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Exploring Training to Use Technology Enhanced Learning in a Uruguayan School of Primary Teachers

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Abstract

This study attempted to investigate how are Uruguayans future Primary teachers learning how to teach with technology in a country that is commemorating 10 years' anniversary of their OLPC Program called 'Plan Ceibal'. A case study was chosen to answer the research questions, documents analysis and interviews were the methods selected. Seventeen people were interviewed, teachers and advanced students of an Uruguayan School of Teachers.

Data analysis revealed that current approaches to learning about how to teach with technology are quite basic and technology is treated as an isolated subject, furthermore, Plan Ceibal opportunities are not being fully exploited. Most of the teachers use technology to support their lectures and according to participants, it is barely used in their School of Practices, therefore, students do not have many examples where technology is integrated. Students mentioned they feel their learning is not enough and is outdated.

Findings of the study show there is a need to improve not only the teachers' attitudes towards technology but also their training. Moreover, teachers who integrate technology into their classes and encourage their students to include technology into their practices should be rewarded. Instances to reflect on the role of technology and how current teaching methods could be innovated should also be considered.

Keywords: teacher education, technology, ICT, OLPC, technology integration, attitudes and beliefs.

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1. Introduction

The following dissertation considers the case of an Uruguayan School of Teachers and how the future educators are being trained to teach with technology. It is a case study that focuses their attention in the School of Teachers of the capital of Uruguay, Montevideo.

As it is known, the training of teachers is very important and should be one of the keys to transform education. Many governments around the world have decided to first invest in the implementation of what could be seen, at least at that moment, as high technological device/s to the educational environments (Ringstaff and Kelley, 2002; Lin, 2003; Culp, Honey and Mandinach, 2005; Ng, 2008; Tezci, 2009). There are many examples that are popular, as introducing laptops to the classrooms, interactive whiteboards, tablets, etc. (Fajebe *et al.*, 2013; Haßler *et al.*, 2016; Mathews-aydinli and Elaziz, 2017). These investments are generally quite expensive and usually bursts the classrooms from one day to another. The attention tends to be focused on the students and the technology, but less attention is given to the teachers and their training.

The arrival of technology into Education have come with an inquiry of how to adapt the children and teenagers' program, but on the same way, this has happened to the teaching programs (Haßler *et al.*, 2016). There is an urge to transform the teaching education to try to have graduated teachers with the skills and competencies needed to face and embrace this new context (Goktas, Yildirim and Yildirim, 2008). ICT is an invaluable tool for teaching not only for their career in the schools but also as a medium of

professional development (Kirschner and Selinger, 2003). Among many other, ICT could help teachers and education to improve the learning materials, increasing students' autonomy, foster equal opportunities to every student, increase efficacy, etc. (Kirschner and Selinger, 2003). As the following citation from UNESCO (2016) says:

'With the rapid expansion of opportunities and changes in the 21st century, technology in education has become no longer an option or a choice, but an inevitable reality. Teacher capacity is a core enabler in successfully integrating technologies into teaching and learning, and helping develop the necessary skills in the minds of students' (p.2).

There is a need for a change in Education, especially when it comes to ICT and Teaching training. While each context will determine their own education of teachers, there is a mismatched in the time it takes for the Schools of Teachers to adapt to the new technological changes compared to their students and the societies they are immersed (Kirschner and Selinger, 2003).

In this opportunity, this research tried to put the attention into future teachers, those who will be at the 'front line' in the next years. On the belief that if the teacher education is depth, complex, and it makes students learn and experience a variety of innovative teaching/learning practices, future teachers will benefit from this, embracing technology in a natural and meaningful way (Haßler *et al.*, 2016). Thinking about this phenomenon as the cascade one, where one teacher could flourish many students' teachers to be great professionals. Although the future of education does not have

only one direction, what seems to be very clear is that educational technology will be part of this future (Robertson, 2005).

The national OLPC Program Plan Ceibal is commemorating 10 years old anniversary. It is a well-known plan that has been recognized in many parts of the world, democratizing the access to children and their families to a computer as well as Internet (Rivoir, 2009). About the educational transformation, every child and teacher received a personal laptop called 'XO' or '*Ceibalita'* with many programs and tools tailored to deal with the Uruguayan curriculums (Rivoir and Lamschtein, 2012). Teachers were provided with courses about the XOs (UNESCO, 2011a), but what about the pre-service teachers?

The objective is to understand how teaching staff and their students believe that current approaches to teacher education address the opportunities that Plan Ceibal has provided by giving every student their own personal laptop. For this reason, the main research question is the following:

'How does the Uruguayan School of Primary Teachers prepare their students to teach with technology?'

Subquestions:

1. To what extent and in which ways is technology being used within the School of Teachers?
    1.1 What is the intended curriculum for training about technology and what is enacted in practice?
2. How important is learning to teach with technology for students, teachers and the School of Teachers?

3. How does this training prepare teachers for the Uruguayan OLPC policy Plan Ceibal?
4. How would actors improve the current training to teach with technology?

To try to respond this questions, the views from nine teachers of the School and eight advanced students will be considered. Moreover, the curriculum of the two technology subjects will also be taken into account.

This research is structured in seven chapters, including this introductory one. In the second chapter, Literature Review, the main concepts of ICT and Teacher Education are discussed. Useful models are considered regarding the inclusion of technology into teaching education and key themes are mentioned. The third chapter, Context, describes the main characteristics of the Uruguayan OLPC program and the School of Teachers. In the fourth chapter, the methodology of the study is described, the research design, the sampling, the research methods, the data analysis and ethics are considered. The findings obtained from the interviews and the analysis of documents are described in the fifth chapter. Furthermore, in the following chapter, Discussion, the findings are analysed taking into account the concepts mentioned in the previous sections literature review and context. Finally, in the last chapter, the main research conclusions are detailed together with the limitations and suggestions for future research.

2. Literature Review

2.1. Reasons for including

There seem to be various reasons why ICT have entered education, apart from the obvious reason that it is embedded in many aspects of peoples' lives, there are others that lead the arguments for this inclusion. First of all, there is an line of thinking that believes the school should prepare students for the future world of work (Sanders and George, 2017). In this case, the school should provide computing skills to students to enhance their resumes because from now on every job will require some technological knowledge (Sanders and George, 2017). This argument does not seem very strong considering the fact that with the high speed of technological changes (Benamati and Lederer, 2017), it seems that the knowledge acquired at the school by the time needed these would probably be obsolete.

The second reason is based on the changing of the society from an industrial to an informational one, schools should accompany this transformation by preparing citizens ready to face and be included in this society (Moll, 1998). This is why educational institutions must include ICT so everyone has access to culture and knowledge, moreover, this is an argument that is concerned about the equity access to avoid reproducing the social inequalities (Moll, 1998; Sanders and George, 2017).

There is a third argument more related to educational context itself, where a crisis of methods and pedagogies is occurring. ICT is seeing as a great solution to inject motivation and stop boredom, for both teachers and students (Fullan and Langworthy, 2013). Furthermore, it could be a medium

to increase the educational outcomes of our children, by not only changing the school environments but changing the way students and teachers are learning and teaching (Watson, 2001). As it was presented in the introduction, governments invest large sums of money into educational technology but results and teaching methods have not been revolutionised as it was expected (Sanders and George, 2017). Apparently, in many cases 'the cart has been placed before the horses' (Watson, 2001, p.252).

Seems important for the research to remind that the integration of technology is not about the devices, software, etc. itself but on the way we deal with those in the class (teacher methods) and the topic that is intended to teach (content) (Earle, 2002). The design of learning opportunities and new teaching methods should be the priority in order to achieve a real educational change and transformation through 'new pedagogies in a technology-rich society' (Fullan & Langworthy, 2013, p.1).

2.2. Learning how to teach with technology

It is very important to include ICT training in the teacher education but it seems diffuse how to do it as there are many approaches. For example, some curriculums are only including ICT as a student experience in their learning process but not as a learning how to teach through ICT (Enochsson and Rizza, 2009). Probably with the expectative that their own learning experience could easily transfer into the future classroom with their students.

Another way of introducing ICT is by adding specific subjects to the curriculum, these are typical focused on the basic ICT skills and provide a

set of fundamental competencies to infuse ICT on the classrooms (Watson, 2001; Kay, 2006; Goktas, Yildirim and Yildirim, 2008; Tondeur *et al.*, 2016; Admiraal *et al.*, 2017). Although these courses could be very useful for students' teachers, it is recognised that only this initiative is not enough to ensure the infusion of ICT in Education. The critic is based on the argument that isolated subjects just cause solitary learning practices and students will found it difficult to include it in the rest of their teaching skills (Tondeur *et al.*, 2012, 2016; Admiraal *et al.*, 2017). These subjects tend to be quite theoretical (Goktas, Yildirim and Yildirim, 2008), a study exploring the views of students' teachers in their training to use technology describe them feeling overwhelmed by the quantity of information and in some cases the content was not suitable to their perspectives (Barton and Haydn, 2006).

In other words, Watson (2001) distinguish learning with technology and learning about technology, using the example of learning the parts of a car like the brakes, the engine, etc. but without actually learning how to drive. However, there are some drawbacks when this type of courses are not included in teaching career because it is left to all the subjects and this could lead to a negative impact as no subject feels in charge of this responsibility (Enochsson and Rizza, 2009).

On the other hand, there is an approach of infusing ICT along the curriculum in all subjects, this could lead to a more confident use of the tools as well as more opportunities to use it in real contexts (Kay, 2006). Furthermore, these experiences are seen as a great chance of knowing different teachers approaches, real examples of classes, as well as solving problems on specific subjects (Kay, 2006; Goktas, Yildirim and Yildirim, 2008). Although it counts

with the already mentioned drawback, this is understood as a good approach. For example, Thompson, Bull and Willis (in Goktas et al., 2008) described three principles for learning about teaching through ICT in teacher education, these are ICT should be introduced in all the curriculum, it should be presented in real contexts, and finally, teacher career should provide students with significant and innovative educative experiences related to technology.

2.3. Useful models to consider

It was pertinent to the researcher to include four models or framework to evaluate teacher education regarding technology. The first two, UNESCP ICT-CST and ACOT, intend to describe the place in which teachers are situated according to their technology use and knowledge in a classroom. The rest two, TAM and ACM, aim at identified certain characteristics or subjective aspects that explain and influence educators' inclusion of technology.

While the first two models are descriptive, the others help to understand why the individuals are having certain behaviour towards technology and invite to reflect how certain aspects should be encouraged to improve the current situation.

2.3.1. ACOT

ACOT stands for Apple Classrooms of Tomorrow (Dwyer, Ringstaff and Sandholtz, 1991), although it was created based on observations on a serious of teachers with computer integration in 1990, it is still contemporaneous. This could lead to thinking why on one hand technologies

rapidly changed during a five-year period but a framework for understanding the progression in teacher integration of technology could still work more than 25 five years later.

The framework was built on primary classes but seems useful to transfer it into teacher education. Five progressive stages are defined: Entry, Adoption, Adaptation, Appropriation and Invention. The first one is Entry, this is getting in contact with the technology and using it to support lectures, feelings of frustration and struggling with devices are recognized (Dwyer, Ringstaff and Sandholtz, 1991). In Adoption phase, technology is still used to support traditional teaching methods but teachers are facing the situation with some more enthusiasm.

Adaptation is the first step where the ease of use was recognized by the teachers (Teo, 2010), that is to say, that certain tasks completed through the devices were easy and finished faster than through traditional methods. Teachers are seen more motivated and according to ACOT, this is the stage where teachers began to challenge their beliefs about technology (Dwyer, Ringstaff and Sandholtz, 1991). Appropriation means teachers dealing confidently with ICT and there is a transformation in the teachers' role changing from passing out the knowledge to a facilitating role where collaborative learning is spread. The last stage is Invention and as the name indicates it is changing the teaching and learning experiences for the improvement of their students (Dwyer, Ringstaff and Sandholtz, 1991).

2.3.2. UNESCO ICT-CST

UNESCO (UNESCO, 2011b) have created an *ICT competency framework for teachers*, UNESCO ICT-CST from now on, where three approaches are defined together with six aspects of teachers' work. When the approaches and the aspects are combined in a table the UNESCO ICT-CST is created (UNESCO, 2008). The approaches are Technology Literacy, Knowledge Deepening and Knowledge Creation, are considered as three levels in the teaching career. Whereas the aspects of teachers' work are understanding ICT in Education, Curriculum and Assessment, Pedagogy, ICT, Organisation and Administration and Teacher Professional Learning (UNESCO, 2008). These aspects should be considered as upward levels.

