DIGITAL LITERACY, TECHNOLOGY AND SOCIAL INCLUSION

EDITION SARA PEREIRA

MAKING SENSE OF ONE-TO-ONE COMPUTER PROGRAMMES AROUND THE WORLD

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> Foreword

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LITERACY TO NAVIGATE

In times past, learning to read, write and do arithmetic was to get on course to earn the "writ of emancipation" in society. These skills are still essential today, but are not enough to live in society. Reading and critically understanding the world we live in, with all its complexity, difficulties and challenges, require not only other skills (learning to search for and validate information, reading with new codes and grammar, etc) but, to a certain extent, also metaskills, matrixes and mechanisms that are transversal to the different and new literacies, are necessary. They are needed not just to interpret but equally to communicate and participate in the little worlds that make up our everyday activities as well as, in a broader sense, in the world of the *polis*, which today is a global world.

These tools- cultural compasses and GPS, maps and mappings- which one must learn to use if not build, increasingly intersect with the (old and new) media, social networks, digital platforms and applications. At first sight we are dazzled by the performativity of the machines and gadgets and by the promise that they are self-sufficient to solve life's problems. Technologies are presented to us as a fact and not as a possibly problematic social construction, both in terms of their creation and affirmation and in the way they position themselves in relation to their potential users.

However, the machines and their resources appear, develop and perish at breathtaking speed, feeding the global market and attracting powerful economic interests. In fact they are not just economic: from the standpoint of educational and cultural policies, it is easier to develop initiatives around something which draws attention and has symbolic capital (associated to "innovation", the "modernising and transforming power" of technology...) than to bank on something which, immaterial as it is, is more striking and long-lasting: training, reflectiveness and acquiring communicative skills.

This does not mean that technology can or should be opposed to education. The latter needs the former, more so today than yesterday. But one should not lose sight of the hierarchy which is at play here: the lead should be taken by the goals for the citizens' cultural development. From this point of view, technology is instrumental and should itself be the aim and focus of research. People come first, and all resources, digital and analogical, that contribute to the broader purpose should be mobilised.

These thoughts are relevant when considering the project " Navigating with Magalhães: Study on the impact of digital media on children", which was developed between 2010 and 2013 by the Communication and Society Research Centre of the University of Minho, coordinated by Professor Sara Pereira and funded by the *Fundação para a Ciência e Tecnologia*. The aim of the study was to ascertain and assess the impact of the "eEscolinha" measure of the Technological Plan for Education (2008-2011), with particular emphasis on how it was implemented in the field, i.e., in schools and families.

The way this measure came about did not conceal either the philosophy or the ambition behind it. It arose not from the Ministry of Education or with its major contribution or involvement as would be expected but, instead, from the Ministry of Economy, and its ultimate purpose was enlightening: "to place Portugal among the five most advanced European countries in terms of school's technological modernisation." In the media, the message that was conveyed was one of a strong governmental commitment to the programme, which consisted above all in the delivery of the laptop Magalhães at a very affordable price or even free of charge. It is true that, according to 2011 data of the EU Kids Online

project, Portugal moved to the number one position at EU level in terms of personal computer ownership (65 and 24% respectively) and of internet access in the bedroom in the 9-16 age group (67 and 49% respectively). If access were in fact to have solved the essential issue, the scenario would undoubtedly be exciting.

In fact, nobody with any common sense will question the worthy political effort to facilitate the access to and the use of computers and the Internet from an early age (a measure with a similar purpose was launched in Portugal for adults involved in improving their academic qualifications). But investment in the dissemination of information and communication technologies disconnected from other components, such as teacher training, media education, curriculum integration and others, will inevitably mean that local circumstances will be left with major challenge of assigning educational and cultural scope to a tool which, when regarded as the centre and the object, only by chance will be a significant part of learning processes.

These topics were ultimately present at the time of the launch of the "Navigating with Magalhães" project. At least they provided a context for observing what, after all, did go on in classrooms when the blue and white box, so successful both domestically and internationally, was widely introduced

Not meaning to reveal the findings, and actually inviting the reader to discover them by reading the chapters comprising this book, one can nonetheless say that the political vicissitudes that led to the change in government in 2011 also entailed the end of the Technological Plan for Education and, consequently, that of the eEscolinha. In other words, instead of conducting an evaluation so as to correct what had been done wrong or bring in what was missing, the option was a measure which was both extreme and blind. Having to choose between going with something that may have been ill designed or doing nothing, the choice was to throw out the baby with the bath water.

Paraphrasing Dickens in a "Tale of Two Cities", we live simultaneously in the best and the worst of times, in an era of both wisdom and foolishness. We have performative tools, but we forget that without the contribution and participation of the social agents in the field, there is no measure, no matter how enlightened it may be, that will yield good results.

It seems the time has come to think about what was done and to resume an interrupted journey by redesigning along new lines. It's a journey that has to be centred not on technologies but on people; no on the market, but on educational institutions, not on quantity but on quality and by placing pedagogical and cultural criteria at the fore of any measures to be taken. The 21st century citizen is not one who owns technology but rather one who can understand them and use them in order to take advantage of them to address the challenges life has to offer. We are travellers in these times, But first of all we need to ask ourselves where we want to go. Only after the direction has been set, does it make sense to think of the tools that may guide us. This book may be a contribution to a movement in that direction.

