E-LEARNING: THE RECIPE FOR SUCCESS

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The application of technology-based solutions in the world of education has been a "hot topic" for more than a decade. In particular, e-learning systems represent one of the most significant and emblematic applications that have been used. This paper – with a clear focus on the higher sector of education, i.e. university and post-university environments - aims to make a step back and understand whether new technologies (mainly the Internet and web-based applications) as well as changing expectations of learners require a re-framing of the e-learning phenomenon. First results of a research on how students perceive e-learning (adoption intentions, success factors and usage obstacles) seem to confirm the need of a clear understanding of the factors that may truly drive a successful e-learning initiative in higher education contexts.

1 Introduction

The last decade has been characterized by a considerable evolution of technology, in particular of the Internet and web-based applications.

Such exponential evolution – together with an increased use of those Internet-related technologies – has contributed to a high level of pervasiveness of "information technologies" in both personal and professional settings. The continuous evolution of this phenomenon is affecting – and in some cases determining – the success of many organizations from various types, size and across almost every industry, and also the educational one (Murillo & Velázquez, 2008).

One of the most relevant applications of technology for learning purpose is represented by e-learning systems (Liaw *et al.*, 2007).

E-learning plays an important role in transforming an organization into a learning organization; e-learning is an important tool for accelerating the effectiveness of organizational learning (Wong & Huang, 2011). Many organizations have made significant investment in e-learning systems as a supplement to traditional type of education. That is because e-learning may enable immediacy, consistency and convenience, and can be implemented organization-wide (DeRouin *et al.*, 2005). Although e-learning system's advantages are clear enough, their real usage and effectiveness are still open issues.

Based on these issues, and mainly using an educational and managerial point of view, we intend to discuss the need of a clear framework to investigate and understand the relationships between e-learning characteristics and its successful and effective implementation, adoption and usage.

2 What does "e-learning" stands for? A literature review

E-learning system can be defined as a set of models, methodologies, and processes for "the acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety of channels (e.g. wireless, satellite) and technologies (e.g. cellular phones, PDA's) as they are developed and adopted" (Wentling et al., 2000).

Rosenberg (2001) defined e-learning as "the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance".

According to some authors (e.g. Rosenberg, 2001) e-learning system delivers content to learners via networked computer using Internet technology, and has to go beyond the traditional paradigms of education.

Welsh *et al.* (2003) defined e-learning as "*the use of computer network technology, primarily over or through the Internet, to deliver information and*

instruction to individuals". E-learning refers to learning-on-demand opportunities for individuals, based on Internet-based systems, in order to reduce the gap between needs and preferences, and to break down geographical barriers (Murillo & Velazquez, 2008).

Moreover, e-learning has been defined as "the ability to deliver training and education via Web technology" (Terry, 2000).

More recently, European Commission has described the e-learning as the use of Internet and new multimedia technologies to advance the quality of learning by providing access to resources and services as well as enabling remote exchange and collaboration (Alptekin & Karsak, 2011).

3 Benefits and effectiveness of e-learning system

Benefits of e-learning system have been widely discussed in literature. Baldwin-Evans (2004) would recommend e-learning to a colleague due to it being flexible, interactive and efficient. More widely, typical critical success factors, as emerge by literature, are: flexibility in time management for learning; active participation of faculty members; the establishment of control mechanisms that ensure learning occurs; course content quality and structure; the promotion of interactive elements among faculty members and participants, and with each other; the use of standardized and developed technologies; teaching and learning styles; leaners' motivation; learners' technical competency; organizational support of e-learning activities (Selim, 2007).

Although e-learning system usage has increased, its underutilization remains an open issue (Lee *et al.*, 2011). Researchers have investigated main factors influencing e-learning utilization. Factors affecting e-learning system adoption and acceptance have been analyzed in literature, and has been proved how they become essential to improve understanding of real e-learning utilization (Alhawari & Mouakket, 2010). As said, interaction is one of the main expected benefits from e-learning system, but at the same time it represents one of the major e-learning weaknesses today. More precisely, there is a lack of ability to stimulate active interaction within the e-learning course (Rodrigues *et al.*, 2011).

Considering the pivotal role played by learners in the educational environment today, we would start asking "how do learners consider e-learning system today? what does e-learning mean for learners?" in high education environments.

Thus, in this paper we intend to share some evidences from a first-step-study that investigates the concept of e-learning form the learner perspective.

