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## Educational Technology in a French Teacher Training University: Teacher Educators' "Voice"

Maria Antonietta Impedovo, Fatma Saïd Touhami,  
and Pascale Brandt-Pomares

**Abstract:** This research examined the use of educational technology in a teaching training university in France and identified useful dynamics related to designing formative activities for the use of educational technology for teacher educators and student-teachers. The data was gathered by way of a semi-structured interview with four teacher educators, each with different responsibilities and skills. The transcripts were analysed qualitatively through grounded theory methodology. We proposed a first data exploration, where main elements in the data were outlined and then critically discussed contrastive categories that emerged. The findings of our study allowed us to identify elements that support the process of teachers' appropriation of technological tools and open further spaces to investigate the role of new technologies in the teacher training university.

**Résumé:** Cette recherche a examiné l'utilisation de la technologie éducative dans une université de formation des enseignants en France et a identifié des dynamiques utiles liées à la conception d'activités formatives pour l'utilisation de la technologie éducative pour les formateurs d'enseignants et les étudiants-enseignants. Les données ont été recueillies au moyen d'une entrevue semi-structurée avec quatre formateurs d'enseignants, chacun ayant des responsabilités et des compétences différentes. Les transcriptions ont été analysées qualitativement grâce à la méthodologie de la théorie ancrée. Nous avons proposé une première exploration des données, où les éléments principaux dans les données ont été présentés et ensuite, nous avons discuté de façon critique les catégories contrastives qui ont émergé. Les résultats de notre étude nous ont permis d'identifier les éléments qui soutiennent le processus de l'appropriation par les enseignants des outils technologiques et d'ouvrir d'autres espaces pour étudier le rôle des nouvelles technologies dans l'université de formation des enseignants.

**Keywords:** technology, teaching training, technology integration, teacher education

### Introduction

In France, the Ministry of National Education has worked on computer integration in teaching, with the aim being to encourage innovation (Bruillard, 2011). Several steps have been taken by the French education system for the development of computer and multimedia skills, both in school systems and at all levels, with a marked commitment at the university level. For example, 'France Digital University' (France Université Numérique – called 'FUN') has an initiative for higher education 2013-17, with the aims of improving student success and transitions, encouraging new pedagogical approaches, using ICT to drive new student-centered pedagogy, and supporting the development of connected campuses. However, according to OECD Teaching and Learning International Survey (TALIS), only 24% of teachers in France use ICT for students' projects or class work (the EU average is 34%).

Considering this, more responsibility is given by the teacher training institutes to an adequate level of technological training for future teachers or teachers already in service. Indeed, the development of technological expertise is considered a priority for future teachers during their



training (Carugati & Tomasetto, 2002; Fisher, Higgins & Loveless, 2006). It is important to determine the conditions necessary for the use of technology in teachers' training that can bring positive and profitable results in student-teachers' progress (Russell, Bebell, O'Dwyer, & O'Connor, 2003). A series of studies have been conducted on technology in teacher training, considering teachers' perceptions, the integration of educational technology in pedagogical practices and classroom management (Genevois & Poyet, 2010). In this paper, our focus is specifically the perception and the use of educational technology in a French teaching institute by teacher educators. We consider the perspective of teacher educators useful to bring out significant insights into the student-teachers' ICT training.

The first part of the paper will explore technology in teacher training. Then, we will move on to present the study in the French context and, finally, discuss the results.

## **Technology in Teacher Training**

During teacher training, ICT is often used in a traditional pedagogical setting, rather than to help the construction of students' knowledge (Depover, Karsenti & Komi, 2007; Pamuk, 2012). Consequently, student-teachers' experience of using ICT pedagogically is rather limited (Graham, Tripp & Wentworth, 2009). Thus, once in service, future teachers tend to reproduce the same uses (Koh & Divaharan, 2011), or to add technology to traditional learning methods only. It appears that only after several years of experience do teachers begin to incorporate more critical approaches to the integration of technologies (Béziat, 2012).