Introduction

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This book was produced in the scope of a research project entitled "Navigating with 'Magalhães': Study on the Impact of Digital Media in Schoolchildren". This study was conducted between May 2010 and May 2013 at the Communication and Society Research Centre, University of Minho, Portugal and it was funded by the Portuguese Foundation for Science and Technology (PTDC/CCI-COM/101381/2008).

As we shall explain in more detail later in this book, the main objective of that research project was to analyse the impact of the Portuguese government programme named ´e-escolinha´ launched in 2008 within the Technological Plan for Education. This Plan responds to the principles of the Lisbon Strategy signed in 2000 and rereleased in the Spring European Council of 2005[1]. These principles are based on the modernization of the information systems of European Union member-states and the integration of the European citizens in the so called Information and Knowledge Society, in order to reduce the social disadvantages and fostering job creation, based on ICT. From this commitment, EU countries created their own initiatives to better exploit the potential of ICT to foster innovation, employment and economic growth.

1 After that, in 2010, the European Commission launched the Digital Agenda for Europe "to chart a course to maximise the social and economic potential of ICT, most notably the internet, a vital medium of economic and societal activity: for doing business, working, playing, communicating and expressing ourselves freely" (European Commission, 2010 p. 3). The Digital Agenda is one of the seven flagship initiatives of the Europe 2020 Strategy (EUROPE 2020 – A strategy for smart, sustainable and inclusive growth – COM(2010) 2020).

But it is not only in Europe that countries are in this XXI Century investing in innovative programmes to get the most out of digital technologies for creating inclusive societies and competitive economies. -Initiatives of this kind have been emerging all over the world with their own specificities and objectives. Several nations are also creating specific ICT plans for education. One example, and maybe the most publicized, is the One Laptop Per Child (OLPC) project, a non-profit organization led by the Massachusetts Institute of Technology (MIT) Media Lab (founded by Nicolas Negroponte), whose mission- "is to empower the children of developing countries to learn by providing one connected laptop to every school-age child" (http://laptop.org/en/vision/mission/index.shtml). According to the project's site, "roughly 2 million children and teachers in Latin America are currently part of an OLPC project, with another 500,000 in Africa and the rest of the world". Someway related to its technocentric vision, this project faced several criticisms (see, e.g., Warschauer & Ames, 2010; Leaning, 2010; Selwyn, 2013), which in any case should not disregard the positive outcomes arisen from the initiative (Selwyn, 2013).

Referring to OLPC project, Warschauer and Ames (2010) argue that "regrettably, there is no magic laptop that can solve the educational problems of the world's poor". In fact, there's no laptop that solves the educational problems, in general. Shafiul Alam Bhuiyan (2008) argues that no technology ever brought social equality. Characterizing the society information as a postindustrial society where information and information technologies are the principal forces of growth, he speaks about the North and the South as unequal information societies. Shafiul Alam Bhuiyan (*idem*) states that the information society is a discourse of social progress and Pérez-Tornero (2008) says it is a 'slogan', corresponding to projects rather realities. Crossing these arguments with some research outcomes, a question that should be raised is if the educational ICT programmes are responding mostly to the commodification of education than to the true community's needs. And about this, what is certain is that we need "an inclusive information society, which fosters equality and participation and functions according to the need of human well-being [rather than] the logic of commodification" (Bhuiyan, 2008, p. 114).

Therefore, putting the issues on the table: what is happening with the multiple 'one laptop per child' programmes around the world? What are their main focus and concerns? How are they being implemented in schools and experienced by children, teachers and parents? How are the 'global' trends influencing national policies and initiatives? These are some questions that this book seeks to address.

The book includes eleven contributions from six Ibero-American countries. The authors responded to a call for chapters launched within the research project 'Navigating with Magalhães'. From thirty-one proposals received ten were selected. Together with the first chapter coming from the founder project they constitute the content of this publication. All the chapters are of the responsibility of their authors as well as the English writing. The content was peer reviewed but the language proof editing was the author's responsibility.

The chapter that opens the book comes from Portugal and it is based on the main findings of the research project that supports this publication. Based on data coming from a set of interviews to key-actors involved in the conception and implementation of the 'e.escolinha' programme and the distribution of the Magalhães laptop and on questionnaires administered to primary schoolchildren, their parents and teachers, the authors analyse the political, educational and social impact of the Magalhães computer in children, families and school life.

The second chapter is from Latin America, more specifically from Uruguay. The authors analyse the One Laptop Per Child model in Uruguay under the Ceibal Plan. Based on quantitative and qualitative data, they show that there is almost no gap between rich and poor households but they found that poorest children have more difficulties in using technology and benefiting from it.

The third chapter is from Brazil but it presents three case studies on one-to-one programmes conducted in Italy, Ethiopia and Brazil between 2009 and 2012. The author uses these cases to illustrate the capability of these initiatives to effectively change teaching and learning practices, and foster digital literacy.