4 Framework and methodology

The first stage of this research project aims to understand how learners perceive e-learning systems, their usage and their main characteristics and obstacles. The framework used in the first stage of this research project is based on the following macro-areas:

- *Attitude towards e-learning*, i.e. intention to attend (actual or potential) online courses, understanding of the most important characteristics and obstacles to the adoption of e-learning;
- *E-learning tools*, i.e. usage (actual or potential) and relative appropriateness of specific technological tools for e-learning purposes;
- *Social and Demographics*, i.e. general questions on respondent's sex, age, employment, usage of the Internet.

Based on these macro-areas, we have structured a questionnaire that has been sent to students attending different universities (by geography and degree courses) in Italy. A total of 100 valid responses have been collected via an online survey. The sample is almost equally split between Bachelor students (49%) and Master students (51%) as well as between males (51%) and females (49%). Moreover, respondents aged between 18 and 29 represent 92% of the sample. 87% of the respondents spend every day 1 to 6 hours connected to the Internet, during this time, the three most frequent activities performed are: social networking and chatting, e-mailing and research.

The three macro-areas described above are compared against each other in other to explore any statistically significant relationship. Thus, data have been analyzed using univariate and bivariate analyses.

5 Main findings

While 46% of the total respondents look at e-learning as a valid instrument to improve their learning capabilities, 30% of the sample does not look favorably at e-learning claiming to prefer a face-to-face interaction between student and teacher. In addition to this, lack of adequate information prevents 18% of the respondents from fully embracing e-learning methodologies in spite of their manifested interest.

When asked to list the three most important characteristics of e-learning, respondents identify the following: (1) being autonomous in the learning activities, (2) enrich the classroom experience with contents and exercises available online, and (3) re-create a classroom-like experience in a virtual context.

In the questionnaire we asked respondents to also identify the three major obstacles to the adoption and usage of an e-learning system. Quite unex-

pectedly, connection problems and general reliability issues ranked second. Besides that, however, first and third major obstacles were, respectively, lower level of interaction with the teacher and lower level of emotional involvement.

Then, we have investigated the attitude towards the use or not of specific technological tools for e-learning purposes. Results are shown in the table 1.

Results show that – in general – there is a positive attitude towards the usage (actual and or potential) of the listed technological tools. Items such as Wikipedia, Search Engines, YouTube, E-mail and Social Networks are already positively used for e-learning purpose by a large majority of the sample. Videoconference, Podcasts, virtual Classrooms, E-books and Business Games & Simulations are generally well regarded as e-learning tools, but they are not yet utilized extensively.

There is a relevant interest and intention towards the use of these latest tools, even if they are currently underutilized. This is in line with some evidences from literature that show a significant contribution of such tools for learning purposes (Caporarello, 2011; Kenworthy & Wong, 2005). This is also true for the so-called *Serious Games*, defined as "instructional and video game elements for non-entertainment purposes […] to create instructionally sound and relevant learning experiences for a wide variety of audiences and industries" (Charsky, 2010).

Table 1
ATTITUDE TOWARDS THE USE OF TECHNOLOGIES FOR E-LEARNING PURPOSES (%)

	Videoconference	Wikipedia	Podcasts	Virtual Classroom	Search Engines	YouTube	Online Exercises	E-book	Forum & Chat	Online Games	E-mail	Social Network	Business Game & Simulation	E-learning Platform
I use it and I like it	12	89	21	7	90	83	65	35	47	29	81	76	27	67
I use it, but I would not like to	6	7	4	2	4	3	3	2	5	11	5	9	4	5
I don't use it but I would like to	65	0	58	75	3	7	27	50	28	23	4	9	57	25
I don't use and I don't want to use it	18	4	18	17	3	7	5	13	20	37	10	6	12	3

Highest-frequency categories are marked in grey

When asked to rank a series of technological products (e.g. tablets, laptops, MP3 players) with regards to their perceived functionality for e-learning

purposes, respondents position laptops, Wi-Fi connections and tablets in the first three positions. "Fixed" products such as PCs, DVD players or cable connections rank in the last positions. It seems that more *mobile* products are perceived more favorably when it comes to their usage in the context of e-learning. In the questionnaire we listed a series of typical e-learning features, and we asked respondents to identify those that represent true success factors for e-learning initiatives. Preferences were measured on a 1-to-5 Likert scale (1=not important; 5=very important).

Univariate analysis results (ordered in descending order) are showed in table 2. Characteristics such as ease to use, online accessibility and quality in the learning process surely represent highly valued elements for the ideal e-learning system.

