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TEACHERS INDUCTION AND DIGITAL CULTURE. THE CASE OF SOUTHERN ITALY TEACHERS ATTENDING TFA

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This paper aims at grasping the digital culture of teachers participating in an Italian teachers' induction context, by referring to the Finnish Opeka theoretical and methodological model. Namely, we grasp how Southern Italy participants in a TFA course aimed at educate to teach students with special educational needs shape their own digital culture. We first describe how the general context of TFA is featured as one of the possible teachers' induction paths in Italy. Then, we show both analysis and results of the research. As for this, we first run Principal Component Analysis to detect what factors compose the participants' digital culture. Then we run independent samples t-test to observe differences between males and females, and preservice and in-service teachers (indeed, even if all of the teachers are attending the TFA as an induction experience, some of them already work in fields different from the special educational needs one). Results show that two

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of the four detected factors are similar to those proposed by the Finnish literature. The other two, instead, differ from them. Furthermore, it emerged that, on average, males have higher scores than females on the factors; these differences are significant on three factors. Last but not the least, experienced teachers have, on average, higher scores than preservice participants. However, these differences are not significant.

1 Introduction

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. In this process, the role of the teacher must be rethought and new teaching skills have to be developed. These competences imply both appropriate design of innovative learning activities and use of ICT in education (Gallina, 2008). In this perspective, the teacher is the director of a complex educational scenario, mediating between the learning practices the student participates in and the chances given by technology. Some studies (Avvisati *et al.*, 2013) showed the teachers' difficulties of integrating educational technological tools. Such a difficulty often depends on "external" obstacles (like the lack of the adequate equipment in schools), which can be defined as first level barriers (Hew & Brush, 2007). However, there is also a second level of obstacles, which are the internal ones and are related to the know-how of teachers and schools about the educational technology, the teachers' digital skills, and their attitudes, believes and perceptions about the digital tools (Ertmer, 2012; Gallego & Masini, 2012). In this plethora of limits, the growing attention on the digital skills preservice teachers makes the understanding and arrangement of the educational context even difficult and underlines the need of contextualizing the teachers' expectations, accessing to technology, and integrating the use of technology with the instructional support (Dexter, 2003). According to Fullan (2007), furthermore, the students' learning experience and the change processes it causes depend on what teachers perceive and think about learning and innovation. Howard (2013) suggests that the risks connected with the teachers' approach to innovation can be reduced by supporting teachers themselves in gaining familiarity with ICT to reduce bad feelings like anxiety or dread. This process can be realized through a continuous support by the school where teachers work.

A more analytic view is proposed by Viteli, Sairanen, & Vuorinen (2013), which elaborated a four-factors schema to describe how teachers' digital culture is shaped. More specifically, authors suggest that the following four dimensions characterize such a culture: 1) Leadership and Management; 2) Resources and

Access to resources; 3) Confidence and Competence; 4) Motivation and Time (see "Context" paragraph for further explanation).

In this paper, we connect the teaching induction process and the development of a digital culture at school. More precisely, we try to understand how Italian teachers participating in the induction process as burgeoning experts in special educational needs perceive the use of ICT in education. We will use the four-factors schema just introduced as a starting point to grasp the dimensions shaping the digital culture of the participants in our study. As defined in the following paragraphs (see "Context" paragraph), we will first describe one of the Italian teacher induction path, which is called TFA. Then, we will go in depth of our research[1].

2 Aims

The aims of this paper are:

- To describe one of the possible Italian teachers' induction process, which is called "TFA" (Tirocinio Formativo Attivo - Active Formative Training);
- To analyse which factors are associated with the digital culture at school in Italian participants in a TFA course for teachers of students with special educational needs;
- To analyse if and how those factors differentiate in relation to some demographics, like both participants' gender and teaching experience.

3 Context

Our research was inspired by Opeka (*op. cit.*), which is a Finnish project lead by the University of Tampere. It was aimed at grasping the digital culture of schools by answering 106 five-point (0=completely disagree, 5=completely agree) Likert items exploring the dimensions shaping the teachers' perception of ICT at school (digital environment, organizational culture, pedagogical activities, evaluation practices). During Opeka project (since 2004 and still ongoing), 3526 teachers were interviewed in Finland. Right after the compilation, teachers received a dynamically generated report with the results of the questionnaire compared with the findings of their own school and the municipality where this is located. As results, 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". "Leadership and Management" dimension refers to the tendency of teachers of arranging the digital tools they use for learning activities, the cooperation they

[1] The research we made and the writing of this paper were funded by "UniTutor – UniFG" project.

have with colleagues and technical experts at school, the pressure they feel to do something else and the pedagogical support 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.