For this reason, it becomes necessary to investigate and support the use of technology in the training of teachers. In France, great attention is paid to the implementation of technologies in teacher training, such as digital work environments (Pacurar & Abbas, 2015) and ePortfolios (Bucheton, 2003). Digital work environments are based on architectural software, which integrates institutional tools like attendance, grades, grade transcripts, text notebooks, emails and forums and pedagogical tools like collaborative environments and digital resources (Henry & Joris, 2013). The use of ePortfolios as an assessment device is widespread in pre-service teacher education, due to its potential in support and reflection on professional practice (Ricard-Fersing, Dubant-Birglin & Crinon, 2002; Impedovo, Ritella & Ligorio, 2013; Zeichner, Hutchinson, 2004).

## **The Use of Technology by Teacher Educators**

Technology integration is a large topic of discussion in education (Lowther, Strahl, Inan, & Ross, 2008). It is possible to find different levels of integration and use of technology by teachers (Wozney, Venkatesh, & Abrami, 2006). Particularly relevant are the characteristics such as age, gender, race, education level, socioeconomic status, years of education, school structure and technological infrastructure of institutions (Hargittai, 2010; Hsu & Kuan 2013). The teaching subject is considered an endogenous factor that influences teachers' perceptions of the added pedagogical value of digital technologies (Orji, 2010; Ruthven, Hennessy & Deane, 2005). However, the teaching and learning effects of ICT depend also on the way in which educational technology is used (Bielaczyc, 2006). For this, it is important to understand and to limit the barriers that schools (Ilomäki, 2008; Tondeurs, van Keer, van Braak, & Valcke, 2008; Zhao & Frank, 2003) and teachers encounter during the process of appropriation and use of ICT (Muir-Herzig, 2004; Strahl, Inan, & Ross, 2008).

Appropriation is when the user begins to use the artefact in his or her environment, leading to a fruitful utilization. Jones and Issroff (2007) define the appropriation in terms of a process by which technology or particular technological artefacts are adopted and shaped in use. The process of appropriation also includes aspects concerning the mutual influence between technology and users (Overdijk & van Diggelen, 2008). The teacher makes choices in their usage of the tool within educational practice by 'adapting' it in a goal-directed activity (Lund

& Rasmussen, 2008). At the same time the technology gets its form and meaning during the social interaction.

From an ecological perspective, the process of integration and full appropriation of technology has to be interactive (Cook, Pachler & Bachmair, 2011). The processes of assimilation and accommodation must be implicated, as well as changes and improvements to technological devices for personal, interpersonal, social and cultural requirements. Indeed Cook, Pachler and Bachmair (2011) view appropriation being characterized by user agency, seen as the user's capacity to act on the world; cultural practices, the routines users engage in in their everyday lives; and the socio-cultural and technological structures that govern their being in the world.

Considering these perspectives, we intend to focus more on the subjective perspective of teacher educators, and how they make use of educational technology in a French teaching institute.

### **French Teacher Training and ICT Skills**

Since the 2013 academic year, the Higher Schools of Teaching and Education (called "ESPE" - École Supérieure du Professorat et de l'Éducation) have provided teacher training. Specifically, this institution provides a Master's degree called "Métiers de l'enseignement, de l'éducation et de la formation" (MEEF) to prepare student-teachers to sit a national examination. In this way, the teacher gains a "Certificat d'aptitude au professorat de lycée professionnel" (CAPLP) to be able to teach in primary and secondary school. This new structure of training proposed by MEEF has a double objective: to complete the process of 'universalisation' of initial teacher training (undertaken by the reform of 2009); and to 'professionalise' the teacher role by establishing, during the Masters' programs, an integrative approach to both theory and practice. In this way, the student-teachers can gradually enter into the profession.