Some social-demographical analyses on the sample show that 87% of the respondents spend between 1 and 6 hours on the Internet every day. Of the entire time spent on the Internet, on average, 23% is dedicated to social net-working and chatting, 17% to e-mailing and 16% to researching/studying or other learning activities. Results are showed in table 3.

Table 2
CRITICAL SUCCESS FACTOR FOR A E-LEARNING SYSTEMS

E-learning requirements for being successful	Average	Standard Deviation
Easy to use and user friendly	4.64	0.59
Access to resources available online	4.48	0.69
Quality of learning	4.40	0.80
Ability to perform tests and exercises online	4.38	0.72
Support to the teacher-student interaction	4.36	0.74
Multi-device (e.g. tablet, smartphone) accessibility	4.32	0.83
Ability to exchange documents on the platform	4.25	0.80
Being autonomous in the learning process	4.11	0.95
Organize the course materials in a personalized way	4.10	0.39
Being able to use the technology of the e-learning system	3.99	0.93
Being able to use the same content on different e-learning platforms	3.96	1.04
Receiving a valuation on the learning level acquired	3.89	0.95
Develop cognitive process (memory, attention, problem solving)	3.87	1.02
Integrating personal and learning/class calendars	3.81	1.15
Support to interactions among students	3.74	1.01
Using Chat/Forum	3.71	1.06
Benefiting from an asynchronous tutor	3.39	1.08
Benefiting from a synchronous tutor	3.38	1.12
Ensuring and adequate level of emotional communication	2.90	1.10

Table 3
TIME DEDICATED ON INTERNET-RELATED ACTIVITIES DAILY

Activities performed online	Time dedicated (out of 100%)
Social network and Chat	23%
E-mail	17%
Research, study or other learning activities	16%
Seeking information on the Web	13%
Reading newspapers online	10%
Watching videos online	10%
Browsing e-commerce websites	6%
Online gaming	3%
Updating my personal blog	2%

In addition to that, there are negative significant correlations (i.e. the more time dedicated to one activity, the less dedicate to the other one; significant level $p<0.05$) between the following couples of activities:
- Social network and Chat and E-mail
- Social network and Chat and Browsing e-commerce websites
- Social network and Chat and Research/study or other learning activities
- E-mail and Seeking information on the Web
- E-mail and online gaming

Then, we investigated for any significant correlation ($p<0.05$) between the potential features of an e-learning system previously listed in table 2. A positive and significant correlation between two variables implies that the higher the importance given to one of the two, the higher the importance of the second one. In this analysis all significant correlations we have identified are positive. Table 4 lists table 2's correlated variables in a more meaningful way by assigning shorter names and grouping them into macro-areas.

Table 4
CRITICAL SUCCESS FACTORS: A RECLASSIFICATION

Original variable	Re-coded variable	Macro-area
Support to interactions among students	Support to student interactions	Relational
Develop cognitive process (memory, attention, problem solving)	Cognitive Process Development	Relational
Ensuring and adequate level of emotional communication	Emotional Communication	Relational
Using Chat/Forum	Chat & Forum	Relational
Quality of learning	Quality of Learning	Quality
Being able to use the technology of the e-learning system	Ability to use the technology	Capability

Original variable	Re-coded variable	Macro-area
Being able to use the same content on different e-learning platforms	Same content on different learning platforms	Capability
Access to resources available online	Resources online	Capability
Benefiting from an asynchronous tutor	Asynchronous tutor	Capability
Ability to exchange documents on the platform	Exchange documents	Capability
Being autonomous in the learning process	Autonomy	Organizational
Receiving a valuation on the learning level acquired	Self-evaluation	Organizational
Multi-device (e.g. tablet, smartphone) accessibility	Multi-device	Organizational
Easy to use and user friendly	Easy to use	Organizational
Integrating personal and learning/class calendars	Calendar integration	Organizational

Figure 1 shows the correlation (all positive) among variables. There is a correlation when the box containing a variable is adjacent to one of another variable. For example, *Same content on different learning platforms is positively correlated with: Emotional communication, Quality of Learning, Ability to use the technology, Resources Online, Asynchronous tutor and Exchange Documents*.
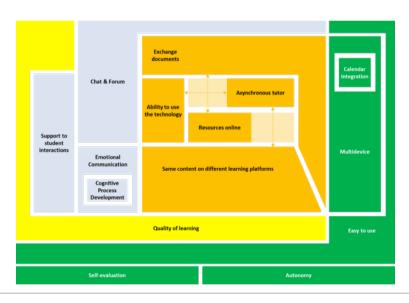