The next chapter, the fourth, comes from Spain. It examines the one-to-one projects developed in Spain in the last four years and proposes

a model for assessing these projects based on a European approach linked to media literacy.

The fifth chapter is from Peru and it aims to analyse the One Laptop Per Child programme from the point of view of children, parents, teachers and the principals of educational institutions from three rural regions in this country.

Following, the sixth chapter is from Uruguay and it aims to analyze how the experiences with the XOs3 computer were appropriated by poor families benefiting from CEIBAL Plan. The authors concluded that although the XO does not have a significant role in the poorest families' community life, it starts to be a mediator between the "inside" and the "outside" of the community and also a mediator between a present of scarcity and a future with more opportunities.

The seventh chapter is from Brazil and it analyses the One Computer per Student Programme (PROUCA), implemented by the Brazilian government, based on a case study of a public school in Goiás. The authors examine the relationship between the pedagogical objectives of the project and teaching practices in that school.

The following chapter also comes from Brazil. Based on the same Brazilian government programme, the authors intend to discuss the appropriation of the digital devices by teachers, in their social and professional environment.

The ninth chapter comes from Argentina. The authors present a comparative approach of the differential computer and Internet appropriation methods by adolescents in secondary school coming from popular and middle classes. This is their base to discuss some questions that arise from the implementation of the Programa Conectar Igualdad (PCI) launched in 2010 in Argentina.

The tenth is from an author affiliated in Spain but who is a native of Argentina. He presents two Argentinian programmes: the Roots Program and the Programa Conectar Igualdad (PCI), seeking to discuss the scope and the limitations of the latter.

The book closes with the country and the governmental initiative that opens it: the eleventh chapter is also from Portugal and it examines the family adhesion to Magalhães computer and its uses by children in different contexts, discussing the inequality in opportunities and ICT

uses. This study is based on data coming from two towns from different Portuguese regions.

Ultimately, we hope that these diverse geographical voices contribute to a better understanding of the one-to-one computing policies and initiatives and their real impact *in situ*. But above all we hope that these voices can be heard so as to improve future initiatives.

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1. The Portuguese programme one laptop per child: Political, educational and social impact

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ABSTRACT

In 2008, the XVII Portuguese Constitutional Government launched the 'e.escolinha' programme, within the Technological Plan for Education, which set out the distribution of a computer, called 'Magalhães', designed for children attending the 1st cycle of basic education. Suspended in 2011 by the XIX Government, this programme has allowed, however, almost 500 000 children to have access to a personal computer. It was expected that this political measure would "revolutionise" the national education system by bringing changes to the pedagogical practices of teachers and the learning processes of children and by achieving educational success, in general. Based on documental analysis and on a set of interviews with key decision-makers in conceiving, implementing and monitoring this governmental initiative, the first part of this chapter presents and analyses the 'e.escolinha' initiative and the policies behind that governmental programme, seeking to disassemble those objectives and provide some insights into the relationship between discourses, rhetoric, and reality. After that, the chapter focuses on children's uses and practices with

the 'Magalhães' laptop, at school and at home. Based on the results of questionnaires filled in by approximately 1500 children from 32 First Cycle public schools of the municipality of Braga (north of Portugal) and also from questionnaires applied to their parents and teachers, this chapter intends to analyse the real impact of this initiative for children, family and school. It also seeks to discuss the contribution of this educational policy to children's digital literacy and also to their own and their families' social and digital inclusion. To understand if it represented an added value to teachers' pedagogical practice is another of its aims. The findings point out a major focus on technology and access rather than on uses and competences or even on social, educational and cultural change. In fact, a major conclusion is the existence of a strong gap between the policy and the practices, typical of a top-down policy design.
This study is an integrant part of a research project titled "Navigating with 'Magalhães': Study on the Impact of Digital Media in Schoolchildren" conducted at the University of Minho, Portugal, financed by the Portuguese Foundation for Science and Technology [PTDC/CCI-COM/101381/2008] and co-funded by the European Regional Development Fund [COMPETE: FCOMP-01-0124-FEDER-009056].

Keywords: *one laptop per child, ICT, education, digital literacy, social inclusion*.

1. INTRODUCTION: THE TECHNOLOGICAL PLAN FOR EDUCATION AND THE 'E.ESCOLINHA' PROGRAMME

Since the launch of the MINERVA project in 1985, there have been no more than ten major projects, programmes and initiatives to introduce technology in education in Portugal (Pereira, 2013, p. 110). Most of these have been under the aegis of the Ministry of Education, currently merged with the former Ministry of Science, Technology and Higher Education, both of which have always played an important role in the programmes connected with technological development (idem, p. 11).