In October 2017, we repeated the administration of the questionnaire in Apulia, a Southern Italy region. We involved 161 (M,17; F,144) teachers participating in a TFA course. Before explaining the questionnaire's administration process and the overall research method (see paragraph "Methodology"), we describe the Italian context within which we collected data.

In Italy, several alternative paths are provided for becoming a teacher and this process is strictly connected with the induction phase, since very often teachers approach the school environment as trainees during those formation paths. In Table 1, we describe how people in Italy can get the qualification of teachers in relation to the school degree (kindergarten/primary school or middle/secondary school). To make the processes clearer, we also indicate the age students have at each school stage.

Table 1
ITALIAN TEACHERS' QUALIFICATION PROCESS

	Kindergarten and primary school	Middle and secondary school
Age of students	3-10 years	10-18 years (compulsory until 16 years old)
Teachers' qualification path	5-years Master degree called «Scienze della Formazione Primaria» (Primary Education Sciences)	1-year specialization degree. This can be attended after the Master degree on a specific topic (e.g. Literature, Math, Science, Foreign language, and so on)

After the qualification, teachers can work as substitute teachers or can participate in a public competitive exam to become tenured teachers. For the secondary school, therefore, the qualified person will teach in the field she had the master degree about by using the pedagogical tools learnt during TFA. Indeed, during TFA, the future teachers participate in a number of theoretical lectures and in a training activity, during which they cooperate with more experienced teachers in real classrooms. Let us make one example to better explain this process. If I do love teaching 3-10 aged students, I need to graduate myself in a 5-years master degree called "Scienze della formazione primaria" (which

actually unifies in a five-years university course both bachelor and the master degrees). During this course, I will attend several training activities at school, to observe the experienced teachers, to collaborate with them and to start gaining confidence with the school context as a teacher. After the qualification, I can already teach at the kindergarten and the primary school.

TFA are organized by public universities and to become a teacher for students with special educational needs you need to attend TFA even to teach in both kindergarten and primary school. The participants in this research were teachers attending TFA for special educational needs organized at the University of Foggia for 2017-18 academic year. Therefore, in the entire sample of participants, there were four different groups of teachers corresponding to the four school grades existing in Italy (Kindergarten, 28%; Primary school, 28%; Middle school, 17%; Secondary school, 27%). Furthermore, some participants are already teachers taking the qualification for special educational needs (85,5%), some others are becoming teachers through TFA course (3,5%), some others are at the first year of teaching (11%). [2]

4 Methodology

4.1 Data collection

The original Finnish questionnaire was translated to Italian by two researchers who first made a literal translation. Then, a broader team of researcher (composed by four experts) checked the translation and rearranged it by taking in account the Italian cultural aspects. During a third step, 10 teachers were involved to complete the questionnaire and indicated eventual unintelligible aspects. As a further step of the questionnaire's preparation, the team arranged the final questions according to the teachers' suggestions. Like the original Finnish questionnaire, 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.

4.2 Data analysis methods

After collecting data, we used the following methods of analysis:

- Explorative factorial analysis through Principal components method (PCM);
- The calculation of the reliability of the factors emerged through the factorial analysis;
- The calculation of the correlation of the factors emerged through the

[2] In Italy, there are other possible alternative induction processes as well, since many new laws regulating this experience were introduced in the last years and months. These should be executive in the next years.

factorial analysis;
- The creation of four sum variables corresponding to the reliable factors;
- The independent samples t-test to detect differences between males and females;
- The independent samples t-test to detect differences between experienced teachers and not experienced teachers.

All of the analysis was made through IBM SPPS software.

5 Results

After data were collected, a first principal component analysis (PCA) was cnducted on the 100 items (106 less the demographic items) with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis. KMO=,762 («good» according to Field, 2009), but not all KMO values for individual items were above the acceptable limit of.5 (Field, 2009). Bartlett's test of sphericity χ^2 *(2346) = 6,722, p<,001* showed that not all the correlations between items were sufficiently large for PCA. Therefore, just items with correlations larger than.3 were taken (Field, 2009), which were 55. A further PCA was run with the 55 selected items with orthogonal rotation (varimax). 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 χ^2 *(1653)=5,927, p<,001* showed that all the correlations between items were sufficiently large for PCA. Table 2 shows the number of items clustered on the same component and the variance explained by each component (due to the aims of this article we do not present here the entire factor analysis loading table).

