineano il contesto di riferimento per le idee proposte dal Movimento e la loro trasformazione e riconfigurazione rappresentano due leve per il cambiamento richiesto alla scuola affinché possa rispondere alle esigenze della società attuale.

Il Movimento delle Avanguardie educative è nato a ottobre 2014 per iniziativa di Indire e di ventidue scuole italiane (scuole fondatrici) con l'obiettivo di diffondere la conoscenza e la sperimentazione di pratiche didattiche innovative già in uso in contesti internazionali e sperimentate in Italia da questo primo gruppo di scuole.

Ad oggi fanno parte del Movimento oltre 600 scuole, supportate da Indire e dalle scuole capofila in un percorso di assistenza-coaching finalizzato all'implementazione delle idee. La partecipazione ad Avanguardie è aperta a tutte le scuole italiane che possono aderire in ogni momento (azione "Adotta un'idea") e possono proporre nuove esperienze (azione "Proponi un'esperienza di innovazione").

In linea con quanto sostenuto a livello europeo (OECD, 2013), Avanguardie educative ha progettato e orientato le attività come supporto e diffusione dei processi di innovazione, il cui punto di partenza è stato il lavoro di ricerca educativa e di analisi di concrete esperienze realizzate all'interno delle scuole fondatrici (Orlandini & Laici, 2016). Il Movimento ha delineato i propri orizzonti culturali in un Manifesto (2014) articolato in sette punti:

1. Trasformare il modello trasmissivo della scuola;
2. Sfruttare le opportunità offerte dalle ICT e dai linguaggi digitali per supportare nuovi modi di insegnare, apprendere e valutare;
3. Creare nuovi spazi per l'apprendimento;
4. Riorganizzare il tempo del fare scuola;
5. Riconnettere i saperi della scuola e i saperi della società della conoscenza;
6. Investire sul capitale umano ripensando i rapporti - dentro/fuori, insegnamento frontale/apprendimento tra pari, scuola/azienda, etc.;
7. Promuovere l'innovazione perché sia sostenibile e trasferibile.

In particolare, il punto n. 4 del Manifesto "Riorganizzare il tempo del fare scuola" invita ad un ripensamento generale della configurazione e della gestione del tempo dell'insegnamento e dell'apprendimento (Scheerens, 2014). Tale orizzonte si è concretizzato nell'idea



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Compattazione del calendario scolastico (Chipa et al., 2015), un'esperienza che si basa sulla revisione del calendario scolastico attraverso una diversa distribuzione del monte ore complessivo delle discipline tra primo e secondo quadrimestre.

Alcune ricerche (Canady & Rettig, 1996) hanno descritto i vantaggi derivanti dall'implementazione di questa idea che impatta sul livello organizzativo ma che ha evidenziato anche significative ricadute a livello didattico: nella programmazione della attività, nell'introduzione della didattica per competenze, nell'integrazione delle ICT. In particolare, si sottolinea la trasformazione delle modalità di insegnamento e apprendimento che, grazie all'aumento delle ore a disposizione, si orientano verso il progressivo superamento della lezione frontale favorendo l'introduzione di modelli di didattica attiva (ad esempio: flipped classroom, debate, teal nelle esperienze delle scuole del Movimento). La frammentazione delle attività didattiche si riduce, così come diminuisce la dispersione dei processi di apprendimento e di insegnamento, in quanto studenti e docenti si concentrano soltanto su alcune discipline per quadrimestre favorendo l'acquisizione e la rielaborazione dei contenuti presentati. Dal punto di vista relazionale inoltre si evidenzia il miglioramento delle relazioni interpersonali tra docenti e studenti, più tempo a disposizione consente infatti agli insegnanti di conoscere più in profondità la propria classe, e tra gli stessi docenti che sono chiamati ad una maggiore collaborazione, con ricadute positive anche sul clima interno alle istituzioni scolastiche (O'Neil, 1995).