In September 2007, the Technological Plan for Education (PTE) was published in the Official State Gazette (First Series, no. 180, 18 September 2007). It was put forward by the XVII Constitutional Government headed by then Prime Minister, José Socrates, and approved by the Presidency of the Council of Ministers on 16 August 2007 (Council of Ministers Resolution no. 137/2007). The document laid

down the plan to modernise schools and teaching, and its main goal was to "place Portugal among the five most advanced European countries in terms of schools' technological modernisation by 2010" (Resolution of Council of Ministers, 2007). To that end, the PTE set out to create the necessary conditions to equip students and teachers with the basic tools to enable learning and training in information and communication technologies by providing access to equipment and digital content and restructuring school infrastructures (Melro, 2011, p. 40). The school is thus understood to be the centre of educational modernisation:

> It is essential to value and modernise schools, to create the physical conditions that favour educational success among students, and reinforce the role of information and communication technologies (ICT) as basic tools for teaching and learning in this new era. (Resolution of the Council of Ministers no. 137/2007).

Following the guidelines established for the technological modernisation of schools since the Lisbon Strategy in 2000, the objectives of the PTE were, among others, to supply schools with computers, develop contents and ensure ICT training for teachers (Pereira & Melro, 2012, p. 302). Based on these principles, the PTE was structured around three main axes of operation: technology, contents and training. Projects to be implemented were allocated to each of these axes taking into account efficiency factors and financing agents. Among the projects were the '*e.escola*' ['e.school'], '*e.escolinha*' ['e.little school'], '*e.professor*' ['e.teacher'], '*e.oportunidades*' ['e.opportunities'], '*Internet na sala de aula*'['Internet in the classroom'], and '*academias TIC*' ['ICT academies']. However, both the 'e.escola' and the 'e.escolinha school' programmes, which made provision for the distribution of laptops to students from the 1st grade up to the 12th, were launched under the aegis of the Ministry of Public Works, Transportation and Telecommunications (MOPTC)within the Technological Plan and were later to be adopted by the Ministry of Education (under Maria de Lurdes Rodrigues and, later, Isabel Alçada) through the Technological Plan for Education within the scope of the Technology axis.

The 'e.escolinha' initiative and the 'Magalhães' computer were officially presented by the Prime Minister at the time, José Socrates, on 30 July 2008 at the Pavilhão Atlântico in Lisbon. The programme made

provision for the free (or at a reduced cost) distribution of laptops with educational contents to 1st cycle school students. The presentation of the computer coincided with the signing of the memorandum of understanding between the Portuguese government and Intel, the manufacturer of ClassmatePC, regarding the production of the 'Magalhães' computers in Portugal, as well as with the consortium set up by the government with JP Sá Couto, the company certified to assemble Intel's Classmate in a plant in Matosinhos (Northern Portugal) run by the siblings Jorge e João Paulo Sá Couto (Melro, 2011, p. 41). At the presentation ceremony, José Socrates called the 'Magalhães' the first laptop for children made in Portugal with its name being a tribute to the Portuguese navigator Fernão de Magalhães [Ferdinand Magellan], the first man to complete a circumnavigation of the Earth, in the 16th century.

The government stated publicly that the 'e.escolinha' was an extension of the 'e.escola' programme that had been in operation for a year. Nevertheless, while the 'e.escola' enabled 2nd and 3rd cycle (5th to 9th grade) and secondary education (10th to 12th grade) students to purchase a laptop at a low cost through a contract with a broadband Internet supplier, the 'e.escolinha' provided 1st cycle students (1st to 4th grade) with a computer either free of charge or by paying 20 to 50 euros depending on their status with the School Social Services. The Internet connection was optional in the 'e.escolinha' programme unlike the 'e.escola'. Besides this, in the 'e.escola' students could choose the make of the computer whereas in the 'e.escolinha' students only had access to 'Magalhães', a laptop which was equipped with educational contents for the 1st cycle of education and had a sturdy structure especially suited for children (anti-shock and water resistant).

At the same time, agreements were made with other companies, namely with content producers Microsoft, Linux, Caixa Mágica and Inforlândia; the distributor Prológica; and the mobile telecom operators, Vodafone, TMN, Optimus and ZON, which had investment obligations arising from the previous *Fundo para Sociedade da Informação* (FSI)[Information Society Fund] which was later converted into the *Fundação para as Comunicações Móveis* (FCM)[Foundation for Mobile Communications], presided by Mário Lino, which ran the 'e.escola 'and 'e.escolinha' programmes.

In September 2008, Prime Minister José Sócrates announced the distribution of 500,000 laptops for the beginning of that school year, reinforcing to the media the inclusive nature of computers in schools: "we want the computer to be part of the school supplies in every school" (*Jornal de Notícias*, 29 July 2009). For José Sócrates, the importance of children's access to the 'Magalhães' computer was strongly linked to the economic development of the country:

> This new generation will be better prepared and will be able to contribute more towards the modernisation and development of Portugal. Besides this, with the 'Magalhães' initiative, many homes will have a computer for the first time, contributing strongly, as well, to overcome info-exclusion in general. (Fernandes, 2008).

In this speech, publicised in a report released by Microsoft (Fernandes, 2008), it is possible to highlight three aspects underlying the ideology of the initiative: the democratisation of access to new technologies (equal opportunities, info-inclusion and family access); the use of technology in the classrooms (equating computers to school supplies); preparing citizens for the future (economic competitiveness of the markets).