Table 2
COMPONENTS, NUMBER OF ITEMS, VARIANCE AND RELIABILITY

Component	Number of items	Variance explained	Reliability (Cronbach's α)
1	17	15,79 %	.93
2	17	14,09%	.93
3	12	13,55%	.90
4	8	8,64%	.87

By analysing the items composing each factor and according to literature, 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). The definition of the factors was first made by the Italian research group and then it was compared with the Finnish research group, in order to both respect the previous study and the specific characteristics of the new one.

After running the PCA, we checked the correlation among the four factors through Persons' r. As depicted in Table 3, 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 the independent samples t-test to detect differences between males and females. Results show that, on average, male participants have a higher score (M=49,88, SE=2,88) than female (M=41,97, SE=1,13) on Factor 1. This difference is significant t(153)=-2,32, p<.05. On average, male participants have a higher score (M=48,17, SE=3,12) than female (M=40,38, SE=1,15) on Factor 2. This difference is significant t(152)=-2,24, p<.05. On average, male participants have a higher score (M=42,11, SE= 1,55) than female (M=38,62, SE=.89) on Factor 3. This difference is not significant t(153)= -1,33, p>.05. On average, male participants have a higher score (M=27,35, SE=1,12) than female (M=23,95, SE=.58) on Factor 4. This difference is significant t(155) =-1,98, p>.05. Therefore, by giving a general glance to these results, there emerges that, on average, male have higher scores than females on all of the factors. These differences are significant for Component 1 (Use of ICT and technology), Component 2 (Innovative teaching and evaluation) and Compo-

nent 4 (Educational community). They are not significant for Component 3 (Rules and digital skills).

Much more interestingly, we run the independent samples t-test to detect differences between in-service teachers (80%) and preservice teachers (people having the first teaching experience during the TFA training) (20%). Results show that, on average, experienced teachers have a higher score (M=43,62, SE=1,16) than not experienced teachers (M=39,25, SE=2,92) on Factor 1. This difference is not significant t(151) = -1,46, p>.05. On average, experienced teachers have a higher score (M=41,62, SE=1,18) than not experienced teachers (M=39,58, SE=3,33) on Factor 2. This difference is not significant t(150) = -,66, p>.05. On average, experienced teachers have a higher score (M=39,58, SE=,86) than not experienced teachers (M=35,87, SE=2,43) on Factor 3. This difference is not significant t(151) = -1,64, p>.05. On average, experienced teachers have a higher score (M=25,51, SE=,59) than not experienced teachers (M=23,38, SE=1,41) on Factor 4. This difference is not significant t(153) = -,771, p>.05. Therefore, by looking by a glance this analysis, we can see that, on average, experienced teachers have higher scores than not experienced teachers on all of the factors, but that these differences are not significant.

Conclusion

The issue about the teaching induction process represents a crucial aspect of the contemporary learning world, and it is interviewed with the development of innovation in learning. As for this, "Determination of the attitudes of pre-service teachers, who live in an age of technology and get ready to raise future individuals, is of paramount importance both educationally and professionally" (Akturk *et al.*, 2015, p.4286). The factors composing both preservice and experienced teachers' digital culture have been defined by the existing literature (*op. cit.*). However, literature asks for new researches and analytic answers as well. Indeed, the continuously changing laws about this process challenge teachers, schools' principals, parents and students. In a nut, polices respond to the changing society by transforming the rules of the game. However, this dynamic process challenges the overall teaching/learning system. At the same time, the broader societal dimensions change day by day, aided by the fact that ICT ceaselessly develop. In this scenario, traditional pedagogical approaches are in question and being a teacher represents an open challenge. Especially, the induction process of teachers requires that we take into account several dimensions.