In the first year of the master's course, the practical experience is based on activities of observation, aimed at the construction of the first skills in teaching. The teacher students have to: actively participate in the organization of teaching sequences, consider the respective subject area and grade level; and to assess the effectiveness of choices. These goals are achieved with strict collaboration between the teaching staff of the ESPE and the guided supervision of a tutor in the school.

In the second year, the student-teachers, admitted to the national competitions, have the status of 'official trainees' and can undertake practical experience in a school. This activity is equivalent to a part-time teaching service, proposed under appropriate monitoring and scaffolding supervision. During this practical experience, the student teacher carries out all the components of the role of a teacher, participating in all activities concerning the life of a school, in terms of teaching (preparing lessons, teaching lessons, assessment, etc.); academic support (participation in educational life) and institutional involvement (participation in school projects, relationships with stakeholders, etc.).

This training, organized in two years, enables all students who are seeking careers in teaching, education and training to acquire the knowledge and build the skills necessary to become a professional teacher. At the same time, they acquire the ability to do their job not only by applying traditional methods and approaches but by designing appropriate training schemes for each student, taking into consideration any difficulties related to students' social status.

ICT skills are also considered important during the two years of training for the future teachers, as established and codified by official institutional ministerial indications (National law of 2006).<sup>1</sup> This proposition, according the national guideline called "Référentiel C2i ®

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<sup>1</sup> de la formation » JORF n°0200 du 29 août 2013 Référentiel de compétences des enseignants - BO du 25 juillet 2013". Link: [http://www.education.gouv.fr/pid25535/bulletin\\_officiel.html?cid\\_bo=73066](http://www.education.gouv.fr/pid25535/bulletin_officiel.html?cid_bo=73066)

niveau 2 Enseignant”<sup>2</sup> is described in 27 skills divided into seven areas related to the exercise of the teaching profession (mastery of the professional digital environment; skills development for training throughout life; professional responsibility within the educational system; taking into account the laws and requirements of professional use of ICT in particular; networking with the use of collaborative tools; design and preparation of teaching content and learning situations; implementation of evaluation approaches).

These ITC skills are operationalized for each teaching curriculum in specific pedagogical task, embedded in the curriculum. It is compulsory that each task be reported by student-teachers in an institutional online learning environment, which includes a personal ePortfolio. The tasks can be implemented by students in an individual or group activity and are validated by teacher educators with a specific curricular grid. At the end of their master’s, the student-teachers must show the acquisition of all the ICT skills. The ICT skills are validated by a specific jury during the official discussion of the final dissertation.

Our study is set within this context, presented below.

## **Study**

### **Aim of the Study**

The overall objective of the study presented here was to explore the perception and the use of educational technology in a teacher training university in France, taking into consideration the subjective point of view of the teacher educators. The general research question was: How do teacher educators in a teacher training university perceive and use educational technology?

This research can be used to identify which dynamics are useful, in order to design formative activities concerning the use of technology in teacher education, both for teacher educators and for student-teachers.

### **Participants and the Data Collected**

The whole staff of teacher educators from a French teacher training institution was contacted directly by the researchers through email. On the basis of voluntarily availability received, we chose only four to participate in the semi-directive interview (two females and two males, with different levels of seniority):

- Teacher educator 1 (male, about 45 years): a senior teacher educator with ICT responsibilities, especially about the online learning environment.
- Teacher educator 2 (male, about 45 years): a senior teacher educator of STEM (Science, Technology, Engineering and Mathematics) education, responsible for ePortfolio didactical management.
- Teacher educator 3 (female, about 50 years old): a senior teacher educator of didactics of language, with a self-declared low level of technology literacy.
- Teacher educator 4 (female, 38 years): a young teacher trainer of STEM education, with self-declared average/high level of technology level.