Specifically, in the Technological Plan for Education, the 'e.escolinha' initiative was defined as the strategy to ensure 1st cycle students had access to personal computers with educational contents (Tribunal de Contas, 2012, p. 97). To that end, it had to meet two main targets: generalise computer and Internet use in early learning and ensure thousands of families had access to a computer (ibid.). Including families in the implementation process of 'e.escolinha' was also a central feature of the measure, on the premise that the 'Magalhães' would be the first computer to enter the home of many Portuguese families.

Despite the fascination conjured by the presentation or perhaps because of it, the opposition parties raised questions immediately, namely regarding not only the direct awarding of contracts to JP Sá Couto (for the 'Magalhães' computer) and to the content producers, but also the management of public funds by the Foundation for Mobile Communications. In December 2009, a Temporary Parliamentary Committee of Inquiry (CIP) was appointed to look into the Government's actions regarding the abovementioned Foundation. In June 2010, the

Committee concluded that there was a "serious lack of transparency in the public management of the Foundation and the programmes and initiatives it operates" (CIP, 2010) and that the contracts made with the hardware and software manufacturing companies had eluded the need for a public tender thereby distorting the laws of market competition. In light of the Committee's findings, it was recommended that the government abolish the Foundation, that the management and coordination of the initiatives be awarded to the Ministry of Education (CIP, 2010) and that open technologies and free software be adopted (ibid.).

After the decision of the Committee, the government launched a public tender for the manufacturing of the 'Magalhães', having JP Sá Couto been selected once again, this time to produce a further 250,000 computers for two more school years. Together with the initial 500,000 (2008/2009), this meant 750,000 computers were ordered in the three-year duration of the programme (2008/2009, 2009/2010, 2010/2011). By December 2009, 401,711 computers had been distributed within the framework of 'e.escolinha' (Tribunal de Contas, 2010, p. 46), with costs of approximately 85.6 million euros (idem, p. 48). As for the second stage, in November 2010, according to the Audit Court Report (Tribunal de Contas, 2012) on the Education Statistics and Planning Office (GPE), among the projects being implemented within the scope of the Technological Plan for Education 'e.escolinha' was the one with the lowest implementation rate (37,6%). Of the 250,000 computers only 94,091 were distributed (Tribunal de Contas, 2012, p. 8) while 59.8 million euros were spent (16.12% of the total investment in e.initiatives) (Tribunal de Contas, 2012, p. 34). Nevertheless, at the time of publication it was not yet possible to know the implementation figures for the final school year (2010/2011) and it is thought that almost all the 250,000 computers allotted to the second phase were distributed. This cannot be absolutely ascertained, however, since to date no new report has been published by the Audit Court on the matter.

Given the period during which the 'e.escolinha' initative was drawn up and the problems involved in its implementation in schools, the 'Magalhães' computer obtained significant coverage in the media (Melro, 2011; Pereira & Pereira, 2013), which, in turn, also impacted on the social systems in the education field and on society as a whole.

2. THE 'NAVIGATING WITH MAGALHÃES' PROJECT: OBJECTIVES, METHODS AND SAMPLE

When the 'e.escolinha' programme was announced by the Portuguese government in 2008 it was expected, taking into account the manner in which it was presented and the objectives that were set, that it could have a significant impact on Portuguese society in social, educational and economic terms. It was on the basis of this assumption that the "Navigating with 'Magalhães': Study on the Impact of Digital Media in School Children" project was set up. It was developed by a team of researchers of the Communication and Society Research Centre at the University of Minho[1] with funding from the *Fundação para a Ciência e a Tecnologia* [Foundation for Science and Technology] and carried out between May 2010 and May 2013. It is based on the assumption that delivering computers to school children does not automatically lead to knowledge and learning. Digital technology offers an important potential for education but, in our view, the use of technology in this context is merely instrumental. Government policies can contribute to bringing new practices into schools, but are these policies coherent? Are they meaningful in the everyday school and classroom contexts? It has been argued that technology is more effective than traditional methods in terms of involving and stimulating children in the learning processes. But can we consider that technology motivates learners by itself? Can the technology itself make all the difference? How can we rethink the schools' role in the age of digital culture?

The main focuses of this study were the policies of the Technological Plan for Education, especially those of the 'e.escolinha'programme, and the uses and practices that children make with the 'Magalhães' computer, and the resources behind it, both at school and outside it. We sought to understand the perspectives of children, teachers and parents about the potential, the opportunities and also the challenges of that governmental initiative.

1 The team consisted of: Sara Pereira (Coordinator), Helena Sousa, Luís Pereira, Ana Melro (research grant holder) and Andreia Lobo (research grant holder between June and August 2011). Scientific Advisors: José Manuel Pérez Tornero, Universidade Autónoma de Barcelona; Évelyne Bévort, Centre de Liaison de l'Enseignement et des Médias d'Information (CLEMI); Manuel Pinto, University of Minho.

In order to meet these objectives, the methodological design of the study comprised a variety of research methods which can be seen in Figure 1.