In conclusion, we can first say that a very interesting difference emerges when comparing the Italian results with the Finnish ones. Indeed, in our sample of Southern Italian participants in TFA course we described, the four factors

emerged through PCA have different nuances than the Finnish ones. Namely, the Finnish components were "Leadership and Management", "Resources and Access to resources", "Confidence and competence", "Motivation and Time". In the Italian context, we defined the following factors "Use of ICT technology", "Innovative teaching and evaluation", "Rules and digital skills" and "Educational community". In some ways, the Finnish factor "Resources and access to resources" and the Italian one "Use of ICT and teaching" are similar. However, in the Italian sample, the use of digital tools seems to be connected with the teaching activities in a unique factor. The Finnish component "Confidence and competence" can be associated with the Italian one "Rules and digital skills", since both of them represent the dimension about digital competences teachers have. However, the Italian factor seems to put together the way teachers perceive their own skills and the normative aspects related to the use of technology. In our view, which can furtherly be deepened, a culture mediation can influence this relation among the items exploring both digital skills and rules' aspects. These cultural features could impact on the emerging of this factor in a double way: first, Italy (and especially Southern Italy) can probably be behind the tech distribution that Finnish schools have. This aspect can influence a socialization process of teachers about teaching technology still very much relied on technical rules and laws. Second, the Italian culture can traditionally be more normative than the Finnish one. The component "Innovative teaching and evaluation" and the component "Educational community" seem to be very much different than the other two Finnish components ("Learning and management" and "Motivation and Time"). This suggests that the role of teachers is differently perceived in the two countries, since, in Finland, the teacher is a decision maker too who organizes activities and digital tools, by taking in account the motivational dimension of her job. In Italy, it seems that the teacher's job implies a concern about the appropriate ways to innovate the learning activities and the evaluation practices. Furthermore, the community dimension represents an aspect that makes teachers feeling the relational support in their job. These two final dimensions, in particular, can be two culturally mediated components and we do claim that this hypothesis could be furtherly explored in future studies. At the same, even if the analysis of factors is supported by statistical analysis, the final definition of them is made by the researchers. Therefore, this definition itself could be mediated by the researchers' culture and the process of components' label making could be analysed by looking at the Italian-Finnish intercultural procedures.

Another interesting result is about the difference between male and female teachers in the sample. That is, according to the independent t-test, on average, males have significant higher scores on Component 1, 2 and 4. By going in depth in the items of the respective factors, it seems that males are more

confident than females with the use of ICT in education. In their research on preservice teachers, Akturk *et al.* (2015) discover male participants had more positive attitudes to the use of technology in the classroom than females. Authors sustain that these last can be more diffident and less self-confident about the use of digital devices. This claim can help understanding our results as well, by underlining a cultural difference between male and female teachers. However, this aspect represents another element to be furtherly explored with future researches. Furthermore, this difference should be verified in a broader sample since, in this study, male teachers were just the 11% of the entire group of participants.

Consistently with the aim of this paper, we also run the independent t-test to analyse differences between more and less experienced in-induction teachers. Russel *et al.* (2003) found that less experienced teachers usually have higher level of comfort with ICT and use them to prepare teaching activities. Whereas, more experienced teachers use them to deliver activities in classrooms or to engage students. In our study, it emerges that there are differences between the two groups as well (more experienced teachers have, on average, higher scores on all the factors). This result suggests that can be a mediation of the experience in the way teachers perceive and use ICT for education. However, this possible idea (that should be in depth explored) unfolds further research questions, such as "What aspects of the teachers' experience can influence this perception?", "Does the relational dimension impact on this process?". Far from proposing through this paper a model explaining if and how these aspects can interrelate with one another, we open these questions as further aspects to be analysed in future studies. Indeed, we think that further directions of the study can be planned. It can represent a first step of the research, since it involves a particular and not randomized sample. When we run PCA, we took just the items with significant correlations to grasp the four factors and the reliability of each factor was high enough. However, the questionnaire was not a validate scale and needs to be furtherly structured according to the Italian population, by looking at the scores of the single item as well and their possible relation with the items grasping the four factors. The high number of items for each factor can also positively impact on its reliability and subdimensions within each factor could be explored. At the same time, the Finnish sample was not composed just by induction teachers and the comparison between the two cultures cannot be generalized. However, we highlight the importance of the results emerged from this study. Indeed, we do claim that they suggest interesting aspects about the specific context we analysed and can suggest important implications for the organization of not experienced teachers' education. For example, the specific course within which the analysis took place can be arranged through learning

activities supporting the exchange knowledge between males and females, and, especially, between experienced and not experienced teachers. At the same time, at a more general level, TFA courses can be thought as experiences were teachers develop their digital skills and try to connect them with the teaching activities in future classrooms. As for this, TFA can be the context where participants begin shaping that digital culture that will be furtherly specified in the specific contexts the teachers will work at some point and that will produce a complex system teacher-digital skills-school context-mediated activities.

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