We used a semi-structured approach to these interviews with an aim to “gain knowledge about people’s living situations, their opinions, attitudes and experiences” (Tanggaard, 2009, p. 29). Indeed the scripting of the interview was structured but also flexible and open to exploring interesting themes emerging in the interview situation (Kvale & Brinkmann, 2009). The interviews were organized into six questions in total, and into two main topics, which focused on subjective and institution-related factors (Baylora & Ritchie, 2002):

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<sup>2</sup> <http://eduscol.education.fr/numerique/textes/reglementaires/competences/referentiels/c2i/niveau-2-enseignant>

1. teaching training university technology (planning, leadership, curriculum alignment, professional development, technology use)
2. teacher educator ICT skills and impact on teacher student content acquisition.

Each participant was interviewed in a university classroom and each interview lasted an average of one hour. The interview was conducted by one of the researchers involved in the study with the mirroring technique, which allows the interviewer to put the interviewee at ease, devoid of any assessment. The four audio-recorded interviews were the data collected for the study.

## Analysis

The answers to the questions asked in the four interviews were fully transcribed. The transcripts were then analysed qualitatively by two independent researchers. Specifically, first the two researchers repeatedly read the transcripts independently, in order to familiarize themselves with the content and extract the main themes relevant to the purposes of this investigation through grounded theory methodology (Bryant & Charmaz, 2007; Charmaz, 2006). Doubts or problem cases were discussed with a third researcher. Then open and axial coding was used, which formed the final set of categories in a tree-like structure. The codes were condensed into five contrastive categories, identified as conceptual oppositions, namely representations of technologies as opposed to aspects deemed important for teachers. The categories were prescriptions versus personalization of ICT tasks; technical versus pedagogical ICT teacher educators training; required use versus student-teachers' ICT skills; technical features versus subjective resistance in online learning environment use; and ePortfolio between containers and autonomy, which are shown in Figure 1:

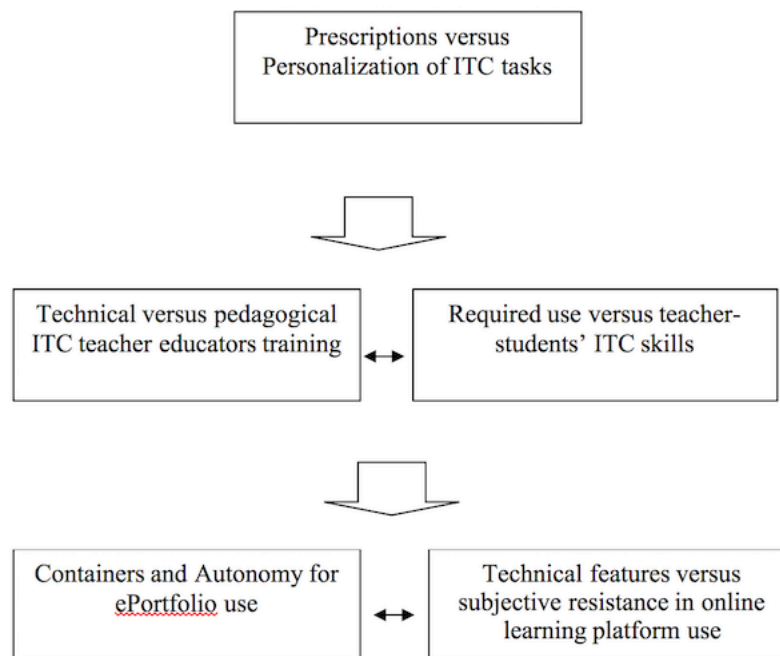


Figure 1: Axial coding: Five contrastive categories

We believe the construction of these systems of contrastive categories allowed us to see how educational technology was represented and used by the four particular teacher educators in the teacher training university analysed.

## Results

The results are divided into two sub-sections: data discovery, where the five most prominent contrastive categories in the data are outlined; and discussion, where the categories are critically discussed through the use of external theory. Below, we will focus on the data discovery of the five contrastive categories, which emerged from the interviews.