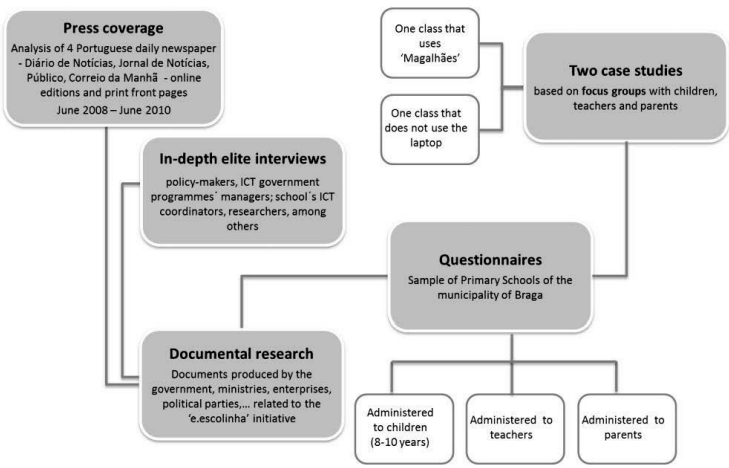

Figure 1: Methodological design of the study

In this chapter, we will report on the results obtained through the in-depth elite interviews as well as on the results deriving from the questionnaires administered to the children, their teachers and their parents.

2.1. In-depth elite interviews

Within the scope of the project, twenty-two interviews were conducted with key-players in the design and implementation of the 'e.escolinha' programme[2], namely: government officials (6), political parties (4), business-

2 The interviews were conducted between June 2011 and February 2012.

es (4), trade unions, associations (6) experts on ICT in education (2) (Table 1). With this series of interviews, we sought to become acquainted in more detail with: the political, educational and social assumptions which gave rise to this governmental measure; the concepts of child, school and learning held by those responsible for devising the programme; and the views on technology which justified and legitimised the measure.

Once transcribed, the interviews were processed and analysed using the qualitative analysis programme NVivo. The analysis grid comprised four main topics: 1) Design, implementation and objectives; 2) Results, appraisal and evaluation of the implementation (negative aspects and positive aspects); 3) The future/continuance (obstacles and possibilities); and 4) Perspectives / conceptions (competences, media literacy, the child, school, family, computer)

TABLE 1: Key players interviewed and their posts.

GROUP	INTERVIEWEES	POST*
Government	Maria de Lurdes Rodrigues	Minister of Education, XVII Constitutional Government (March 2005 to October 2009)
	Isabel Alçada	Minister of Education, XVIII Constitutional Government (October 2009 to June 2011)
	Nuno Crato	Minister of Education and Science, XIX Constitutional Government (since June 2011)
	Carlos Zorrinho	National Coordinator of the Lisbon Strategy and the Technological Plan from 2005 to 2009; State Secretary for Energy and Innovation XVIII Constitutional Government (until June 2011).
	Paulo Campos	Assistant State Secretary for Public Works and Communications, XVII and XVII Constitutional Governments.
	José Vítor Pedroso	Coordinator of the Educational Resources and Technologies Team (ERTE) of the Ministry of Education.
Businesses	Jorge Sá Couto	JP Sá Couto
	Rui Grilo	Assistant-coordinator of the Technological Plan and Head of the Education area at Microsoft.
	Adelaide Franco	Microsoft Education
	Paulo Trezentos	Caixa Mágica

(*) Post held at the time the initiative was devised or implemented.

Trade Unions Associations and Foundations	Mário Nogueira	Secretary-General of FENPROF – National Federation of Teachers
	João Dias da Silva	Secretary-General of FNE – National Federation of Education
	João Grancho	President of ANP, National Teachers' Association, until September 2011; currently the State Secretary for Basic and Secondary Education
	Albino Almeida	President of CONFAP – National Confederation of Parents' Associations
	Mário Franco	President of the Mobile Communications Foundation
	Luís Amaral	Member of the APDSI (Association for the Promotion and Development of the Information Society) High Level Group
Political Parties	Hélder Amaral	Member of Parliament for CDS-PP
	Emídio Guerreiro	Member of Parliament for PSD e member of the Education, Science and Culture Parliamentary Committee
	Bruno Dias	Member of Parliament for PCP
	Pedro Soares	Member of Parliament for BE
Experts	Roberto Carneiro	Coordinator of the Observatory for the Technological Plan for Education (Minister of Education, XI COnstitutional Government)
	Maria do Carmo Leitão	1st cycle teacher at Escola Básica Várzea de Abrunhais, Lamego; winner of the Innovative Teachers Prize 2009, awarded by Microsoft and of the National Teachers' Prize, in the innovation category, awarded by the Ministry of Education.