Fig. 1 - Correlation among variables: a conceptual schema

Possible "reading paths" of the above conceptual schema are as follows:

An organization willing to...	Should...
Develop an e-learning system that ensures high quality of learning	Give priority to elements such as ease of use, emotional level of communication, interaction among students, social communication tools (e.g. Chat and Forum) and to the possibility of accessing the same content on multiple platforms.
Develop an e-learning system that is easy to use	Pay particular attention to the levels of study autonomy and self- evaluation that the system guarantees to the user, to the possibility of accessing the system from multiple devices, to the presence of social communication tools (e.g. Chat and Forum). An easy-to-use e-learning system will be then positively correlated with a perceived higher quality of learning.
Develop an e-learning system that serve/is perceived as an asynchronous tutor	Make sure that the system acts as a document repository for exchanging files and/or access resources online, ensure that the system users are familiar/capable of interacting with the system technology, allows the system to make the same content available on multiple learning platforms.

Conclusion

Both academic and practitioner literatures have been analyzed main e-learning's critical success factors for many years.

Although much has been said about the adoption of e-learning systems, their effectiveness is still widely debated in literature.

Thus, we suggest to reframe the e-learning phenomenon according to the following characteristics. This would support the evaluation, implementation and maintenance of an e-learning initiative in order to maximize its effectiveness.

First of all, the educational paradigm has shifted from the teacher-centric to a learner-centric model. Good learning environments are learner-centered, knowledge-centered, assessment-centered, and community-centered. In an e-learning context, this implies that learners expect to receive a high *Quality of learning.* According to the results of this study, a high quality of learning is guaranteed when the e-learning system is easy to use, it allows accessing the same content on different platforms and it ensures good levels of emotional and social communication among the other learners and the physical teacher(s).

Secondly, the adoption of a successful e-learning system requires the definition of overall learning strategy and objectives, in particular: enriching the quality of learning; giving access to content and resources; improving communication; guaranteeing autonomy. Learning strategies and objectives need to be well thought out, carefully implemented, and constantly aligned with the learners' needs. Thus, as already highlighted in literature, it is not the e-learning

system intended as a pure technological tool that makes the difference by itself. It is the way the e-learning system is used by teachers and participants that makes the difference. This implies that learners should be able to clearly see the benefits for which the e-learning system has been built.

Thirdly, the preliminary findings of this study reveal that the social dimensions of an e-learning system are pivotal to unlock its full potential. Many respondents (about 30% of the sample) still perceive e-learning systems as not good enough to support the interaction processes between students, and teachers. In fact, there is a lack of ability to foster interaction within the e-learning courses. It is important to notice that an e-learning system will not be able to substitute the face-to-face interactions between students and teacher(s). As discovered by Paechter and Maier (2010), students still prefer face-to-face interactions "where ideas are exchanged and knowledge is developed (situations with a high degree of cognitive presence) and situations where socio-emotional relations are established (situations with a high degree of social presence)". When "fast exchange" between other students and/or the instructor(s), students favor the on-line channel (*ibid.*). This implies that the interactivity of an e-learning system must be coherent with the learning objectives of the system itself. Interactive and social platforms *per se* are not enough if not properly inserted in the overall e-learning strategy.

Fourth, our study says that respondents expect e-learning systems to provide contents and opportunities to practice and exercise the knowledge acquired and discussed during the course. Learners must be able to use the systems not only as a powerful platform to share contents and materials, but also as an additional environment to autonomously self-evaluate their progress.

Lastly, learners perceive mobile and non-desktop solutions more favorably than traditional ones. This creates additional complexity since a multi-device e-learning system might require significant investments as different devices require specific configurations of the system itself. The institution adopting the e-learning system should be aware that additional efforts might be required in order to guarantee a seamless high-quality-of-learning experience across all usable devices.

Main limitations to this research are related to the definition of the sample. Most of the respondents, in fact, are Italian students enrolled in Business/Economics courses. As a consequence, Italian-specific knowledge and usage of e-learning, as well as Italian-specific Internet-related habits, might affect the level of generalization of our first findings. Further research will require using a more international sample thus enabling to control for any nationality-related differences.

Although they are underutilized, the interest and intention towards the use of e-learning systems exist. Thus, further researches on the capacity of educational

designers to consider such systems are needed.

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