### Prescriptions versus Personalization of ICT Tasks

The ICT guidelines for student-teachers are designed by the educational ministry, which provided directions for its implementation to the teacher training university. So, the ministry guidelines led the teacher-training university to adapt the guidelines into concrete activities and tasks. The mission is to design activities that include the integration of technology. In this way, the student-teachers are placed in situations where they must use new technology to demonstrate how they personally integrate ICT in their teaching. However, these claims are perceived as “top down” by the teacher educators who have to adopt the national guidelines into concrete pedagogical activities, as expressed for example in Extract 1.

*Extract 1:*

*Teacher educator 1: It is the ministry that has imposed this and, at the beginning, we worked very hard to design the tasks to submit to student-teachers. But it was very difficult...*

The teacher reconstructs the trainers' difficulty in creating the task situations, integrating the ministerial directives into the curriculum and the educational requirements and content in which the student-teachers are inserted. The lack of additional information, provided subsequently by the national guidelines, has led forums of improvisation and "urgency" to respond to the institutional demands. This process is considered "difficult" in its implementation.

### Technical versus Pedagogical ICT Teacher Educators Training

The main and compulsory educational technologies used in the local context of the teaching-training university were the online learning environment and the ePortfolio. Video recording and smart tablets (present only in some rooms) video projectors, video-conference systems and cameras were also used. iPads weren't available then but were expected to be used in the next academic year. Only some courses are delivered online or in a blended version, organized mainly in forums and with weekly deadlines. To facilitate the use of educational technology, especially the online learning environment and the ePortfolio, the ESPE proposed specific training sessions for teacher educators. This professional developing training provided for teacher-educators was considered insufficient to allow independent use of the technological tools, as expressed in Extract 2.

*Extract 2:*

*Teacher-educator 3: As a language teacher, I always need audio and video material. At first, the use of the video projector seemed difficult, now I take written notes to help me to memorize the procedure to use it. When I receive the training it is better for me, I can understand how to use it, but for me they go too fast. Also, in my opinion, they give us some content but not enough. To Masters[sic] the tool, I need a lot of guidance and specific indications....*

Teacher-educator 3 expressed her difficulties in managing the technology with her starting low level of ICT knowledge. Also, this training was offered to learn about the tool itself (like use of software and disciplinary online environments) and not about educational strategies for the integration of the technology. This position was supported also by a second teacher-educator, as reported in Extract 3.

*Extract 3:*

Teacher educator 2: *I have followed some ICT courses, but I didn't always find it appropriate. It's what I call "the click-click training". We learn to use the tools but not to do lessons with the tool. We need to reflect on the context of the use of technology in the classroom and allow the trainers the freedom to use it...*

The teacher claimed to have run different training courses, indicating his active involvement in computer activities. These courses, offered by management, reproduced a logic of software adoption, without a real appropriation. The teacher-educator also considered self-learning very important in managing the technological tools, and going beyond technical need and taking pedagogical strategies into consideration, in order to improve the use of educational technology.

### **Required Use versus Student-teachers' ICT Skills**

The specific training to the use of the institutional online learning platform and the ePortfolio tool, the two main educational ITC used in the ESPE, was planned to be delivered only to teacher-educators. Student-teachers don't have special training in their use, especially at the starting point of their master's degree. This causes some problems, as expressed, for example, in Extract 4.

*Extract 4:*

Teacher educator 1: *But the training is only for teachers and not for the students. The problem is that the teachers put documents online, but if students are not previously trained to use the platform, how can they open them?*

If the students are not trained to use the platform, they cannot handle the requests of trainers to enter and use the online learning platform. Therefore, initial ICT training for students is a missing element that compromises the learning and teaching process. This expertise, in fact, should be supplied in the first months of the masters' registration.

On the other side, it is also important to consider the ICT skills level of student-teachers.