2.2. The questionnaires: listening to children, parents and teachers

As far as the questionnaires were the concerned, the goal was to listen to the opinions of children attending the 3rd and 4th grades[3], as well as to those voiced by their teachers and parents. The sample was collected from among the 1st cycle schools in the municipality of Braga, which is also where the institution carrying out the research is located. It was considered appropriate to study and analyse the social,

3 The Portuguese Educational System currently provides for 12 years compulsory education (Law no. 85/2009 of 27 August). There are five cycles of study: pre-school (optional), 1st cycle of basic education (1st, 2nd, 3rd and 4th grades); 2nd cycle of basic education (5th and 6th grades); 3rd cycle of basic education (7th, 8th and 9th grades); secondary education (10th, 11th and 12th grades). Based on data published in the report "Educação em Números" [Education in Numbers] by the General Directorate for Statistics on Education and Science (DGEEC, 2012), the mean of the distribution of the number of students, in Portugal, by level of schooling in the three years the 'e.escolinha' programme was in operation (2008/2009, 2009/2010, and 2010/2011) was as follows: 13.8% in pre-school, 23.9% in the 1st cycle, 13.7% in the 2nd cycle, 24.9% in the 3rd cycle and 23.7% in secondary education. The 1st cycle of basic education consists of 4 schooling levels (grades) with children aged between 6 and 10 and the distribution of the students per level is of approximately 25% for each of the levels. (DGEEC, 2011; GEPE, 2009; GEPE, 2010).

educational and geographical context of the area in which the project was carried out.

The sample was selected from the population comprising the 3rd and 4th grade students attending the 1st cycle schools in the municipality of Braga. Information pertaining to school clusters, the geographical locations and the different grades (school years) were cross-referenced and a matrix drawn up so as to ensure that schools from all the clusters were represented in the final sample[4]. In each cell of the matrix, a school was randomly selected through a simple random sampling process. All 3rd and 4th grade students of the selected schools were surveyed[5]. The sample size was determined considering a 95% confidence level and a 2% margin of error.

A total of 32 schools (out of the existing 72) participated in the study, with the final sample consisting of 1517 3rd and 4th grade students (out of a population of 3584), 79 teachers[6] and 1264 parents and guardians[7].

The Computer programme IBM-SPSS Statistics v21 was used to conduct the statistical analysis of the data collected from the 'Children', 'Teachers' and 'Parents' questionnaires. The descriptive analysis of the data was carried out taking into account the nature of the variables being studied. The following measures were calculated: absolute frequencies; relative frequencies (percentage of valid cases –%); central tendency (mean); dispersion (standard deviation); and the maximum and minimum values. In the multiple choice questions, the percentages of answers presented are in relation to the total number of valid cases. For the inferential analysis we resorted to the application of non-parametric tests since, on the whole, the conditions of applicability of parametric tests were not met. To compare independent or unconnected groups the Mann-Whitney and Kruskal-Wallis tests were used, whenever there were two groups to be compared, respectively. If significant differences

4 At the time of the study, the education area of the municipality of Braga consisted of 13 school clusters. Of these only two were unwilling to participate in the study.

5 Bearing in mind the possibility that some parents would refuse to take part, a list of alternative schools was drawn up based on stratified random sampling.

6 In total 80 questionnaires were collected but one was not considered for this analysis.

7 The questionnaires were administered in May and June 2012. Parent questionnaires were given to the children to take home, where they were filled in.

were detected, they were identified by a pair-by-pair comparison using the Mann-Whitney test. To check the independence between two categorical variables, Chi-square tests were used (Marôco, 2011). All the tests were applied with a confidence level of 95% unless otherwise stated.

The main results of the study are discussed in the following sections. Taking into account the amount of data collected from the questionnaires administered to the children, parents and families and the impossibility of describing it all in this chapter, we decided to select the topics which best reflect the objectives we set out to achieve in this text: to become acquainted with and analyse the impact and the significance of the initiative that involved the distribution and delivery of the 'Magalhães' computer and to compare them with the objectives stated when this governmental programme was devised and implemented [8].

2.3. Characterisation of student, parent and teacher samples

As mentioned before, the study was conducted in 1st cycle schools (1st cycle of basic education) in the municipality of Braga, which is situated in the North of Portugal. It has a resident population of 181,494, including 29,667 children aged between 0 and 14, which accounts for 16.3% of the population. The study involved 50 of the 62 parishes which make up the municipality. The majority (33) are predominantly urban while the remaining 17 are in moderately urbanised areas[9].

As regards the sample of children, of the 1517 surveyed, 49% are female and 51% male. The vast majority are aged between 8 and 10. In terms of the school level, it is a balanced sample: 48% attend the 3rd grade and 52% the 4th grade. Most of the children come from a middle class background as indicated by the data they provided on their parents' level of education and professions. Approximately 30% completed basic education while around 20% finished secondary education. As far as higher education is concerned, 24% of the mothers have a degree

8 This study has been examined in other publications. Presentation and discussion of other data may be found in Pereira, 2014; Pereira, 2013; Pereira & Pereira, 2013; Pereira & Melro, 2012, among other publications.

9 According to the Typology of Urban Areas (TIPAU) of the National Institute of Statistics (INE), 2009. This variable was not used in the data analysis because it was not regarded as significant.

compared to 18% of the fathers. Regarding the fathers' professions, 18% hold a high level position (executives, directors, managers, and experts in intellectual and scientific fields), 30% have intermediate level occupations (administrative and service-industry workers) and 42% work in industry, construction and agriculture. The remaining 10% include unskilled workers (3, 5%), those who are unemployed (6%), pensioners and students. As for the mothers, 23% hold a high level position, 35% have an intermediate level job and 14% work in industry, construction and agriculture. The unemployment rate is higher among the mothers (13%) as is the percentage of unskilled workers (11%). Three percent are domestic workers and a minute number are pensioners and students.