### **Metodologia**

La ricerca si è basata sull'impiego del *mixed method* (Creswell & Plano Clark, 2011) e ha preso avvio da una prima fase di selezione dei casi di studio avvenuta tramite la somministrazione di un questionario semi strutturato con domande chiuse e aperte. Obiettivo del questionario è stato realizzare una mappatura delle interpretazioni date dalle scuole "adottanti", rispetto all'idea proposta dalle scuole "capofila" e descritta nelle "Linee Guida per l'implementazione dell'idea Compattazione del calendario scolastico" (Chipa et al., 2015), al fine di individuare gli aspetti simili (invarianti) e evidenziare le caratteristiche di originalità (varianti).

Il questionario è stato strutturato in tre sezioni (anagrafica, processo di adozione e caratteri di originalità) al fine di indagare il livello di penetrazione e diffusione dell'idea in seguito all'adesione al Movimento e il contributo di originalità e personalizzazione della stessa rispetto ai modelli proposti dalle scuole capofila. La somministrazione è avvenuta online ed è stata avviata a maggio 2015, ha interessato 51 scuole adottanti l'idea Compattazione del calendario scolastico.

Sono stati considerati soltanto i questionari completi di tutti i campi richiesti (23% delle scuole adottanti l'idea). Si è proceduto quindi ad un'analisi puntuale dei dati emersi per stilare un primo elenco di scuole che rispondessero all'oggetto di indagine.

In seguito, il gruppo di ricerca ha approfondito alcune informazioni tra quelle dichiarate nel questionario attraverso colloqui telefonici o Skype con il/la docente referente dell'idea per

stilare un elenco delle istituzioni presso le quali effettuare la visita in loco: tre Istituti Comprensivi e un Istituto di istruzione secondaria [IC Premariacco (UD); IC Bozzano (BR); IC Quartiere Moretta (CN); Istituto D'Istruzione Superiore Ciuffelli Einaudi (Todi, PG)]. La stessa applicazione in un ordine scolastico diverso da quello delle scuole capofila (nei tre Istituti Comprensivi) è stata reputata dal gruppo di ricerca un elemento di interesse, in virtù della necessaria trasposizione del processo di innovazione dal livello secondario di secondo grado (rappresentato dai modelli proposti dalle tre scuole capofila) al secondario di primo grado.

Le scuole che non sono state prese in considerazione sono quelle che avevano formulato la sola intenzione di sperimentare la Compattazione in un momento successivo, rispetto alle quali, quindi, un approfondimento sarebbe risultato prematuro.

A partire dall'inizio del 2016, si sono tenute le visite di osservazione in tre delle quattro istituzioni individuate (al momento, trattandosi di un lavoro in corso d'opera, non è stata ancora realizzata la visita all'IC Moretta) secondo un protocollo di ricerca che si è avvalso dei seguenti strumenti:

- visita generale alla scuola e ai suoi ambienti;
- intervista al dirigente scolastico;
- intervista al docente o ad un gruppo di docenti coinvolti nell'implementazione dell'idea;
- intervista di gruppo con alcuni studenti;
- osservazione di alcune attività realizzate in classe.

Per ogni visita effettuata è stato prodotto un report di osservazione e di analisi contenente i principali risultati emersi dalla consultazione e triangolazione delle informazioni provenienti dal dirigente scolastico, dai docenti e dagli studenti, oltre che dall'osservazione delle attività didattiche nelle classi coinvolte nell'implementazione dell'idea.

Questo primo *set* di dati ha consentito di formulare una descrizione analitica delle caratteristiche, dei relativi benefici percepiti e delle difficoltà risolte o ancora in essere rispetto al modello di Compattazione messo in atto. Successivamente (periodo giugno-agosto 2017), le medesime scuole sono state invitate a compilare una scheda narrativa sviluppata attraverso la metodologia della *narrative inquiry* (Clandinin & Huber 2010).