*Extract 5:*

Teacher educator 1: *For students, it is very complicated to put the tasks in the platform. They are used to writing text online, going on social networks, but we expect a critical reflection on the use of technological tools. (...). There is a help forum that I followed to answer some technical questions. Then some more skilled student voluntarily started to reply to help their colleagues, compensating for the lack of online tutors...*

In the case of students, the difficulty was not a lack of computer skills but a lack of skills not instrumental to educational use of technological resources. However, when the skills are learned, students are ready to take action in learning and peer-networking to help and support the others (answering forums, etc.). This testifies to the objective difficulties of students in mastering the educational tools, and to the spontaneous strategy enabling the "learning by doing" of the students. This solution, however, does not entail the attainment of a shared command of the educational tools in a short time span on the part of all students.

### **Technical Features versus Subjective Resistance in Online Learning Environment Use**

The use of online learning platforms is a mandatory educational tool, as mentioned before. However, it is perceived as not user-friendly by both student-teachers and teacher-educators, as expressed for example in Extract 6.

*Extract 6:*

Teacher-educator 1: *The philosophy of the software is to create pages that must be shared to make them visible. Consequently, I get a lot of automated emails from students who shared their pages with me,*



*making spam. So the platform is mainly to ask questions, but not for interaction. Even if you send a message on the forum, people then respond by email...*

Reportedly, the platform is used in a passive manner and in its basic functions, using traditional ways of communication when possible, it is mainly email. This problem is shared by all educators and teachers registered on the platform, thus becoming a common problem. At the technical level of the online learning environment, there was also some subjective resistance, as is expressed, for example, in Extract 7.

*Extract 7:*

*Teacher-educator 3: The platform is difficult for me. I do not put anything on the platform. So for me the platform is useful to see the documents, the file, and online course. Sometimes it doesn't work. I think I'm not capable, but it is only a technical issue. Last year a student accused me of putting a wrong evaluation. But it was not true! Probably, another trainer entered into the platform and clicked a wrong grade. (...). With the online learning environment we lost a lot of time, we should go back to the previous way...*

The experience described by the teacher educator was filled also with a strong emotional dimension, having the online situation compromise the relational dimension between the trainer and the student, with a feeling of disappointment. The dimension of time was reported as the main obstacle in the use of the platform, and the ability to use it to reshape the activities through the ITC ESPE proposals.

### **ePortfolio between Containers and Autonomy**

The ePortfolio is a mandatory activity, in which student-teachers must present documents, files, and projects developed during the two years of the master's. It is an assessment tool with a rigid structure but also with the opportunity for the students to customize it in some ways (insert pictures, link, create folders, etc.). For some teacher-educators, it is a very rich tool to track the path of each student-teacher, as expressed, for example, in Extract 8.

*Extract 8:*

*Teacher-educator 2: At the beginning of the year there is a sharing of information and criteria that we expect during the Masters. Everything is evaluated in fact ... I do a personal assessment of the task, and then they can organize the task inside their ePortfolio as they like. I think it is a very interesting tool. It allows me to follow the students, having a very rich view of their works....*

The teacher, having adopted the ePortfolio in his practice, appreciated the versatility and educational potential, considering the two years of the master's that the teacher-students are expected to follow before becoming effective teachers. Indeed, the two years of the master's can be traced in the ePortfolio, thus enabling reflexive potential during and after the course. However, for the student-teachers the perspectives about the ePortfolio were different, as expressed by the same teacher educator in Extract 9.

*Extract 9:*

*Teacher-educator 2: With STEM student-teachers, I used the ePortfolio. They liked it and then used it in their own classroom. They have completed their ePortfolio very well. However, most of the students do not see the usefulness of it, not being a tool required in school education...*

The perception of the ePortfolio was heterogeneous, with some students appreciating the value of it for their own teaching, and others reporting little interest. Indeed, for some students it is an activity that is appropriate and can be useful in their teaching professional practice but remains a tool that is not a mandatory requirement in the French educational system. In fact, the lack of national guidelines and systematic opportunities on the use of ePortfolio leaves teachers free to implement or not implement it in their classroom. So the ePortfolio was regarded as a valuable tool in itself, to be used in a manner required in the two-

year master's degree, yet with no continuity in subsequent professional practice once in the role of practicing teachers in the classroom.