It is important to say that Technology Literacy allows students to use ICT in their learning process but no many aspects of the traditional class changed. Technology Literacy is always the first stage where devices and access are provided for everyone, going back to the reasons governments decide to include technology in education, seems that this approach fits the argument of a society of information and communication. Regarding the teachers, this approach is characterised by basic technology skills and competencies, technology is used to complement certain aspects of the curriculum (UNESCO, 2011b).

On a second stage, there is the Knowledge Deepening, students learn skills and knowledge to apply to the subjects and real world context. In this case, certain changes in the curriculum are made and also the assessment methods include some holistic or wider views on students' performance (UNESCO, 2011b). In this opportunity, teachers deal confidently with

technology and are aware that their position inside of a classroom is to guide students. The teacher is able to design effective group projects in order to solve problems in real contexts situation, the traditional teaching methods are leave behind to a more student-centred approach (UNESCO, 2011b).

Finally, Knowledge Creation is about creating answers to the societies' problems. Teachers not only manage ICT very fluent but also are capable of creating learning opportunities for their students, promoting critical thinking and knowledge creation. Classrooms are more seen as communities of practice where they become familiar with a topic and try to intervene to improve a situation, teachers collaborate among themselves sharing their practices and participating in professional development activities (UNESCO, 2011b). This approach needs a change in the curriculum and also in the school management, as it is not an initiative that could be done by an isolated teacher. What it is also implied apart from teacher education, are policies and changes on institutions and on the educational government (UNESCO, 2011b).

For example, in the Technology Literacy, the different aspects of the teachers' work are described for this approach. *Understanding ICT in education*, it is referred to policy perception; *curriculum and assessment* to the elemental knowledge; and *pedagogy* to the integration of technology into the class (UNESCO, 2011b). About *ICT* it refers to the rudimentary tools; *organization and administration* to the ordinary classroom and *teacher professional learning* to the 'digital literacy' (UNESCO, 2011b, p.9). Each approach count with a specific description of the aspects of teachers' work.

2.3.3. TAM

TAM stands for the Technological Acceptance Model, it tries to explain the relationship between the user and the technology. The attitude could be positive if it is perceived as useful and easy to use (Davis et al. in Teo, 2010). Although this model was created to understand technology acceptance by users in businesses areas, it is now used in educational contexts (Teo, 2010). The model is based on the perceived usefulness and the perceived ease of use, the first one corresponds to consider that technology would enhance their production (Teo, 2010). The second one is about how a person feels that using certain technology will be effortless (Teo, 2010). For example, in a study with student teachers certain educational software were seen as useful but not easy to use (Barton and Haydn, 2006).

In a research that study the pre-service teachers' attitudes toward computer use (Teo, 2010), other aspects were suggested to add to the TAM like subjective norm, facilitating conditions and technological complexity. The subjective norm refers to a person's awareness of people that are important to him/her think about the use of technology. The example given is when a co-worker feel that using a certain software is worth the other person tend to have the same idea (Teo, 2010). The facilitating conditions improve the positive attitude to use computers if there is technical support, information and training, etc. (Teo, 2010). Finally, the technological complexity refers to the extent of difficulty perceived by a user, that is to say, how the technology is perceived as difficult or easy to understand and therefore use (Teo, 2010). Considering a research comparing pre-service teacher training

of two different countries, it was shown how the attitude towards computer use influence in the intention of actually using it (Teo *et al.*, 2009). The good opportunity is that the attitudes are not unchanged and those should be taken into account to provide friendly and useful ICT training to teach through technology to future educators (Enochsson and Rizza, 2009).

2.3.4. Access, Competence and Motivational Model

This model was presented by Viherä and Nurmela in 2001 (Enochsson and Rizza, 2009), it is very simple but it does combine interesting aspects to consider when it comes to teacher education and integration of ICT in the teaching practices. *Access* is given by devices and technical support, *Competence* is the ability to deal with confidence with the different sources available and applying it to teaching classes (Enochsson and Rizza, 2009). *Motivation* is given by the awareness of benefits from teaching with technology (Enochsson and Rizza, 2009). Now, these concepts can make an account when teacher mentors or student teachers are not integrating technology as expected. Problems related to access are given by the lack of resources available, but lack of competence is given by the absence of training and confidence to integrate technology, these are both related to ICT skills and pedagogic arguments. Motivation could not be satisfactory when teaching with ICT is not required or it is not rewarded (Enochsson and Rizza, 2009).

2.4. Key themes regarding the learning how to teach with ICT

It is very important to bear in mind that technology is not and will never be a 'magic bullet' (Earle, 2002) that will solve our educational problems. While

being optimistic about ICT is important, it should never be seen with a naïf perspective (Sanders and George, 2017). Because *'it is not about what technology by itself can do, but what teachers and learners may be able to accomplish using these tools'* (Earle, 2002, no pagination).

Suggestions to improve current approaches were taken from various studies on teacher education and learning to integrate technology. First of all, it is important to focus on the themes regarding the preparation of student teachers. Combining theory and practice, this is applying the theoretical concepts learned and being more consistent in the practice was seen as useful (Tondeur *et al.*, 2012). Having teachers as role models have been seen as a very beneficial aspect, as students can observe good practical examples of integration of technology and feel motivated about it (Barton and Haydn, 2006; Kay, 2006; Tondeur *et al.*, 2012, 2016).

Another theme that is suggested by the research (Earle, 2002; Tondeur *et al.*, 2012), is the possibility of reflecting on technology and education. The role that is given to ICT, the attitudes towards ICT, and making themselves questions like who is in charge of the class, what are the benefit of teaching through ICT to our students and ourselves, etc. It should not be forgotten that teachers are at the centre of any educational transformation and if they perceive more costs than rewards probably when more change is trying to be introduced, the more everything will remain the same (Fullan, 1991). So, if good reasons are given, if they teachers could be motivated, students' teachers would probably improve their attitudes towards ICT. As research has shown (Williams *et al.*, 2000) this attitude and the use of ICT have a significant correlation. It should be about showing that learning to teach

with ICT and then infusing it on their practices will be worthwhile. Because it has been seen how teachers recognized the importance of incorporating ICT but not necessarily do it (Enochsson and Rizza, 2009).

Furthermore, learning how to design classes through ICT, collaborative spaces among students teachers and scaffolding teaching experience through the use of technology have also been recognized as important themes regarding the teacher education (Kay, 2006; Tondeur *et al.*, 2012). Moreover, changing the 'traditional assessment to continuous feedback' (Tondeur *et al.*, 2012, p. 139) have also been identified as a positive theme.

There are other themes that were considered important to teacher education and learning how to teach with technology but are more referred to an institutional level. These are: *'cooperation within and between institutions, staff development, access to resources, systematic and systemic change efforts'* (Tondeur *et al.*, 2012, p. 140).

3. CONTEXT

Plan CEIBAL is the name of the Uruguayan OLPC Program (One Laptop Per Child), it started in 2007 delivering laptops first to Public Primary Schools starting with the Rural Areas (Rivoir and Lamschtein, 2012).

3.1. OLPC

The OLPC Program was created by Negroponte in the MIT Media Lab (Massachusetts Institute of Technology) in 2005 (Sharma, Dedrick and Kraemer, 2009). About the program, it is an initiative of low-cost laptops that could reach millions of kids around the world that other way they could not afford to study with a computer (Warschauer and Ames, 2010). Moreover, it also has a social objective of bringing laptops into the homes of different families and they could benefit from learning through the device. It also intended the accomplish the utopian idea of children that can teach themselves by the only use of the laptop and Internet (Warschauer and Ames, 2010). For the program's mentor, sharing a laptop among a group of students seems as reasonable as sharing a pencil among the same group. Another important fact about OLPC is that the low-cost laptop they used is called 'XO' and they used an open software called 'Sugar' (Ames and Warschauer, 2010). They are designed to be in children's hands, are durable, runs with low battery, tolerates the dust and can be exposed to the sunlight (Sharma, Dedrick and Kraemer, 2009).

OLPC implies three main components: social, educative and technological (Sunkel and Trucco, 2012). The first component has the objective of social inclusion by the democratic access to a laptop and Internet, diminishing the

digital gap in societies. The children and teachers owned their laptops, those are not to keep in the school but to take home and involve the children's families, this is intended to promote other uses apart from the educational one. The educative part pretends to improve education by the incorporation of ICT into the classes promoting the innovation among children and teachers. Finally, the technological component is the one that ensures the infrastructure and connectivity to develop the entire program (Sunkel and Trucco, 2012; UNICEF, 2012).

It was created to reach the more impoverish and remotes areas of the world, to try to bring a revolutionary transformation inside Education. By the beginning, it intended to bring a solution that could fit every context and environment (Sharma, Dedrick and Kraemer, 2009). There are some arguments that claim it was naïve to expect a deep change in Education by the mere incorporation of laptops into the educational environment without taking seriously concern about the political situation, the context, the Internet facilities, among many other factors (Sharma, Dedrick and Kraemer, 2009; Ames and Warschauer, 2010). Certain fundamental aspects of the plan such as the training of teachers and the IT support is a responsibility of each country or region. For this reason, there are different approaches depending on where this program landed (Sharma, Dedrick and Kraemer, 2009), some of the places that have incorporated this plan are Madagascar, Miami, Kenya, Nicaragua, Gaza, etc. (OLPC, no date).

3.2. The Uruguayan case

Uruguay is one of the first countries in the world to implement this program on a national scale (Rivoir, 2009; UNESCO, 2011a; Rivoir and Lamschtein,

2012; Sunkel and Trucco, 2012), so every child and teacher (and teenager as well in Secondary School) that enter to the Public Education will receive a laptop. Students of Teaching careers, receive their laptop in the second year as this is the time when they begin with their professional practices on schools. In the most recent years, the children from kindergarten and the first two years of Primary School, are receiving a tablet that continues with the same rugged characteristics of the XO but those works with Android System (*Tablets Plan Ceibal*, no date).

Uruguay has incorporate technology into the Education since thirty years ago but it was in 2007 that a national program was embraced with the objective of reducing the inequality of access to technology and Internet (UNICEF, 2012). As the access to Technologies of Information and Communication are considered a potential resource of empowerment, human development and social inclusion, Plan CEIBAL was introduced as a way of diminishing the social inequalities produced by a world of informational development and to encourage a society of information and knowledge (Castells in UNICEF, 2012). Plan CEIBAL stands for 'Plan de Conectividad Educativa de Informatica Basica para el Aprendizaje en Linea' in English Plan of Educative Connectivity of Basic Information for Learning Online (Sunkel & Trucco, 2012, p.125), moreover, 'Ceibo' is the National Flower (symbol) of Uruguay.

From the very beginning, Plan CEIBAL makes explicit their two main aims: equality and improvement of the educational quality (Sunkel and Trucco, 2012). The plan was encouraged by the President of the Uruguayan Republic, Tabaré Vazquez which explained *"The strategic principles encompassed by*

*this project include equity, equal opportunities for all children and teenagers, the democratization of knowledge, of the availability of learning tools and of a learning which does not only entail the education provided at schools, but also self-learning through the use of modern technology themselves"(*Presidency of the Republic in UNESCO, 2011, p. 31).

The general objectives of the Plan Ceibal are to contribute to the improvement of the educational quality through the implementation of technology into the classes, the schools and the families (UNESCO, 2011a). Moreover, to promote equal opportunities among all Uruguayan students of Primary School by providing a laptop to each child and teachers (UNESCO, 2011a). Furthermore, to develop a collaborative culture in four lines, child-child, child-teacher, teacher-teacher and child-family-school. Last but not least, to promote literacy and critical thinking (Rivoir, 2009; UNESCO, 2011a; Sunkel and Trucco, 2012).

Regarding the specific objectives of the Plan, these are promoting the use of the laptop as a support for the educational tasks, achieve the training and the continued updates of teachers to encourage their use inside the classes, to produce educational tools for the laptops (UNICEF, 2012). Moreover, to encourage innovation from the teachers, to create areas of IT support so as pedagogical support, to imply the students' families in the adequate and responsible use of the technology; to promote the participation of the stakeholders in the decision making and to encourage the creation and development of new communities of learning (UNICEF, 2012).