In questa fase, sono stati coinvolti anche due Istituti che, pur non rientrando tra le scuole adottanti, hanno aderito al Movimento presentando una nuova idea di innovazione (azione "Proponi un'esperienza di innovazione). La Redazione dell'azione "Proponi un'esperienza di innovazione", come da protocollo, ha analizzato i materiali inviati attraverso l'apposita form, ne ha effettuato una valutazione di coerenza con il Manifesto e ha abilitato l'integrazione della proposta nell'ambito dell'idea Compattazione attraverso una visita in loco. Mediante questo canale è stato possibile arricchire il ventaglio di modelli e proposte offerto alle scuole adottanti [ITE De Fazio (Lamezia, CZ); Liceo Parini (MI)]. Poiché, come detto, queste scuole provenivano da un circuito parallelo che aveva comunque previsto la compilazione di una form

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on line e la visita in loco dei ricercatori Indire, si è deciso di inserirle nel flusso di lavoro che ha interessato le scuole adottanti a partire dall'invio delle schede narrative.

Sono state quindi elaborate due schede narrative distinte: una per il dirigente scolastico, l'altra per il docente referente e per gli eventuali altri docenti coinvolti dalla sperimentazione. Tale strumento è stato somministrato anche alle tre scuole capofila i cui modelli, pur noti, non erano stati oggetto di revisione e aggiornamento dalla stesura delle Linee Guida (febbraio 2015).

La scelta di operare attraverso la modalità narrativa (Bruner, 1992) è stata determinata dalle potenzialità intrinseche di questa tecnica che sollecita il racconto in prima persona, dove il soggetto è protagonista, facilita l'emersione dell'"implicito didattico" (Perla, 2010), innescando processi di metacognizione anche attraverso il coinvolgimento della parte emotiva (Atkinson, 2002; Denzin & Lincoln, 1994; pp.1-17).

Le schede sono state strutturate attraverso input narrativi elaborati a partire dai macro indicatori del Framework DigCompOrg (2015) che ha consentito di analizzare la sperimentazione della Compattazione alla luce delle categorie della leadership, dello sviluppo professionale, delle pratiche di insegnamento e apprendimento, della valutazione, del curriculum e dei contenuti didattici, fino all'infrastruttura e alla dimensione di collaborazione e rete. Complessivamente, sono state raccolte e analizzate 17 schede narrative rispetto alle quali il gruppo di ricerca ha esaminato le principali ricorrenze con particolare attenzione agli aspetti positivi e critici connessi ai macro indicatori del framework DigCompOrg.

Dall'analisi dei dati e delle informazioni provenienti dal questionario, dalle visite in loco e dalle schede narrative è stato possibile descrivere quattro modalità di Compattazione oraria.

Nel mese di ottobre 2017, infine, le scuole oggetto di studio (le tre capofila, le quattro adottanti e le successive due proponenti) sono state invitate a prendere parte ad un workshop che si è tenuto a Firenze al quale hanno preso parte i dirigenti scolastici delle nove Istituzioni coinvolte e il/la docente di riferimento. In quella sede sono stati presentati i risultati di analisi e la proposta di raggruppamento delle sperimentazioni con l'obiettivo di effettuare un'operazione di verifica e rispecchiamento.

La successiva fase di lavoro ha visto le scuole operare in sottogruppi per dettagliare gli aspetti ritenuti più rilevanti della Compattazione (e, più in generale, del tema della flessibilità oraria) rispetto al curriculum e alla valutazione. Entrambi questi aspetti, erano infatti emersi in maniera ricorrente dall'analisi delle schede narrative come piste di lavoro, approfondimento e ricerca nell'ambito delle sperimentazioni in essere.

Trattandosi di un lavoro in corso d'opera, l'attività di ricerca non può dirsi ancora conclusa, gli sviluppi vengono di seguito esplicitati.