## **Discussion**

In this section we propose a discussion of the five categories that emerged from the analysis: prescriptions versus personalization of ICT tasks; technical versus pedagogical ICT teacher educators training; required use versus student-teachers' ICT skills; technical features versus subjective resistance in online learning environment use; and issues in the use of the ePortfolio. From the first category, Prescriptions versus Personalization of ICT Tasks, we have chosen the prescriptions indicated by the national guidelines and the difficulties in translating the directives into the practice of teacher education. The implementation has required resources and coordination for the organization of ICT tasks to be proposed to the teacher-students and adapted to the disciplinary paths.

As considered by Rey & Coen (2012) most teacher-training institutes rarely base their technological decisions on specific published research findings. Instead, they often start by thinking about the intended results that technology should provide within their school environment. So, it has been found that the use of ICT is below initial expectations. Institutions that are successful in integrating technology into the curriculum are often guided by a comprehensive Technology Use Plan (TUP). These plans do more than just provide a blueprint of the sequence of events the school hopes to achieve. The plans also describe the overall philosophy of technology use and explore how technology will improve teaching and learning (Lefebvre & Loiselle, 2010). In this way, the efficient use of technological tools in teacher training makes it possible to lead a change not only for single users but in the practices of educational communities (Tuomi, 2002).

In relation to the second category, Technical versus Pedagogical ICT Teacher Educators Training, and the third category, Required Use versus Student-teachers' ICT Skills, we consider that the online learning environment and the ePortfolio are the main and common educational technologies used in the teacher training considered. To implement these educational tools in the ESPE, some training is proposed for teacher-educators, mainly with regard to technical ITC features. These aim to bridge the gap in ITC knowledge, without a real change in the teacher-educators' practices.

On the other hand, this emphasizes the necessity of providing specific ITC training for student-teachers, especially in the first year of their master's course. Indeed, teacher-students, even if they are considered "digital natives", don't have all the necessary knowledge, skills, and attitude to correctly use educational ITC. From these two categories, we can consider that while ICT has been important in teacher training programs in recent years, improvements are still needed. The challenge is to rethink the training of future teachers so that they can appropriate pedagogical uses of ICT. An understanding of the dynamic that exists between technological knowledge and educational discipline also reveals an important factor in the integration of ICT (Koehler & Mishra, 2005). Moreover, the chance to offer exemplary use of ICT would add value to the initial training of student-teachers, (Béziat, 2012), providing ideas and suggestions of how to use it in the classroom (Raby, Karsenti, Meunier & Villeneuve, 2011). Therefore, it is important to focus on dedicated student-teachers' training on techno-pedagogical aspects, offering concrete examples of the use of ICT in various disciplines (Henry & Joris, 2013; Lefebvre & Loiselle, 2010), considering that not all young teacher-students are tech-savvy (Bennett & Maton, 2010; Sherman et al., 2000; Vaidhyanathan, 2008).

As to the fourth category, Technical features versus subjective resistance in online learning environment use, and the fifth category, ePortfolio between containers and autonomy, we explored the technical difficulties related to the ITC tool use by the teacher-educators and the teacher-students. The implications are that in relational and pedagogical dimensions, consequent attempts using practical strategies were used to get around the lack of