Plan Ceibal began in 2007, at the end of the 2016 the initiative was announced by the President through the creation of a decree with the objective of provide with a laptop to every children and teacher of the public education system, train teachers in the use and inclusion of the tool and to promote educational projects related to technology and education (MEC, OEI and Santillana, 2012; Sunkel and Trucco, 2012). By the beginning of 2009, Plan Ceibal has already completed 100% of the Public Primary Schools including students and teachers (MEC, OEI and Santillana, 2012).

3.3. Projects born from the Plan Ceibal

With the implementation of Plan Ceibal in 2007 to these days, numerous projects were encouraged taking the advantage of having this infrastructure. To review just a few of them, the creation of the 'Guri' Program allows the assistance control, the teachers' leave, the students' performance, the enrolment to kindergarten, etc. (CEIP, no date). This program facilitates the work for teachers, employees working for the Public Education, so as families as they could follow their children's performance using the XO or '*Ceibalitas',* as they are frequently called in Uruguay. Even more importantly, there are instant digital records that could be analysed by the government. Moreover, there are some online tests to students, where everybody must attend to it at the same time and the results are rapidly obtained (Trucco and Espejo, 2013).

Regarding innovation, the *Ceibalitas* counts with several platforms specially created and developed to work with the Uruguayan curriculum of Maths, Science, Spanish, etc. (PLAN CEIBAL, no date b). Inside these platforms, teachers could share their class plans and create tests or other resources

tailored to their own group of students. It is intended to deal with virtual learning as students could also access to these platforms and comments on forums, doing homework, etc. outside the school hours (PLAN CEIBAL, no date b). The collaborative work is intended among students but also among teachers that could meet through these platforms and share their experiences and practices (PLAN CEIBAL, no date b), those are called CREA, CREA 2 and PAM. What is more, the implementation of Tech Labs where students work with robots, 3D printers and programming software is one of the most recent incorporations of the Plan Ceibal (PLAN CEIBAL, no date b). There are Scratch competencies among schools, programming videogames, kits for science sensors, etc. All these initiatives are not yet universal to all the schools, but each year the number of resources is increasing (PLAN CEIBAL, no date b).

Furthermore, there is Learning English through Videoconference with foreign teachers from USA, UK, etc. (PLAN CEIBAL, no date a). Almost every urban school (99.8%) counts with the equipment of videoconference installed where they use it to have classes of English through Videoconference (PLAN CEIBAL, no date a). It is a project for Primary and Secondary Schools, students begin with English when they are approximately ten years old.

Another interesting initiative is the Online Library, where more than 4.000 educative contents are freely accessed (PLAN CEIBAL, no date a). From literature books to school books, songs, podcasts, videos, videogames, etc. (PLAN CEIBAL, no date b).

Finally, there is a 'kit of tools' on Ceibal's website for teachers, this includes tools to evaluate, create presentations, looking for information, chat with other teachers, etc. (PLAN CEIBAL, no date b). Every teacher has a personal Ceibal account where they could access to get to these materials (PLAN CEIBAL, no date b).

3.4. The Uruguayan Training of Primary Teachers

The context of this research is the Uruguayan School of Primary Teachers situated in the capital of the mentioned country. The career last four years and the certificate graduated students receive is not a university degree but a tertiary education, teachers graduated from this public school will be able to work in both public and private sector of education (ANEP, 2007). Although the career is available to study in the 19 Uruguayan departments, the school selected is the one situated in Montevideo. It is a public institution that depends on the Consejo de Formacion en Educacion (Teacher Training Council) that is part of ANEP, Administracion Nacional de la Educacion Publica, in English National Administration of Public Education (OEI, no date).

ANEP is responsible for the Primary and Kindergarten Education, Secondary Education, Technical Education and Training in Education (Administracion Nacional de Educacion Publica, no date). The government of Education in Uruguay is quite complex, as there is more than one actor in charge of important areas of the Uruguayan Education (Mancebo, 2006). The other actors are the Ministry of Education and UdelaR that is the Republic University, both are responsible for other Educational sectors (Mancebo, 2006).

Studying in these institutions is free of charge and the career takes four years, however, only one out of ten students graduated in the mentioned time frame (El Observador, 2017). It is a career that demands a large amount of time as from the second year all students should start their practice on different types of schools. On average, students spent weekly almost 38 hours between classes and practices (CFE ANEP, 2009). Many students should start working to maintain their cost of living, more than 60% of students of teaching careers declares to have a job (ANEP and CFE, 2015). This is probably one of the main reasons why they take so long to complete the career.

The population of the students is formed by 90% of women (ANEP and CFE, 2015). Taking the census of 1996 and 2011, the number of students enrolled in this career had a minimum increased compared to the beginning of the period (González, González and Macari, 2013). However, it is interesting to mention that the number of students opting for teaching career has exponentially (46%) grown over the same time frame, other training options like secondary teachers are preferred (González, González and Macari, 2013).

About the curriculum of the teaching career and technology, there are two subjects especially concerned about this topic (CFE ANEP, 2009). On the second year, there is 'Computing' with three hours per week course and on the third year, there is another subject with two hours weekly of 'Education and Integration of the Digital Technologies' (CFE ANEP, 2009). Considering the total hours students are meant to be in the School or school practices,

the first subject represent 6.8% of the total hours while the second subject stand for 5.4% of the total hours of the third year of the career.

4. METHODOLOGY

4.1. Research design

A qualitative case study research was chosen to answer the main research question '*How does the Uruguayan School of Primary Teachers prepare their students to teach with technology?'*. Considering this question, there is a need for collecting data in a qualitative approach to explore and understand the current situation of the Uruguayan School of Primary Teachers regarding the training to use technology to students (Flick, 2014). For this reason, an exploratory case study was selected, as it is 'an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources' (Jack & Baxter, 2008, p.544). Case studies focuses on a particular topic to gain insights that through other type of research would not be possible to get it (Denscombe, 2007; Cohen, Manion and Morrison, 2011; Yin, 2012), because 'the aim is to illuminate the general by looking at the particular' (Denscombe, 2007, p.36). This type of research concentrates on 'effects in real contexts' (Cohen et al., 2011, p.289) and try to understand cause and effect (Cohen, Manion and Morrison, 2011) putting emphasis on the context (Robson, 2011).

Furthermore, it seems appropriate as case studies tend to explain *why* certain situations are happening, it weighs the process and relationships rather than the outcomes (Denscombe, 2007). It is an exploratory case study because it meant to explore the different issues concerning the training of future teachers regarding technology (Denscombe, 2007). Case studies understand that there are so many variables acting on the same case that it needs more than one tool for data collection (Denscombe, 2007;

Cohen, Manion and Morrison, 2011). It seems very suitable for answering the research questions as case studies are concerned about a specific matter, the feelings and perspectives of the participants (Cohen, Manion and Morrison, 2011).

This research is a qualitative one as it implies an interpretative approach to the events the researcher wants to study putting emphasis on people and their contexts (Bloomberg and Volpe, 2016). It could be easily categorised as qualitative as it intended to understand the complexities of perspectives from the protagonists of the School of Teachers at a certain period of time, it attempts to narrate the 'meaning of the findings from the perspective of the research participants' (Bloomberg & Volpe, 2016, p.41).

The paradigm used was interpretive because it is defined by a worry for the individual and the subjective (Cohen, Manion and Morrison, 2011). Moreover, it 'emphasize the meaningful nature of people's participation in social and cultural life. The focus is on an analysis of the meanings people confer upon their own and others' actions' (Robson, 2011, p. 527). Because the world is a social creation and the only way of knowing it is through the eyes of the people that are living in a certain context of interest for the researcher (Denscombe, 2010; Grbich, 2013).

In this research, interviews and data analysis were the methods used for the data collection.

4.2. Sampling

The selected sample was a non-probability sample as it does not intend to represent the whole population, it is specially used in small scale research

(Cohen, Manion and Morrison, 2011). There were two groups selected to interview and these were advanced students and teachers of the School of Teachers of Montevideo.

The participants were selected in two groups by a convenience sampling, this is choosing the participants that meet the researcher requirements and the most '*accessible at the time*' until the sample size is completed (Cohen et al., 2011, p.156). These type of sampling is usually used in case studies because it does not intend to represent another group but itself (Cohen, Manion and Morrison, 2011).

By advanced students, the researcher understands a student that has already completed at least 70% of the teaching career. Students interviewed were generally between their third or fourth year on the career. The other group were teachers working at the School of Teachers of Montevideo regardless of their job position. The sample included eight advanced students, seven women and one man and nine women teachers, in total seventeen people were interviewed.

4.3. Research Methods

As it was mentioned, the case study uses various methods for the data collection, in this case, interviews and data analysis were the methods selected.

4.3.1. Interviews

Individual interviews were used because it is an appropriate method to get information about a complex phenomenon that could not be answered by

yes or no questions (Denscombe, 2007). Interviews have other advantages as they facilitate to reach to participants' perspectives about a subject and interviewer could ask for immediate clarification (Greenfield and Greener, 2016). For this reason, semi-structured interviews were carried out by the researcher. This type of interview is more flexible as it allows the interviewee to develop their own ideas about the topic asked by the researcher (Denscombe, 2007). Two alike question guides were created for the teachers and advanced students, although it has one unique question for each group, the idea was that it should be as similar as possible. Although each interview was different as each actor respond differently, the order and the sequence of the questions were predetermined in advance, this increases the exhaustiveness of the data and the comparability (Cohen, Manion and Morrison, 2011).

For the creation of the question guides, the researcher used other studies in the same field (Williams *et al.*, 2000; Brush and Van-nest, 2003; Valcke *et al.*, 2007; Enochsson and Rizza, 2009; Tondeur *et al.*, 2016) to take interesting question that were suitable for these research questions. Like Newton said '*If I have seen far, it is by standing on the shoulders of giants'* (Newtonn in Scotchmer, 1991, p. 29).

As the researcher was not travelling to Uruguay, the interviews were coordinated by email and were carried out by video-conference or phone calls whichever was more comfortable for the interviewees. The seventeen interviews started on the 23 of June and ended in the 13 of July.

4.3.2. Analysis of Documents

Data Analysis is a primary source of qualitative data and it is a very good method to get information and confirm data obtained through the interviews (Flick, 2014; Bloomberg and Volpe, 2016). Documents can help to show new insights on the case selected as it contains explicit information about the phenomenon. It could also aid to understand why certain topics are dealt in a specific way by the protagonist of the case (Denscombe, 2007).

The main data are the two programs of the technology subjects of the teaching career, these are 'Computing' and 'Education and Integration of Digital Technologies'. These are official and state documents (Flick, 2014) and were obtained through the Internet.

4.4. Data Analysis

Thematic coding analysis was used to analyse the qualitative data, the codes and themes were inductively developed as they emerged from the data (Flick, 2014; Robson and McCartan, 2016). The researcher followed a guideline described by Robson & McCartan (2016) where they suggested five phases into the thematic coding analysis. To start with the coding analysis one should be very familiar with the data, this means transcribing the interviews and reading the information together with the subjects program several times. The second stage is to create '*initial codes',* this is to identify pieces of information that are of value for the research, those could be repeated along the documents or not. The third phase is to '*identify themes'* (p.469), this is connecting codes that correspond to a similar topic or situation and create a possible theme (Robson and McCartan,

2016). Then, '*constructing thematic networks'* and finally, '*integration and interpretation*' (p.469) of those themes.

A table with the themes and the codes obtained from the data could be seen in the next image:

Table 1. Themes and Codes inductively developed.

THEME	SUB-THEME	CODE
Technology use	Technology presence	Subjects
		Expository
		Moodle
		Televisions
	Considerations on these uses	Basic
		Outdated
	Intended curriculum vs. enacted	Subject program
		Student disagreement
	Good practices	Practice
		School
Role of technology	School vision	No vision
		Clear vision
		Trying/making efforts
	Importance of technology in Primary School	Not the most important
		Educative use
		Digital natives
	Benefits	Society of information and communication
		Looking for information
		Distance learning opportunities
		Motivation
		Working with disabilities
		Future job opportunities
		Others
Readiness for OLPC program	Plan Ceibal	Perspective/attitude
		Challenges
	Near future practice	No change
		Technology integration
	Obstacles	Teachers
		IT issues
Suggestions for the future	Teachers mentors	Training
		Mandatory use of tech
		Avoid perpetuation
		Others
	Curriculum	Transversal trainning
		Focusing on Ceibal
		More practical, less theory
		Others

4.5. Trustworthiness

Trustworthiness is paramount of importance in qualitative research, in this opportunity, the suggestions made by Lincoln and Guba (Elo *et al.*, 2014; Shenton, 2016) were considered along with the different stages of this study. These are credibility, conformability and dependability.