## **Risultati e discussione**

In generale, si è potuto osservare come la rimodulazione del tempo-scuola sia stata accompagnata dall'introduzione di metodologie didattiche attive che favoriscono processi di insegnamento e apprendimento che pongono al centro gli studenti, consentendo loro di apprendere secondo i propri stili cognitivi e rispettando le singolarità di ognuno (Orlandini & Chipa, 2016). Nelle realtà scolastiche adottanti, il cambiamento avvenuto nella dimensione del tempo e della didattica, ha progressivamente avviato un processo di riallestimento e riconfigurazione degli ambienti scolastici superando il concetto di 'aula' tradizionalmente intesa. Alcune scuole, in seguito all'implementazione della Compattazione del calendario, hanno introdotto idee come Aule Laboratorio Disciplinari e Aula 3.0; si tratta infatti di esperienze che incidono direttamente sulla configurazione dei setting educativi e che sostengono un'impostazione più flessibile e adattabile degli ambienti in relazione alle attività che si svolgono al loro interno.

In particolare, il percorso di analisi svolto ha evidenziato quattro modalità di riorganizzazione del tempo-scuola sviluppate dalle scuole a partire dall'esperienza delle scuole capofila del Movimento.

### ***Compattazione delle materie***

Si tratta del modello osservato nelle scuole capofila del Movimento: una disciplina si svolge esclusivamente nel primo quadrimestre, l'altra, con cui viene compattato l'orario, si svolge, invece, esclusivamente nel secondo quadrimestre. Questa soluzione è presente soprattutto nel biennio delle superiori per ovviare alla parcellizzazione delle materie. In genere non vengono coinvolte le lingue ed educazione fisica per le quali c'è bisogno di continuità.

### ***Flessibilità delle attività curricolari***

Con questo tipo di intervento non si dispone di un tempo raddoppiato ma, al contrario, di un tempo più limitato che induce a effettuare una profonda revisione del curriculum anche in termini di condensazione e individuazione dei saperi essenziali.

Le scuole che hanno deciso di operare in questa direzione si sono poste come obiettivo di proporre agli studenti un curriculum personalizzabile, con un monte ore uguale per tutti ma con la possibilità di scegliere come impiegare le ore di flessibilità.

### ***Compattazione delle materie e riduzione dell'ora di lezione***

Si attua una compattazione delle materie e contemporaneamente si riduce l'ora di lezione da un minimo di 5 a un massimo di 15 minuti. Con questa riduzione si formano pacchetti orari per attività destinate ad aumentare le ore di compresenza tra docenti, sostituzioni (livello organizzativo) e attività di didattica laboratoriale. Si tratta di una modalità di strutturazione del tempo che incide profondamente sull'organizzazione complessiva dell'orario scolastico; per tale ragione un'azione di questo genere spesso avviene nel corso dell'intero anno scolastico.

### **Compattazione tra materie**

Prevede l'accordo tra due docenti che insegnano discipline diverse. Non dunque una Compattazione delle ore all'interno della stessa disciplina, come abbiamo osservato negli Istituti superiori, ma un accordo fra docenti di discipline diverse che, unendo le ore, decidono insieme gli obiettivi didattici e come raggiungerli. Viene messa in atto una sperimentazione della compattazione su base annuale che prevede che le due materie 'compattate' lavorino entrambe su un programma condiviso (es. scegliendo un sfondo integratore), pur mantenendo ciascuna disciplina, all'interno delle proprie ore, una specificità di trattazione. Questo tipo di sperimentazione è stato osservato negli Istituti Comprensivi, sia a livello di scuola primaria che di secondaria inferiore.

### **Prospettive di ricerca**

Il percorso di ricerca ha restituito uno scenario caratterizzato da una pluralità di esperienze implementate dalle singole realtà scolastiche a partire dalle linee guida. L'impostazione iniziale, che configurava la Compattazione come idea di innovazione legata all'impianto organizzativo della scuola, si è ampliata facendo emergere percorsi caratterizzati dalla riconfigurazione del tempo-scuola finalizzato alla flessibilizzazione del curriculum scolastico. In relazione a ciò, le prossime attività di ricerca saranno pianificate per analizzare ulteriori esperienze in linea con questo orientamento con l'obiettivo di indagare se e come il metodo di studio degli studenti ha potuto giovare dei benefici indotti dall'uso flessibile del tempo scuola.

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