appropriation (like the use of email instead of the discussion forum or online communication). In addition to the technical aspects, the lack of direct application of educational ITC in the teaching profession (such as the ePortfolio used in the training of teacher-students in the ESPE but not required in the classroom) influenced the interest in the use and adoption of educational technology. From these two categories, we can emphasize the importance of the subjective factor: it is the teacher, rather than the technology itself, which influences the effective use of ITC (Starkey, 2011) and mediates the adoption of it for the students (Kukulska-Hulme, 2007). Sometimes the use of educational technology shows a degree of "unwillingness to change" (Lasky, 2005, p. 913). A slow process of adoption leads to meshing new ideas with well-established beliefs and practices. Also, there is a need to build appropriate social infrastructure to support the use of technology (Bielaczyc, 2001; Lipponen, Lallimo, Lakkala & 2006). These social infrastructures include culture (the philosophy and norms established among educators and students), activity (practices), and tools (technology). From this perspective, the social and technical infrastructure is seen as aspects of infrastructure in general, not as two separate entities. And both dimensions have to change simultaneously to achieve an efficient integration of technology.

From the five category analyses, we noted a general picture of the representations of the educational technologies used in the ESPE through teacher-educators' voices. In general, a vision of technology as input for the renovation of teacher-educators' practice emerged, requiring ITC skills and new pedagogical solutions in view of legislative requirements in the training of student-teachers. Student-teachers, although equipped with advanced computer skills, find different difficulties in the use of educational technologies, especially when there is a lack of vision about their usefulness in professional practice.

There may be a disconnection between the institutional ITC systems (mainly based on Moodle) and the digital environment preferred by students (Hannon, Riddle, & Ryberg, 2014): the students often are using alternative or parallel infrastructures (like Facebook, Google Drive, Dropbox, Gmail, Skype) to the institutional offerings (Thomsen, Sørensen & Ryberg, 2016).

Interestingly, the question became whether or not the teacher-educators should embrace and use these new technological ecologies for learning together with the students (El Bialy & Jalali, 2015), and playing "a more active and critical role in disturbing and provoking critical reflections on the tools and infrastructures we use in higher education" (Thomsen, Sørensen & Ryberg, 2016, p. 100).

For both, the technology was not yet "light and invisible", considering the technical difficulties involved in its integration and appropriation. Indeed, we are still far from the perspective of ubiquitous computing, which proposed the role of the computer in helping people reach their goal while the technology is embedded and "silent" in the activity. A growing trend, as is shown with the spread of mobile technologies and the emergence of increasingly miniaturized devices, is establishing the new scenario of the Internet of Things. This process appears to be still in its first development in the educational context, bringing with it related contradictions. The process includes a change in continuity with established standards and value with uncovered tensions between institutional orders and real teaching practices (Lantheaume & Simonian, 2012). Tensions oriented to the evolution of the teaching role, able to enhance the "teacher factor", are defined as the ability of the teacher to influence the effective use of the technology in the school rather than the technology in itself (Starkey, 2011).

Finally, the next section presents the conclusion from our study.

## **Conclusion**

In this paper we built a case for the need for ICT integration in teacher-training institutions in France, starting by considering the "voice" of some teachers' educators. Our attention specifically addressed teacher-educators' opinions about technologies and their arguments

related to their ITC use for the training of teacher-students. We believe the arguments are necessary in order to understand if and how the technologies can be used in the specific cultural context of teacher training in France. The issue of technology integration in educational institutions has been discussed quite frequently in the literature outside of France (e.g., North America) but needs to be explored more in France, focusing on the implementation of training devices and deployment of educational processes, problematizing research and innovation (Choplin et al., 2007).

Although our sample size was limited and does not allow for generalisation, the insights gained regarding the view of ICT in the teacher-training institute, highlighted some contradictions in the dynamics of use and integration of educational technology that emerged from the analysis of contrastive categories. Although we are aware of the limitations in generalising results, given the small sample size and qualitative nature of the study, the tool of the interview was a suitable instrument for our intended purpose, as “a specific setting for the dialogical production of personal narratives and social life” (Tanggaard, 2009, p. 1498). Future research will need to be oriented to a wider quantitative data pool, focusing on teacher-students' perspective and their critical use of technology during teacher training.

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