4.6. Ethics

The ethical part of the research was very important during the design, the data collection and the analysis of this work. Based on the Ethical Guidelines for Educational Research provided by BERA (Bera, 2011) and also the Code of Research Conduct and Research Ethics provided by the University of Nottingham (The University of Nottingham, 2010). The ethics statement was approved by the committee of the University of Nottingham before starting this project.

To call the participants, the researcher elaborated an information sheet where all the main details about the research and the participation in the interviews could be found. There was also a consent form sent to the potential participants where they should decide whether to take part in the research or not by agreeing on the terms and conditions. Seems important to say that those documents included the statement of audio recorded, anonymity, confidential and security protection of information and finally, it states that material will be stored and then destroyed by the University of Nottingham. Moreover, in both documents, the contacts of the researcher, the supervisor and the ethics coordinator were provided. Once they were informed and agreed to participate, the interviews were coordinated. It is

very important to count with informed and voluntary participants that were given all the information needed to decide whether to collaborate or not (Denscombe, 2007; Flick, 2014; Robson and McCartan, 2016).

Although the School of Teachers could be identified because it is the only public institution of these characteristics in the capital of the country selected, the participants cannot be identified as they were given a different name making it impossible to recognise their speeches. In other words, confidentiality and anonymity were assured (Denscombe, 2007; Bell, 2010; Cohen, Manion and Morrison, 2011). To help the reader recognise the interviewees' group, the advanced students are mentioned by their first pseudonym name, while the teachers by their pseudonym surnames, for example, Lauren and Mrs. White respectively.

5. Findings

Overall, this chapter will present the findings obtained from the seventeen interviews and the two subject programs of Computing and Technology.

The information was divided into four main sections, derived from the thematic coding and the research questions. In this section, the headings of the segments correspond to a sub-question research. In the next section, discussion, the reader will find that the headings take the name of the theme. For example, the question '*how does this training prepare teachers for the Uruguayan OLPC Program?'* has been changed to 'Readiness for OLPC Program'.

5.1. To what extent and in which ways is technology being used within the School of Teachers?

5.1.1. Uses

According to four students and three teachers, the main use of technology is given by the screening of presentations to support lectures. In words of Amelia *'It is used to make presentations, like many years ago when I was in secondary school and they projected slides, now they are using PowerPoint or another modern tool but the way is the same, I haven't seen other strategies to use technology in the School of Teachers, with the exception of some particular case'*.

Another use of technology is the platform Moodle called 'Campus', in Alyssa's voice: '*There are some subjects that upload the material into the Campus'.*

The School count with Televisions on the classrooms, on Mrs. Jones words '*Today we have televisions in almost every classroom'.*

Moreover, the students count with a *Ceibalita* from the second year of the career, Mrs. Jones said '*every student have the Ceibal devices because when they begin with the practice in the second year they should use it'.*

About the participants' perspective on this technology use, seven students and two teachers believe it is quite basic especially considering the Uruguayan OLPC program. Mrs. Smith best illustrates this idea*: 'I think the use of technology is very poor taking into account the existence of Plan Ceibal'.*

Furthermore, two teachers complained about the students' attitude towards technology, on Mrs. Taylor's words: *'The students only take notes on their notebooks, even if they have the laptop, they depend on the paper'.*

5.1.2. What is the intended curriculum for training to teach with technology and what is enacted in practice?

There were differences between what subjects' programs promised and students' speeches. First of all, there was a strong disagreement with the content of this subjects as seven out of eight students considered it is very basic and outdated. On Katie's words*: 'What it is learned is outdated for students of this era (…) while it is logical that some time ago learning about the Internet was a priority as not all students knew about it or could get access to it, now it is not practical nor useful'*.

The first subject students studied on the second year is 'Computing' (CODICEN, 2009), it combines theory and practice and the contents are divided into three main units: Computing concepts, Communication and Information nets, and uses in Education. Mainly each unit has three or four themes to work, in the first unit concepts of computing, computing science and fundamental concepts (like software, hardware, etc.) are included. The second unit works with what is the Internet and the search of information. Finally, the last unit has three main themes: which type of computing should be taught depending on the age, the relationship between math and computer science, introduction to LCMS and creating content in the classroom.

The second subject is 'Education and Integration of Digital Technologies' (CODICEN, no date), the reason of this subject is Plan Ceibal because it has modified the role of the teacher and the methods to a more student-centred approach. For this reason, there is a need for exploring new ways of teaching, taking into account the collaborative learning and the universal access to technology. Moreover, their objectives are to train teachers who could face with success the educational challenges of this era. Their contents are divided into four units, the educative institution in new contexts, learning environments on Internet, 1:1 model Plan Ceibal and selection and production of multimedia sources.

While the first unit contains themes more theoretical like digital natives, new ways of learning, the creation of Google, etc. the other ones implies some practical aspects. For example, the second unit deals with social media and other tools of communication, collaboration and production (wiki, blogs,

MOOC, etc.). The third unit is related to the model 1:1 and the themes are related to the Xo and how to develop activities on those devices. Lastly, it is not detailed the themes but it is suggesting using apps for the classroom and the school, incorporating cell phones, cameras, mp3, and other technological devices.

Along the students' interviews, the lack of agreement with the contents suggested reasons like learning basic tools, four students suggested this idea, in Francesca's voice: *'We learned how to use Google Drive, Word, PowerPoint, and other presentations tools like Prezi'.* Moreover, three students believe there is no connection with Plan Ceibal, Alyssa said '*We don't have a deep knowledge regarding the Ceibal technology, all the apps and tools related to the Ceibalitas are never treated in the class'.* Finally, Amalia expressed '*It is different what it is on the program and what we actually work during classes'.*

5.1.3. Good practices

This question intended to identify experiences that students considered inspirational on the use of technology. Five out of eight students referred to their professional practice as being the place where they find meaningful experiences, for example, on Olivia's voice: *'I had the opportunity to observe a teacher that worked everything through ICT, half of the day with the computer and the other half using the regular notebooks'.*

Moreover, the use of the Ceibal's platforms CREA 2 and PAM were also named by students. Inside the School of Teachers, two students referred to

the computing subjects, for example, Peter said: *'learning how to use Scratch was very significant to me'*.

Overall, there seem to be differences between the intended curriculum and what it is learned by the students assisting to these courses. The use of technology is identified with the two technology subjects and the employ of slide shows. Good practices are recognised by the students and the majority took place during their professional practice.

5.2. How important is learning to teach with technology for students, teachers and the school of Teachers?

5.2.1. Vision

In this case, almost all of the students (seven out of eight) mentioned they do not consider that the School of Teachers has a clear vision of the use and integration of ICT. Lauren encapsulated this idea on the following quote: '*There is no clear vision at all, there is no vision about why, for which proposes and how to use technology in teaching, we are learning technology as users but not as future teachers'.* Among the teachers, four out of nine believes there is no clear vision while there are two that thinks the opposite. Here the two opposite positions:

Mrs. Smith: 'There is no clear vision, it depends on each teacher if they want to incorporate technology into their subject or not'

Mrs. Brown: 'There is a clear vision, teachers of computing have shown students how to integrate technology, when to do it and with which purposes'.

Furthermore, the rest of the teachers (three) and three students considered the School is trying to overcome this situation although actions taken are still not enough to defeat the circumstances. Mrs. Taylor said '*Many things are trying to be done, we have offer courses for teachers and students, however, we are not receiving any support from the users'.*

Some of the reasons that could explain the lack of clear vision could be related to two different but related reasons, the inclusion of technology depends on the teachers' will and elderly teachers refrain from incorporating ICT. The first argument is supported by three students and three teachers, Mrs. Lewin sums up this idea: '*It depends on the teachers' taste (…) there is nothing on the program that emphasises the use of technology'*. Furthermore, Mrs. Robinson summarize the second argument mentioned by two students and two teachers, '*Teachers were prepared with a different frame of mind, some of us are old and it is not easy for us to change and adapt to the new technologies'*.

5.2.2. Importance of technology in Primary School

Considering the importance of teaching with ICT in Primary Education, all interviewees agree it is very important.

Three teachers considered that technology is an important tool but it is not the most important of primary education. According to Mrs. Robinson: *'Technology is important, but it is not the most important, it is a tool, it opens lots of possibilities, but you do not solve anything just with technology, the most important thing is the teacher education (…)'.*

Another repeated argument mentioned by two students and three teachers were the need of using the laptops with educational motives: *'one should work harder to use it for educational purpose and not just use laptops for fun, I see lots of teachers that keep on using it 'ok, now if you have finished go and play with your laptop while the rest finished their work' (Mrs. Wood).*

Furthermore, three students and one teacher infer the concept of 'digital natives' to express the importance of including ICT into teaching. In Amelia's voice: '*It's important because children were born in a technological world, they were barely born with a smartphone on their hands and perfectly knows how to deal with the tools'.*

5.2.3. Benefits of teaching and learning with technology

A common aspect seen in the interviews when this question was asked, is that everyone tends to say there *are 'unlimited possibilities with teaching through technology'*, but providing concrete examples seems harder. Another repeated argument at the beginning of their answers was that school could not be out of what is happening in the societies regarding technology. Five teachers and three students shared this view, Lauren's quote summarizes the idea: '*I believe in the world we are living technology play a part, so the schools could not get out of that, because if not it will remain isolated'.*

The most repeated benefits among teachers were looking for information in a critical way, six out of nine holds this belief. Three students also share this view, Ella said:

'they should be able to look for information but also they should learn how to differentiate the good and the bad, the real from what it is not real, there are many things that are not true, they shouldn't stay with the first information that they found'.

Distance learning opportunities was a benefit mentioned by four teachers, however, in the School of Teachers, all the courses required attendance. Mrs. Jones said: '*the ease of working distantly, create a group of work with other colleagues or peers with no need of leaving your place'.*

Moreover, benefits regarding the motivation, increasing of attention and stopping boredom was mentioned by five students and three teachers: *'When using the computers children are happier and students concentrate more' (Francesca)*

Furthermore, two students and two teachers recognised benefits related to working with children with disabilities or learning, in Katie's own words: *'I saw a kid with motor difficulties using GeoGebra, this child by the regular methods of using rule and compass could not accomplish the activity and would have felt very frustrated'.*

Finally, two students considered technology will enhance the future career of the children: '*In the future, they will know how to deal with a computer since they were kids, this is going to offer some new job opportunities' (Ella).*

Some other benefits mentioned by few participants were new forms of assessing students, online assessing with immediate results, an increase of students' autonomy, multiple representations, collaborative work and families' involvement.

Overall, teaching with technology seems very important for Primary Education, so it is very important to train future teachers in this respect as it could bring several benefits. However, according to ten participants the School of Teachers does not have a clear vision on how to use and incorporate technology into teaching and this is causing problems in the training of the next teachers' generation.

5.3. How does this training prepare teachers for the Uruguayan OLPC policy Plan Ceibal?

5.3.1. Participants' perspectives of Plan Ceibal

Plan Ceibal is considered to be positive by all participants, among the students the agreement is more solid. The following quote exemplified the advanced students' view: *'I think it is a great contribution and we should adapt the class, it is not going to replace us, on the contrary, it complements us and it helps us (…) we should see Ceibal as an ally, not an external agent, it is one of the pillars of our education today' (Alyssa)*

Six students and five teachers considered that Plan Ceibal has helped to diminish the digital gap and democratize the access to computers and the Internet to children and their families. Mrs. White said *'I found it wonderful the digital inclusion of Plan Ceibal, it is a right that is acknowledged in the Educational Law and Plan Ceibal puts into practice'.*

However, five teachers and four students claimed it was an imposed program and teachers were not considered on the implementation. In words of Mrs. Robinson:

'the problem that we had is that it was imposed, we didn't have a training in the beginning, we were face to an entirely new system to use, a new tool, with a complete ignorance, because we didn't know in what consisted (…) but we should have had a better training'.

Four teachers mentioned the great opportunities given Ceibal like robotics, English classes, the platforms, the Guri program, etc. For example, Mrs. Foster said: '*The platforms are fabulous to work with children, it is an amazing resource because it allows you endless possibilities'.*

Finally, three teachers and one student believe Plan Ceibal is being underused, in words Mrs. Lewis '*I believe Ceibal has many positive tools but we are not taking advantage of it, we are using less than 50% of what we could use because we don't have the knowledge, nor the connectivity needed, nor the laptops in good conditions, nor the training and preparation needed for teachers to work 100% with Plan Ceibal'.*

5.3.1.1. Challenges

Seven students and five teachers agreed they must adapt and integrate technology, while four students and seven teachers believe lifelong learning is their major challenge. In the participants' voice: *'the challenge is to adapt, to be trained and using it wisely' (Lauren),*

'The challenge is the training, we as teachers know that our training does not finish when we graduated from the School of Teachers, it should be a permanent education, unfortunately, some teachers just stay with what they learned at the School' (Mrs. Brown).

5.3.2. Near Future Practices

When interviewees were asked about how they imagined they will be teaching in five years ahead (to teachers the question aimed at imagining the recently graduated teachers), five students and three teachers believe that everything will be pretty much the same as today:

'There is not much progress since I graduate from Primary School till now that I'm seeing classes with the professional practice, I wish everything would change more to a technological context and new ways of learning and teaching, I keep on seeing much of what I saw when I was at school and it's been twelve years, in fact, computers are rarely used, this is my experience' (Francesca).

Five teachers and three students believe in a positive change regarding the integration of technology, these students considered that although the integration of technology will be imminent, the traditional methods will persist. Ella said *'I believe in five years technology will be much more integrated than today, maybe we are just working with the laptops and no paper (…) but the way of teaching will be the same, what will change is the medium'.* The five teachers supporting this positive change based their argument on the belief that new generations have a new mindset, therefore, they will have no trouble incorporating technology, in words of Mrs. Brown:

'They are all young generations, young people use technology and use it applied to Education, they have a different vision, they have been trained differently, they have a different frame of mind, they are digital natives, the change will be important'.

It seems clear how among students, this positivism does not exist as five out of eight students believe their practice will remain the same as today. However, teachers do state a different position, arguing that as they are young they will infuse technology into their practices. Regarding this argument, it seems important to hear to Katie commenting about the new teachers: *'Everything is very traditional therefore the views of the teachers are like that too, even young teachers that have been educated in the traditional school, and it is very hard for us to change it'.*

5.3.3. Barriers for the inclusion

The first obstacle mentioned by all the participants was related to IT problems, this is technical issues and connectivity problems: *'Computers got stuck and there are problems connecting to the net, this generates frustration and demotivation to use the tools' (Mrs. Robinson).*

This barrier generates fear, loss of time and are a good excuse for those who are not in favour of using technology. In words of Katie: *'When we have an assessment in the schools, we give a class and there is a group of teachers and the school's director evaluating us. I cannot lose time connecting the technology because it something goes wrong, then the entire class is going to be wrong (…) So, you choose not to include technology in the first place, because you are afraid that something wrong would happen'.*

Regarding the teacher seen as an obstacle, there were six students and three teachers that argued the lack of teachers' training is a difficulty to students to learn and teach with technology, in Mrs. Taylor's words:

'the obstacle is the teacher because if we do not give the example, we do not motivate students to incorporate technology into their teaching practices, what future teachers are going to do when they will face a group? Learn all from zero after graduating? I don't think so because our education is not preparing teachers to be autonomous'.

This is in consonance with the argument two students and one teacher presented, Peter illustrates this idea *'One repeats what has seen in their teaching career, so if you are not seeing examples on how to integrate technology, then you are not going to integrate it either'.*

The lack of attitude was a barrier only mentioned by teachers, five out of nine teachers believe that there is a negative attitude among some teachers towards the use of ICT, and therefore technology is not being used. In words of Mrs. Smith: *'a lack of attitude of wanting to be trained, because we count with the tool but then if it is not incorporated we are not going to see many changes'.*

Overall, Plan Ceibal is positively perceived by the participants, the challenges identified are lifelong learning and adaptation to technology. About the future practices, there are two possible scenarios, one is the same as today, and the other one is the inclusion of technology into teaching practices. Students who believe technology will be integrated, think the teaching methods will not change. Finally, the major obstacles to teach with ICT are IT problems and teachers' lack of training or attitude to work with technology.

5.4. How would actors improve the current training to teach with technology?

These suggestions were divided into two categories, one regarding teacher mentors and the other one to the curriculum.

With reference to teachers, four students and two teachers suggested training teachers, Olivia best illustrates this idea by saying '*Teachers mentors should know better (...) I would say training them so they could train us'.* Mandatory use of technology was proposed by two students and two teachers, for example, Mrs. Taylor said: *'I believe that until we as teachers do not get a specific score (on their formal evaluation) for the use of technology, nobody is going to change anything (…)'.*

Furthermore, two students and one teacher considered that the perpetuation of teachers should be avoided, Mrs. White expressed: '*there are teachers that remain since too many years in their job positions (…) they keep on managing to stay and this end up being harmful, because they resist the changes, we should find a way of renewing the human resources, so they could try different things and enrich the School'.*

Another suggestion was improving salary conditions, Mrs. Robinson said '*Improve training as well as salary conditions';* give economic reward to those that incorporate technology, Mrs. White proposed '*paying extra to those who are working with technology';* having teachers from other professions to enhance the training, Lauren claimed '*We need other professionals to enrich the career, and they need us as well';* and enable

students to evaluate teachers best illustrated by Katie saying *'we should be able to evaluate teachers and now we can't do it'.*

Regarding the curriculum, six teachers and three students suggested that there should be a transversal training to use technology along the different subjects, Mrs. Wood proposed: *'Technology should be integrated into all the subjects, teaching how to use technology from that area, it should be transversal to the entire teaching career and not only a couple computing subjects'.*

Another priority mentioned by four teachers and four students was focusing the contents on the Ceibal's opportunities. In words of Alyssa:

'Include training in the use of the Xo or the tablets the children have, we graduate from the career without training in it, therefore you get into the school and you are faced with a tablet or a Xo without a minimum idea on how to deal with it'.

Participants also considered the training of the computing subjects should be more practical and less theoretical, Amelia best illustrates the idea that four teachers and three students suggested: *'I believe the learning should be applied to the classroom, because it is there where we will teach, we learnt how to be computer users and that makes no sense'.*

Other suggestions concerned the creation of virtual learning opportunities inside the school, Mrs. White proposed '*we could include blended courses'*; changing the teaching practice *'there are things that need to change in the professional practice, it should be detached from the traditional methods and be more like a technology lab where they could try new practices'* (Mrs.

White) and solving the IT issues *'We need the technology in the proper conditions, working and connected'* (Mrs. Jones).

5.5. Summary of findings

Before moving to the next section seems important to summarize the findings seen in this chapter. First of all, the use of technology was seen in the technology subjects and the use of presentations like PowerPoints, the contents of those subjects were considered by students to be basic and outdated and there is certain mismatch between the intended programs versus the enacted. Good practices were described and many of them were experience during their professional practice.

About the role of technology, ten participants believe the School of Teachers does not have a clear vision of the use and inclusion of ICT. However, teaching with technology was considered very important by all the participants and several benefits were identified. Among them, the most repeated were looking for information, distance learning opportunities, motivation, etc.

Regarding the future teachers' readiness to work with Plan Ceibal it could be said that it is seen as a positive plan that has brought challenges to the teaching profession. These are lifelong learning and adaptability (to technology), moreover, participants imagine two possible scenarios when it comes to future practices, everything remains the same as today or technology is integrated into teaching. Students who hold this last belief also think that the teaching methods will not change. Finally, interviewees

identified two main barriers when it comes to the inclusion of technology, these are IT issues and teachers, their lack of attitude and training.

To end, the suggestions to improve the current situation include the training of teachers, mandatory use of technology, avoid the perpetuation of teachers. About the curriculum, participants proposed transversal training to use technology, focusing on Ceibal opportunities and include more practice than theory.

6. Discussion

The objective of this chapter is to synthesize the findings and answering the four sub-research questions that helps to answer the main one: How does the Uruguayan School of Primary Teachers Prepare their Students to Teach with Technology?

It will be divided into four main sections: technology use, role of technology, readiness for the OLPC program and priorities regarding the training to teach with technology.

6.1. Technology use

The use of technology remains quite isolated into the computing subjects and in other subjects to complement lectures, finally, a platform Moodle exists. Moreover, many participants considered the use to be quite basic and some teachers complained about the students' attitudes.

According to Cuban (Russell *et al.*, 2003), this is because teachers do not know how to incorporate into their instructional classes and the school has not been adapted to the infusion of ICT. The author argues that as a result the use of laptops support existing teaching methods rather than to innovate (Cuban, 2002) because their use is related to a special occasion or an 'add-on' to the traditional curriculum (Russell *et al.*, 2003).

Regarding the students' attitude, seems interesting to consider the TAM model. Students are said to be 'paper-dependant', this could be because they are not perceiving usefulness nor effortlessness in the use of

technology (Teo, 2010). At the same time, this could also explain why teachers are not incorporating technology into their classes.

Taking the models into account, it could be said that the current use of technology could be situated in the Technology Literacy approach of ICT-CST (UNESCO, 2011b), as it is used to complement the traditional teacher approach and access is provided. Considering ACOT, it could also be said that they are still in the Entry or Adoption stages (Dwyer, Ringstaff and Sandholtz, 1991) because they are using technology to support traditional practices. Regarding the ACM Model, from this section, it could be said that the Access is provided.

6.1.1. What is the intended curriculum for training about technology and what is enacted in practice?

As it was mentioned in the last chapter, there are two specific subjects dealing with technology contents, there was some discordance between the intended program and the enacted. Furthermore, the vast majority of students considered the contents to be basic and outdated.

According to research (Tondeur *et al.*, 2012, 2016; Admiraal *et al.*, 2017) isolated subjects could cause isolated knowledge making it hard for students to incorporate technology into their teaching practices. While these courses are necessary, those are not enough for future teachers to educate with technology (Enochsson and Rizza, 2009).

As it was mentioned, this kind of courses especially focused on the development of technological skills and basic competencies (Watson, 2001; Kay, 2006; Goktas, Yildirim and Yildirim, 2008; Tondeur *et al.*, 2016;

Admiraal *et al.*, 2017), however, students believe the contents are not suitable. This is not an exception among students and their learning to teach with ICT, previous research has shown how students tend to disagree with the subjects' contents (Barton and Haydn, 2006).

Judging from the list of contents of the 'Computing' subject (CODICEN, 2009), it could be said that there is a difference in learning how to teach with technology and learning about technology (Enochsson and Rizza, 2009). As it was already mentioned, the metaphor of learning the parts of the car seems quite clear in this context, because learning what is Internet, Software, Hardware, etc. will not teach students how to 'drive', in this case, how to teach with technology (Watson, 2001). About the second subject, combining theory and practice was considered a key aspect by research (Tondeur et al., 2012). However, the program promised to deal with Plan Ceibal and students complained the lack of Ceibal's contents. Although the program should teach about Plan Ceibal, what it is not included in their units are the recent incorporation of Tablets and the GURI Program. Both will be part and parcel of a graduate teacher life, therefore it should be studied on the career.

6.2. Role of technology

Overall, technology is considered important by the actors, however, there seems to be no clear vision of how to use and incorporate it into the teaching and how to make students learn how to teach with technology more effectively. It all depends on the teachers' will to teach to use technology or not and elderly teachers are obstructing the inclusion of ICT. Benefits of teaching and learning with ICT are recognized but in general, the most

repeated demonstrate that participants have a quite limited idea of the potential of technology into teaching practices.

6.2.1. The need of Vision

Having a clear plan is a very important aspect of learning how to teach with technology, the International Society for Technology in Education (ISTE) states that educators in management positions should have a shared vision of how to incorporate ICT in Education (ISTE, no date). Furthermore, the '*vision building'* is a key aspect to integrate a change in educational institutions because *'it permeates the organization with values, purpose, and integrity for both the what and how of improvement'* (Fullan, 1991, p. 81). This vision should be known by all the actors involved in the change, as it is a way of giving meaning to the use of technology and how it will improve the teaching condition (Ertmer, 1999; Ertmer and Albion, 2001; Valcke *et al.*, 2007). Probably this lack of vision is also influencing the benefits perceived by the actors.

According to the extension made by Teo (2010) to the TAM Model, the subjective norm was found to be an influence aspect when it comes to teachers' attitudes to computer use. These elderly teachers that are not using technology are negatively influencing other colleagues and students because it refers to the importance people give to another person's behaviour or attitude regarding the use of ICT. So as incorporating technology is not compulsory on the rest of the subjects, these teachers are hindering the use of technology and the construction of a shared vision.

6.2.2. Importance in Primary Education

Participants insisted on giving an educative use to computers instead of a recreational one, also some interviewees insinuate the term 'digital natives' to refer to the children students.

The fact that giving an educational use to the laptops was a repeated topic is putting in evidence that computers are being utilized as a reward when students succeed on a task or when there are special occasions (Williams *et al.*, 2000). This is reinforcing the idea that the use of Plan Ceibal is still peripheral in some primary schools and it is seen as a complement (Cuban, 2002) instead of a teaching strategy.

The digital native term is suggesting a distance between teachers and children at school and this is causing a dichotomy. It has been demonstrated that not because one has born in a technological context (Bennett, Maton and Kervin, 2008; Selwyn, 2009) should be an expert dealing with ICT. It is generating a negative barrier because the technological competence depends on many factors, the attitudes, the behaviour, the training but it is not related to an objective characteristic as it could be the age of the user (Selwyn, 2009).

6.2.3. Benefits perceived by the actors

A considerable number of participants mentioned that it is important for schools to include technology as we are living in a society of information and communication. The benefit more repeated among interviewees was looking for information. Furthermore, participants mentioned benefits regarding distance learning opportunities, motivation, increase of attention

and stop with the boredom, enhance the curriculum for future job opportunities and working with special needs students.

The argument of the society of information and communication has been described as one of the reasons to include ICT in Education (Moll, 1998; Sanders & George, 2017). Looking for information is in close connection with such society and it could be interpreted as an add-on to traditional teaching methods where technology is used to support or complement traditional class (Russell et al., 2003; Williams et al., 2000).

The other repeated topic referred to motivation, increase of attention and stop boredom, this is also a 'promise' of the inclusion of ICT in Education (Sanders & George, 2017), where technology came to end the educational problems (Fullan and Langworthy, 2013). However, this is not as simple as everyone would want, technology would transform education depending on the pedagogic use (Sanders & George, 2017) it is given by school and teachers.

Furthermore, the argument of working with technology since early ages will enhance the curriculum on a future job career has been demonstrated to be wrong (Sanders & George, 2017) due to technological skills change very rapid and probably those gained at school will be obsolete by the time a student get into the world of work.

None of their arguments, but for singular exceptions, suggested a change in their methods to a more student-centred oriented, rethinking the relationship teacher-student, the way contents are treated, teacher professional development through technology, etc. There seems to be a

naïve perspective towards the benefits or potential benefits of infusing technology into the teaching practices, participants were quite narrow on their descriptions but for the distance learning opportunities and attention to kids with special needs. This is showing signs that the training to use technology is not exhaustive and until teachers and students are not fully prepared other benefits will not be realized (Russell et al., 2003).

According to studies (Enochsson & Rizza, 2009; Sime & Priestley, 2005), teachers recognized certain benefits of teaching with ICT but usually fail on the complete incorporation into their practices. Judging by the section Technology Use, it could be said that this is probably what is happening to the teachers and students interviewed.

In addition, considering the TAM model, there was no mention of any benefit regarding the usefulness of technology. This is reinforcing what was seen in the previous section, participants are not perceiving that technology will enhance their job performance (Teo, 2010) and this is influencing on their attitude to use it.

In this section, it has been strengthened the idea that the School is situated on the Technology Literacy approach according to the UNESCO ICT-CST and on the Entry and Adoption phases of ACOT. Because teachers are using technology to support some of their practices (Dwyer, Ringstaff and Sandholtz, 1991), but they understand that having the access to digital technologies is very important for students. Although curriculum remains the same, teachers try to adopt it in some activities and ICT is used to preparing certain classes (UNESCO, 2011b). Regarding the ACM model, it could be said that Motivation is not perceived as there is not a complete

awareness of more interesting benefits of learning and teaching with technology.

6.3. Readiness for the OLPC Program

To understand the students' readiness for the OLPC Program seems important to analyse the attitudes and challenges towards the Plan Ceibal, how do participants imagine giving classes in five years and which are the obstacles they identified from teaching and learning with technology. It could be said that future graduated teachers are not completely prepared to work with the OLPC. Changes should be considered to improve the current situation and be more prepared to exploit the Ceibal's opportunities.

6.3.1. Plan Ceibal

The participants see Plan Ceibal as a positive plan, democratizing access to technology and the Internet to children and their families, with brilliant platforms to work with children. Students have a more solid positive attitude towards the plan. However, interviewees believe teachers were not considered and that the implementation (ten years ago) was not the most appropriate. Some of the interviewees recognized that Plan Ceibal is underused due to a lack of training and issues related to connectivity and technical support. Both groups of participants acknowledge the same challenges for teachers, these are adapting and integrating technology and lifelong learning.

It is very important that Plan Ceibal counts with a good acceptance from teachers and students as it is a good start to keep on infusing technology into the teaching training career. As it was said, there is a correlation

between the attitude towards technology and their use (Williams et al., 2000). Although as it was mentioned, the current use of technology is quite poor.

Plan Ceibal is a massive inversion on educational and like every change, it is a process not an episode, therefore, asking teachers to adapt their thinking and behaviour is very complicated and should not be underestimated (Fullan, 1991). Therefore, training and assistance are essential to the process of change, it should not be surprising that teachers in the teacher education are not deeply familiar with the new technologies.

As it was mentioned earlier, computers are underused because it is not clear how to incorporate it into the teaching methods (Cuban, 2002). Apart from being a worrying situation and an apparent waste of money, students are not seeing teaching examples nor inside the school nor in their practice schools (Barton and Haydn, 2006; Kay, 2006; Tondeur *et al.*, 2012, 2016). Lack of role models will cause the persistence of this situation in the following years, this is keeps on seeing technology as an isolated area that it is used to complement certain practices.

The challenges recognised by both groups could be seen as an opportunity for change as actors are recognizing the need to integrate technology and being updated. Although according to participants Plan Ceibal has not been incorporated 100% into the School of Teachers, seems interesting to perceive it has brought changes to the teaching career and the profession like the need of lifelong learning.

6.3.2. Future Practices

Participants were asked how they imagined teaching in five years, two scenarios described their answers. On one hand, everything remains quite the same as today, on the other hand, there are positive changes.

The ones holding the first position believe the context will remain the same so the future teachers' mindset will keep on traditional. Unfortunately, students (five out of eight) do not perceive the barriers obstructing the integration of ICT will be overcome in a near future.

About the second perspective, teachers based their argument on the fact that future generations were born in a technological context and this will be transmitted into their teaching practice. Being raised in a technological context does not determine to teach with technology. Research has shown (Russell *et al.*, 2003; Bennett, Maton and Kervin, 2008; Enochsson and Rizza, 2009) that what it is needed is pedagogic knowledge and some technological skills that could help young teachers incorporate ICT into their practices. Moreover, students that believe technology will be integrated believes that teaching methods would not change. It should be interesting to reflect on more uses and benefits regarding the inclusion of ICT that could question the way it is taught today so they can innovate (Cuban, 2002; Earle, 2002; Tondeur et al., 2012).

6.3.3. Factors inhibiting the use of ICT

There are mainly two types of obstacles recognised by participants when it comes to learning to teach with technology, 'human factors and physical factors' (Sime & Priestley, 2005, p. 136). The first one is concerned with

teachers and their need of training and change of attitude towards technology and the second is related to issues regarding connectivity or technical support to fix the laptops.

If students and teachers are perceiving more costs than rewards regarding teaching with technology, it would probably result in the situation to remain the same without major changes (Fullan, 1991). Moreover, it is interesting how lack of knowledge or interest from the teachers' mentors and technical problems has already been identified as obstacles in other studies considering pre-service teacher training (Enochsson & Rizza, 2009; Sime & Priestley, 2005; Williams et al., 2000).

Problems related to Internet connections and technical issues like broken laptops were the major obstacle for all the participants in this study. These are identified as *'first-order barriers'* (Ertmer, 1999, p. 50), these are external obstacles and it could be easily sorted with economic investment. This is causing feelings of frustration and demotivation as technology does not work as expected, and more worryingly are the detrimental consequences as the loss of time trying to make it work prevents participants from including technology in the first place (Ertmer, 1999).

However, the teachers' attitude seems to be more determined in influencing whether or not technology is used. These are *'second-order barriers'* (Ertmer, 1999, p. 51), thoughts or beliefs about teaching and technology, are not easy to change and could have a deeper impact on the integration of technology (Ertmer, 1999). Because although IT problems are a real struggle and affects the use of technology, if teachers have a positive attitude towards ICT they would find a way of still teaching with it. As it was

mentioned, there is a correlation between the attitudes to technology and their use (Sime & Priestley, 2005; Williams et al., 2000). This is an alarming situation, on one hand, there seems to be a positive attitude to the Plan Ceibal but on the other hand, the same could not be said with respect to teaching with ICT. As has been said in this chapter, teacher mentors are very important to students' training, therefore counting with teachers with a negative attitude to work with technology is a concern because students are not seeing the opportunities of working and teaching with ICT. If teachers' beliefs about technology could be changed, this would positively impact on the use of ICT (Russell et al., 2003). However, in the current situation, students are not being motivated to include ICT on their training practice and they would not be asked to include it either.

6.4. Priorities regarding the training to teach with technology

Participants were very keen on giving suggestions on how to improve the current training to use technology that students are receiving in the School of Teachers. Suggestions were grouped into two categories, teachers and curriculum. Regarding the first category, the proposal includes more training, mandatory use of technology, avoid the perpetuation of teachers, among others. Concerning the curriculum, participants suggested transversal technology training, focusing on Ceibal's opportunities, more practical knowledge, etc.

Listening to actors' suggestions to improve the present situation is paramount of importance as they are the ones that would transform education (Fullan, 1991). Regarding the teachers, training was seen as fundamental to improve the current situation, if teachers integrate

technology and count with the necessary knowledge of technology, students will be motivated to integrate technology in their practices too.

In the ACM Model, it seems that in this situation access is provided but there is a need to boost competence and motivation. The student teachers' inclusion of technology is determined by the examples, this is, having teachers as role models (Barton and Haydn, 2006; Kay, 2006; Enochsson and Rizza, 2009; Tondeur *et al.*, 2012, 2016) for this reason, seems urgent to concentrate on teacher mentors to improve their attitudes and competence towards ICT to positively influence on future teachers. Moreover, this training should consider the normal schedule an average teacher has, this is working most of the time on double shift. Courses should not be on extra hours or on holidays as this is detractor factor to gain assistances.

Mandatory use of technology and rewards for those teachers working with technology seem to be interesting ideas to accelerate the change. A grant or reward for those implementing technology and collaborating into teaching to use technology has been demonstrated by research to be successful (Enochsson & Rizza, 2009).

Concerning the curriculum, the infusion of technology along all the subjects was the most mentioned suggestion. Participants were not implying removing the computing subjects of the curriculum but to integrate technology into all the areas, this would help students to feel more confident and have more examples of applied teaching technology (Kay, 2006; Goktas, Yildirim and Yildirim, 2008). Moreover, combining less theory and more practice on the computing subjects has also been suggested by previous

research (Tondeur *et al.*, 2012) as an important aspect and it was described as one of the three principles for successful learning about teaching through ICT (Thompson, Bull and Willis in Goktas et al., 2008).

With regards to Plan Ceibal, students and teachers believe it would be better to exploit more their possibilities. Research suggests that instead of trying to make students learn about a wide range of concepts, it is better to concentrate on some uses so students could improve their confidence and set a base of good examples to use in their practices (Barton & Haydn, 2006). Later, those students could keep on updating into new technology uses.

7. Conclusions

This study aimed at exploring how does the Uruguayan School of Primary Teachers prepare their students to teach with technology. The motivation for this study was the 10 years' anniversary of the OLPC Program Plan Ceibal and how the future generation of teachers is being trained to teach with technology.

According to the models, it could be said that the use, the teaching with ICT and the learning how to teach with technology is still on developed phases. Regarding UNESCO ICT-CST teachers are situated on the Technology Literacy phase. Concerning the ACOT model, teachers are still on the stages Entry and Adoption. About the TAM model, it could be said that either the ease of use or the usefulness of technology was not acknowledged by participants. The subjective norm was seen as an influencing factor that, among other reasons, prevents technology to be integrated. Finally, regarding the ACM model, it was seen how while Access is provided there is a clear need to improve and enhance Competence and Motivation with training and more instances to reflect on the benefits and role of technology.

As has been shown in this dissertation, the learning how to teach with technology seems quite basic according to participants. Although students count with two specific subjects those are not enough to make future teachers incorporate technology into their practices.

About the subjects' contents it should be differentiated the learning about technology and learning how to teach with technology, it should be

emphasized the development of competent teachers and not 'competent users'.

The description of benefits perceived by participants evidenced their knowledge and how ICT is treated along the career, seeing it as an isolated subject. According to TAM Model, it should be appropriate to create instances where teachers could recognise that certain uses of technology are very convenient and easy to incorporate.

Although there is a very good acceptance of Plan Ceibal, there is a need to improve the teachers' attitudes towards teaching with technology. As has been explained, there is a correlation between the attitude towards ICT and the use of technology. There is a clear need for more training opportunities to teachers mentors and students, not only to make them feel more competent but also to transform their attitude with respect to ICT. The creation of a shared vision seems imminent to enhance the current approaches.

Teacher education should not be taken for granted and believe that because this generation of students was born in a technological context they would find it easy to incorporate ICT into their teaching. It has been demonstrated that role models are capital to learn so teachers should teach with the example. There is a need for a change to take more opportunities of the Plan Ceibal, but actions should contemplate teachers on the first place and not giving simple answers to complex problems.

The findings of this study, reaffirm on the first place how fundamental teachers are so as their training. Because the educational change clearly

does not depend on the technology but on the way technology is embraced, teach and learn. Teachers are the agent of change, for this reason, it is fundamental to try to change teachers and students' beliefs about technology. This is what will determine, together with other aspects, the training to use technology of the next teachers' generation.

7.1. Limitations of the Study

To begin with, the major limitation was that the researcher was not in the same country as the participants. This had caused that the interviews had to be done by phone calls and, the minority, by videoconference. The natural setting of the School of Teachers, the facial gestures, their reactions to questions were lost because of the way it was done. On the same way, the researcher considers that having included class observations would have enriched the study. Especially to help to answer some of the research sub-questions like *'to what extent and in which ways is technology being used'* or *'what is the intended curriculum and what is enacted in practice?'.*

Another limitation was the teachers' participants because two-thirds of them were suggested by the Director of the School of Teachers. This had probably affected their speeches and this had also influenced the findings.

Moreover, about the interviews' guides, it would have been interesting to explore their personal relationship with technology. Although it was not part of this study, it would have enhanced the study to compare their educative use with their personal use. Last but not least, included a survey would have brought enriching data, especially to gather information regarding the use and frequency of technology, having a scale on how they feel towards the

training, etc. It would have taken more time to find more candidates to complete the survey but it would have been great data to complement with interviews.

7.2. Recommendations for future studies

For future studies, limitations of this research should be considered. Moreover, it would be interesting to keep on exploring the teacher training to use technology, especially identifying which are the aspects that encourage or hinder the use and integration of technology. In addition, as it was seen that attitudes towards ICT have a correlation with the use of technology, would be interesting to explore the attitudes of the teachers and students on this respect. Furthermore, longitudinal studies observing advanced students on their final year of the career and their first steps as teachers would be very interesting as well. Finally, as students mentioned the best experiences regarding teaching and technology happened during their professional practice, studying the school of practices would be truly enriching for the improvement of the Uruguayan Teacher Education.

References

Administracion Nacional de Educacion Publica (no date) *ANEP*. Available at: www.anep.edu.uy (Accessed: 23 August 2017).

Admiraal, W. *et al.* (2017) 'Preparing pre-service teachers to integrate technology into K–12 instruction: evaluation of a technology-infused approach', *Technology, Pedagogy and Education*. Routledge, 26(1), pp. 105–120. doi: 10.1080/1475939X.2016.1163283.

Ames, M. and Warschauer, M. (2010) 'CAN ONE LAPTOP PER CHILD SAVE THE WORLD'S POOR?', *Journal of International Affairs*, 64, pp. 33–51. doi: 10.2307/24385184.

ANEP (2007) 'Sistema Unico Nacional de Formacion Docente 2008', pp. 1–118.

ANEP and CFE (2015) 'Los estudiantes de formación en educación'.

Barton, R. and Haydn, T. (2006) 'Trainee teachers' views on what helps them to use information and communication technology effectively in their subject teaching', *Journal of Computer Assisted Learning*, 22(4), pp. 257–272. doi: 10.1111/j.1365-2729.2006.00175.x.

Bell, J. (2010) *Doing your Research Project*. fifth edit.

Benamati, J. and Lederer, A. L. (2017) 'Rapid Information Technology Change , Coping Mechanisms , and the Emerging Technologies Group Rapid Information Technology Change , Coping Mechanisms , and the Emerging Technologies Group', 1222(August). doi:

10.1080/07421222.2001.11045663.

Bennett, S., Maton, K. and Kervin, L. (2008) 'The "digital natives" debate: A critical review of the evidence', *British Journal of Educational Technology*, 39(5), pp. 775–786. doi: 10.1111/j.1467-8535.2007.00793.x.

Bera (2011) 'Ethical Guidelines for Educational', *British Educational Research Association*, p. 5. doi: 978-0-946671-32-8.

Bloomberg, L. D. and Volpe, M. (2016) *Completing your Qualitative Dissertation*. third. United States of America: Sage Publications.

Brush, T. and Van-nest, M. H. (2003) 'Integrating Technology in a Field-Based Teacher Training Program : The PT3 @ ASU Project', *Educational Technology Research and Development*, 51(1), pp. 57–72. doi: 10.1007/BF02504518.

CEIP (no date) *Guri*. Available at: http://www.ceip.edu.uy/programas/guri (Accessed: 4 July 2017).

CFE ANEP (2009) 'Plan 2008 de Formacion de Maestros de Educacion Primaria'.

CODICEN (2009) 'Informática , 3er año Núcleo de Formación Profesional Común', pp. 466–468.

CODICEN (no date) 'ed_integr_tecno_digital.pdf'.

Cohen, L., Manion, L. and Morrison, K. (2011) *Research Methods in Education*. 7th edn. Abingdon.

Cuban, L. (2002) *Oversold and Underused Computers in the classroom*. second. United States of America: Harvard University Press.

Culp, M., Honey, M. and Mandinach, E. (2005) 'A RETROSPECTIVE ON TWENTY YEARS OF EDUCATION TECHNOLOGY POLICY *', 32(3), pp. 279–307.

Denscombe (2010) *Ground Rules for Social Research: guidelines for good practice*. second. Berkshire.

Denscombe, M. (2007) *The good research guide: For small-scale social research projects*. 3rd edn. Open University Press.

Dwyer, D., Ringstaff, C. and Sandholtz, J. H. (1991) 'Changes in teachers' beliefs and practices in technology-rich classrooms', *Educational Leadership*, 48(8), pp. 45–52. Available at: http://coe.nevada.edu/nstrudler/ACOTMay91.pdf.

Earle, R. S. (2002) 'The Integration of Instructional Technology into Public Education: Promises and Challenges', *Educational Technology-Saddle Brook Then Englewood Cliffs Nj*, 42(1), pp. 5–13. Available at: http://74.125.155.132/scholar?q=cache:T-ke9I1HqaIJ:scholar.google.com/+Rodney,+2002+technology+integration&hl=en&as_sdt=0,36&as_vis=1.

Elo, S. *et al.* (2014) 'Qualitative Content Analysis : A Focus on Trustworthiness'. doi: 10.1177/2158244014522633.

Enochsson, A. and Rizza, C. (2009) 'ICT in Initial Teacher Training: Research Review', *Education*, 38(38), pp. 1–41. doi:

10.1787/220502872611.

Ertmer, P. A. (1999) 'Addressing First- and Second-Order Barriers to Change : Strategies for Technology Integration', 47, pp. 47–61.

Ertmer, P. A. and Albion, P. R. (2001) 'Beyond the foundations : integration of technology', 46(5), pp. 34–38.

Fajebe, A. A. *et al.* (2013) 'Is the One Laptop Per Child Enough ? Viewpoints from Classroom Teachers in Rwanda', 9(3), pp. 29–42.

Flick, U. (2014) *An Introduction To Qualitative Research*. 5th edn. London: Sage Publications.

Fullan, M. (1991) *The New Meaning of Educational Change*. second. London: Cassell Educational Limited.

Fullan, M. and Langworthy, M. (2013) 'Towards a new end: New pedagogies for deep learning', *Collaborative Impact*, (June), p. 31. Available at: http://www.newpedagogies.nl/images/towards_a_new_end.pdf.

Goktas, Y., Yildirim, Z. and Yildirim, S. (2008) 'A review of ICT related courses in pre-service teacher education programs', *Asia Pacific Education Review*, 9(2), pp. 168–179. doi: 10.1007/bf03026497.

González, F., González, M. and Macari, A. (2013) 'Evolución de las profesiones docentes en Uruguay. Desafíos para la próxima década'.

Grbich, C. (2013) *Qualitative Data Analysis*. second edi. Sage Publications.

Greenfield, T. and Greener, S. (eds) (2016) *Research Methods for*

Postgraduates. third edit.

Haßler, B. *et al.* (2016) 'PERSPECTIVES ON TECHNOLOGY , RESOURCES AND LEARNING', *Faculty of Education, University of Cambridge*.

ISTE (no date) *ISTE*. Available at: https://www.iste.org/standards/standards/standards-for-administrators (Accessed: 23 July 2017).

Jack, S. and Baxter, P. (2008) 'Qualitative Case Study Methodology: study design and implementation for novice researchers', *The Qualitative Report*, 13, pp. 544–559.

Kay, R. H. (2006) 'Evaluating Strategies Used To Incorporate Technology Into Preservice Education Evaluating Strategies Used To Incorporate Technology Into Preservice Education: A Review Of the Literature', *Journal of Research on Technology in EducationOnline) Journal Journal of Research on Technology in Education*, 384(July), pp. 1539–1523. doi: 10.1080/15391523.2006.10782466.

Kirschner, P. and Selinger, M. (2003) 'The state of affairs of teacher education with respect to information and communications technology', *Technology, Pedagogy and Education*, 12(1), pp. 5–17. doi: 10.1080/14759390300200143.

Lin, T. (2003) 'Education , technical progress , and economic growth : the case of Taiwan', 22, pp. 213–220. doi: 10.1016/S0272-7757(02)00030-4.

Mancebo, M. E. (2006) 'La educación uruguaya en una encrucijada: entre la inercia, la restauración y la innovación', pp. 1–26.

Mathews-aydinli, J. and Elaziz, F. (2017) 'Turkish students ' and teachers ' attitudes toward the use of interactive whiteboards in EFL classrooms', 8221(August). doi: 10.1080/09588221003776781.

MEC, OEI and Santillana (2012) 'Experiences de implementacion de las Tecnologias de Informacion y Comunicacion en educacion', *Revista Paraguaya de Educacion*, 2.

Moll, M. (1998) 'No more teachers, no more schools: information technology and the "deschooled" society', *Technology in Society*, 20(3), pp. 357–369. doi: 10.1016/S0160-791X(98)00021-9.

Ng, P. T. (2008) 'Educational reform in Singapore : from quantity', pp. 5–15. doi: 10.1007/s10671-007-9042-x.

El Observador (2017) *Las clases comienzan con 300 cargos de maestros vacantes*. Available at: www.elobservador.com.uy/las-clases-comienzan-300-cargos-maestros-vacantes-n1039957 (Accessed: 1 January 2017).

OEI (no date) 'El Personal Docente: Situacion y Formacion'.

OLPC (no date) *OLPC*. Available at: one.laptop.org (Accessed: 4 July 2017).

PLAN CEIBAL (no date a) *Ceibal en Ingles*. Available at: ingles.ceibal.edu.uy (Accessed: 23 August 2017).

PLAN CEIBAL (no date b) *Plan Ceibal*. Available at: www.ceibal.edu.uy (Accessed: 4 July 2017).

Ringstaff, C. and Kelley, L. (2002) *The Learning Return On Our*

Educational Technology Investment A Review of Findings from Research WestEd ®.

Rivoir, A. (2009) 'Innovación para la inclusión digital. El Plan Ceibal en Uruguay', *Mediaciones Sociales*, (4), pp. 299–328. Available at: http://europa.sim.ucm.es/compludoc/AA?articuloId=746753&donde=castellano&zfr=0.

Rivoir, A. and Lamschtein, S. (2012) 'Cinco años del Plan Ceibal', p. 112.

Robertson, S. L. (2005) 'Re - imagining and rescripting the future of education : global knowledge economy discourses and the challenge to education systems Re-imagining and rescripting the future of education : global knowledge economy discourses and the challenge to education s', *Comparative Education*, 41(August), pp. 151–170. doi: 10.1080/03050060500150922.

Robson, C. (2011) *Real world research: A resource for users of social research methods in applied settings*. 3rd edn. Wiley-Blackwell (an imprint of John Wiley & Sons Ltd).

Robson, C. and McCartan, K. (2016) *Real World Research*. fourth.

Russell, M. *et al.* (2003) 'Examining Teacher Technology Use', *Journal of Teacher Education*, 54(4), pp. 297–310. doi: 10.1177/0022487103255985.

Sanders, M. and George, A. (2017) 'Viewing the changing world of educational technology from a different perspective: Present realities, past lessons, and future possibilities', *Education and Information Technologies*.

Education and Information Technologies. doi: 10.1007/s10639-017-9604-3.

Scotchmer, S. (1991) 'Standing on the Shoulders of Giants: Cumulative Research and the Patent Law', *Journal of Economic Perspectives*, 5(1), pp. 29–41. doi: 10.1257/jep.5.1.29.

Selwyn, N. (2009) 'The digital native - myth and reality', *Aslib Proceedings*, 61(4), pp. 364–379.

Sharma, P., Dedrick, J. and Kraemer, K. L. (2009) 'One laptop per child', *Communications of the ACM*, 52(6), p. 66. doi: 10.1145/1516046.1516063.

Shenton, A. K. (2016) 'Strategies for Ensuring Trustworthiness in Qualitative Research Projects research projects', (July 2004). doi: 10.3233/EFI-2004-22201.

Sunkel, G. and Trucco, D. (2012) 'Las tecnologías digitales frente a los desafíos de una educación inclusiva en América Latina: Algunos casos de buenas prácticas', p. 266. Available at: http://repositorio.cepal.org/handle/11362/21658.

Tablets Plan Ceibal (no date). Available at: http://www.subrayado.com.uy/Site/noticia/36133/llegaron-las-tablet-del-plan-ceibal-a-ninos-de-inicial-y-primaria (Accessed: 4 July 2017).

Teo, T. *et al.* (2009) 'Assessing the intention to use technology among pre-service teachers in Singapore and Malaysia: A multigroup invariance analysis of the Technology Acceptance Model (TAM)', *Computers and*

Education. Elsevier Ltd, 53(3), pp. 1000–1009. doi: 10.1016/j.compedu.2009.05.017.

Teo, T. (2010) 'A path analysis of pre-service teachers' attitudes to computer use: applying and extending the technology acceptance model in an educational context', *Interactive Learning Environments*, 18(1), pp. 65–79. doi: 10.1080/10494820802231327.

Tezci, E. (2009) 'Teachers ' effect on ict use in education : the Turkey sample', 1, pp. 1285–1294. doi: 10.1016/j.sbspro.2009.01.228.

The University of Nottingham (2010) 'Code of Research Conduct and Research Ethics', 4(March 2013), p. 15. Available at: http://www.nottingham.ac.uk/ris/local/research-strategy-and-policy/Code_of_Conduct(Version_3_January_2010).pdf.

Tondeur, J. *et al.* (2012) 'Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence', *Computers and Education*. Elsevier Ltd, 59(1), pp. 134–144. doi: 10.1016/j.compedu.2011.10.009.

Tondeur, J. *et al.* (2016) 'Preparing beginning teachers for technology integration in education: ready for take-off?', *Technology, Pedagogy and Education*. Routledge, 5139(August), pp. 1–21. doi: 10.1080/1475939X.2016.1193556.

Trucco, D. and Espejo, A. (2013) *Principales determinantes de la inegracion de las TIC en el uso educativo. El caso del Plan CEIBAL del Uruguay*.

UNESCO (2008) 'ICT Compentency Standards for Teachers. Implementation Guidelines. Version 1.0', *United Nations Educational, Scientific and Cultural Organization, UNESCO*, p. 17.

UNESCO (2011a) *Plan CEIBAL in Uruguay. From Pedagogical Reality to an ICT road map for the future*. Edited by G. Cyranek.

UNESCO (2011b) *UNESCO ICT Competency Framework for Teachers*.

UNESCO (2016) *Diverse Approaches to Developing and Implementing Competency-based ICT Training for Teachers: A Case Study vol. I*.

UNICEF (2012) *Cinco a�os del Plan Ceibal: algo m�s que una computadora para cada ni�o*.

Valcke, M. *et al.* (2007) 'ICT teacher training: Evaluation of the curriculum and training approach in Flanders', *Teaching and Teacher Education*, 23(6), pp. 795–808. doi: 10.1016/j.tate.2007.02.004.

Warschauer, M. and Ames, M. (2010) 'Can One Laptop Per Child Save the World's Poor?', *Journal of International Affairs*, 64(1), pp. 33–51. Available at: http://eds.a.ebscohost.com.librarylink.uncc.edu/ehost/pdfviewer/pdfviewer?sid=243021bd-7340-4a92-b10a-57c9c336719c@sessionmgr4005&vid=2&hid=4208.

Watson, D. (2001) 'Pedagogy before Technology: Re-thinking the relationship between ICT and Teaching', *Education and Information Technologies*, 6(4), pp. 251–266.

Williams, D. *et al.* (2000) 'Teachers and ICT: Current use and future

needs', *British Journal of Educational Technology*, 31(4), pp. 307–320. doi: 10.1111/1467-8535.00164.

Yin, R. K. (2012) *Applications of Case Study Research*. third edit.

Appendices

Appendix A. Interview guide – Advanced Students

Greetings and starting

Attitudes and practices:

- Which is the current use of ICT in the School of Teachers?
- Does the School have a clear vision about the use of ICT in Education?
- What learning experiences from your education at the School of Teachers were the most meaningful for helping you to integrate technology in your teaching practice?
- Which are the main benefits of teaching and learning with technology?
- Which are the main hinders of teaching and learning with technology?

Curriculum:

- How important is technology to Primary classes?
- What would you add/change to your teaching education to feel better prepared to integrate technology in your teaching practice?

Teacher role:

- How do you imagine yourself teaching a class in five years? It is similar than today?

- What should be the role of teachers nowadays? What should a teacher be able to do with technology?

Plan Ceibal:

- What is your opinion about Plan Ceibal?
- What do you think are the challenges for the teachers?

Final question:

- What would you say to the government if you have the chance of changing some of the decisions relating to teaching and technology?
- There is anything else you would like to add?

Thanks and ending.

Appendix B. Interview guide – Teachers

Greetings and starting

Attitudes and practices:

- Which is the current use of ICT in the School of Teachers?
- Does the School have a clear vision about the use of ICT in Education?
- Which are the main benefits of teaching and learning with technology?
- Which are the main hinders of teaching and learning with technology?

Curriculum:

- How important is technology to Primary classes?
- What would you add/change to the teaching education to make future teachers feel better prepared to integrate technology in your teaching practice?

Teacher role

- How do you imagine the next generation of educators will be teaching a class in five years? It is similar than today?
- What should be the role of teachers nowadays?
- What should a teacher be able to do with technology?

Plan Ceibal

- What is your opinion about Plan Ceibal?

- What do you think are the challenges for the teachers?

Final question:

- What would you say to the government if you have the chance of changing some of the decisions relating to teaching and technology?
- There is anything else you would like to add?

Thanks and ending.

Appendix C. Information Sheet

Postgraduate Research Study: Exploring training to use technology enhanced learning in a Uruguayan School of Primary Teachers.

Information Sheet

You are being invited to be involved in this research study. Before you decide whether you want to take part, it is important for you to understand why the research is being conducted and what your participation will involve. Please take time to read the following information carefully. Please contact me if anything is unclear or if you would like more information. Thank you for reading this.

Aims: The aims of the project are to gather information about how future teachers are being prepare to teach with technology in a country that is commemorating ten years of the OLPC Plan Ceibal. It is hoped the study will contribute research to School of Teachers in Uruguay/Montevideo and the on-going OLPC Program Plan Ceibal, and more broadly at the regional and international level.

Requirements: The interview will be carried via Skype or phone calls in June. The interview will be based around a semi structured interview pattern and will take up to 40 minutes. It is intended as an opportunity for you to express your views on the current approach to technology on your teaching/learning activities (which corresponds teacher/student), including, but not restricted to:

- Practices related to ICT
- Attitudes towards ICT
- Role of the Teacher on these days
- Perspectives of Plan Ceibal

The interviews will be recorded, and later transcribed into text form.

Please note that:

- You can decide to stop the interview at any point
- You do not need to answer questions that you do not wish to
- Your name will be removed from the information and anonymized. It would not be possible to identify anyone from my reports on this study.

It is up to you to decide whether to take part or not. If you decide to take part, you are still free to withdraw at any time and without giving a reason. If you withdraw from the study all data will be withdrawn and destroyed. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form.

Once the thesis arising from this research has been completed, a brief

summary of the findings will be made available by the researcher upon application. It is also possible that the results will be presented at academic conferences and journals. The data will be kept securely for ten years from the date of publication, before being destroyed.

Researcher
Camila Gottlieb
Student / University of Nottingham,
Telephone: +440755093473
Email: ttxcg28@nottingham.ac.uk or camigottlieb@gmail.com;

Supervisor
Shaaron Ainsworth
Director of Postgraduate Research, Professor of Learning Sciences
Tel: +44 115 846 7671
Email: shaaron.ainsworth@nottingham.ac.uk

The contact details of the Research Ethics Coordinator should you wish to contact them: educationresearchethics@nottingham.ac.uk

Appendix D. Participant Consent Form

PARTICIPANT CONSENT FORM

Project title: Exploring training to use technology enhanced learning in a Uruguayan School of Primary Teachers.

Researcher's name: Camila Gottlieb

Supervisor's name: Shaaron Ainsworth

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.
- I understand the purpose of the research project and my involvement in it.
- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.
- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.
- I understand that I will be recorded during the interview.
- I understand that data will be stored at the University of Nottingham and only the researcher, and her supervisor will have access to it and after ten years all data will be destroyed.
- I understand that I may contact the researcher or supervisor if I require further information about the research, and that I may contact the Research Ethics Coordinator of the School of Education, University of Nottingham, if I wish to make a complaint relating to my involvement in the research.

Signed …… (research participant)

Print name ……
Date ……

Contact details

Researcher:

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School of Education Research Ethics Coordinator:
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Appendix E. Uruguayan Research Permission

Administración Nacional de Educación Pública
Consejo de Formación en Educación

Ac. Sec. 20
Res. 28
Exp. **2017-25-5-005647**
VB/ap

Montevideo, 20 JUN. 2017

VISTO: la solicitud presentada por la **Sra. Camila Gottlieb**, alumna de la Maestría en Aprendizaje, Tecnología y Educación de la Universidad de Nottingham en el Reino Unido;

RESULTANDO: I) que por la misma solicita se le autorice a llevar a cabo un trabajo de investigación denominado "Exploración en la Formación Inicial de Maestros sobre Tecnología en un Instituto Uruguayo de Formación Docente", donde se requerirá la participación de Estudiantes y Maestros de los Institutos Normales de Montevideo;

CONSIDERANDO: I) que resulta pertinente acceder a lo solicitado;

ATENTO: a lo establecido en el Artículo 63 de la Ley 18.437 de fecha 12 de diciembre de 2008 y en Acta Ext. 5 Resolución Nº 1 de fecha 24/06/10 adoptada por el Consejo Directivo Central;

LA SECRETARIA GENERAL DEL CONSEJO DE FORMACION EN EDUCACIÓN, ACTUANDO EN ACUERDO CON LA SECRETARÍA ADMINISTRATIVA, en ejercicio de las atribuciones conferidas por Acta 4, Res.25 de fecha 14 de febrero de 2013 y Acta 17 Resolución 31 de fecha 18 de mayo de 2016,

RESUELVE:

1) Autorícese a la **Sra. Camila Gottlieb** a realizar su trabajo en el marco la Maestría en Aprendizaje, Tecnología y Educación de la Universidad de Nottingham en el Reino Unido, en los Institutos Normales.

2) Comuníquese a la División Planeamiento Educativo. Cumplido, pase al Departamento Reguladora de Trámites a fin de notificar a la interesada. Oportunamente, archívese.

Ximena Ambrosoni
Prosecretaria
Consejo de Formación en Educación

Prof. Daniel Martínez Cagide
Secretario General
Consejo de Formación en Educación

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