It is a group of children who enjoy spending their free time using the media but who also spend time on other activities. When asked about what they did in their free time, as first preference, 34% reported social and fun activities such as playing, being and going out with their family, being and playing with friends. In second place were sports activities and in third the media (watching TV, playing videogames, watching films, etc.). Given the range of activities, we may conclude that they are children who use and enjoy using the media but are not glued to the screens and show an interest in a wide range of activities. It is true though that at their age playing and being with friends face-to-face (and not online) is very typical and much appreciated while the relationship with the media loses ground to this type of activities.

As far as the parents are concerned, 93% of the 1264 surveyed are aged between 30 and 50. Forty-five percent completed basic education, 28% secondary education while 27% have a degree. Regarding their professions, 24% hold high-level positions, 37% have intermediate level posts (administrative and service-industry workers) and 15% work in industry, construction and agriculture. The percentage of unskilled workers is approximately 5%, which is also the percentage of those who are domestic workers. The unemployed make up 12% of the sample, which was similar to the national unemployment rate at the time the questionnaires were administered. The remainder are either pensioners or students.

With regard to the teachers (79), the overwhelming majority are female (94%), so the percentage of male teachers is not significant. The age range is between 28 and 59 with the mean age being 47. In terms of years of service, it varies between 6 and 36 years and the mean is 24 years of teaching service. Forty-seven percent of those surveyed teach 3rd grade and an equal number teach 4th grade. Six percent teach classes that have students of both grades.

3. VIEWS ON THE STRATEGIES (AT THE BASIS) OF THE 'MAGALHÃES' INITIATIVE

This section seeks to decode the policies of the 'e.escolinha' programme, namely as regards its objectives, implementation and evaluation, from the point of view of the interviewees as provided in the interviews conducted for the purpose of this research (Table 1).

3.1. Design and objectives

The 'Magalhães' initiative outlasted two Ministers of Education. Maria de Lurdes Rodrig-ues was the minister at the time the measure was designed and implemented. She was later replaced, half-way through the government's term of office, by Isabel Alçada. Finally, with the change in government and a new minister, Nuno Crato, it was discontinued.

According to the Minister of Education of the government that designed and implemented this measure, the various initiatives launched sought to "improve conditions in terms of access and usage of information and communication technologies". In her interview, Maria de Lurdes Rodrigues states,

> What we were able to do was to link the concerns about the development of the information society to educational policies. I think it is the first time that we have realised that the essential part of the development of the information society has to involve the school; it entails improving students access to technology (Maria de Lurdes Rodrigues, interview)

This idea of linking the development of the information society to educational policies is more readily apparent in the words of two other

members of the same government. For Paulo Campos, Assistant State Secretary for Public Works and Communications, "the programme was not devised to increase the number of computers in schools but rather to extend the use of broadband throughout society". According to Carlos Zorrinho, who was responsible for the government's technological strategy, both the 'e.escola' and the 'e.escolinha' were a way to "break a barrier that consisted in the fact that there was a very high Internet usage in Portugal, but basically in only 40% of the households".

Although the former Minister of Education, Maria de Lurdes Rodrigues, seeks to underline the leading role taken on by school and education within the programmes for the development of the information society, and her successor, Isabel Alçada, supports the idea that the 'Magalhães' was at the service of improved learning, the fact is that tension is visible between a view that is more centred on learning and another focused on tackling the low generalization of Internet access in Portuguese households.

For Roberto Carneiro, it is clear that the 'e.escolinha' draws inspiration from the One Laptop per Child (OLPC) project. Nevertheless, those involved in devising the programme do not acknowledge that connection, stating, in contrast, that it was originally devised and thought through within the political context that led to the formation of the XVII government.

Paulo Campos explains how the need for such an initiative arose:

> The idea for 'e.escola'- and the 'Magalhães' computer derives from this programme- came up in 2005, in the first days of government, in a way due to the fact that we were curious enough to look up some statistics that turned out not to match what we were saying about the poor competition in the market in Portugal, which led to high broadband prices and low penetration as a result.
> We ascertained that this reasoning was not entirely correct. Going through the statistics in more detail we established that in households with computers we had higher penetration rates than the European Union average. What we had was low computer penetration per household, so what was preventing the development of broadband was essentially the inexistence of a computer in each house rather than the conditions the market had on offer for broadband access. That is why this programme is devised much more with a slant towards communication than towards

> education since our analysis revealed that it was a problem that was more closely associated to communication issues. In other words, how can we increase broadband penetration in Portugal? And we established that the issue of the computer was an essential one.
> The characteristics of the programme took into account the commitment we had to addressing a shortcoming that consisted in the fact that our society was not connected to the Internet as other societies with higher penetration rates were. The enabling vehicle for that purpose would be the children as through them it would be easier to encourage new behaviours in families that offer some resistance to this type of issue. (Paulo Campos, interview)

Mário Franco, who would become President of the Foundation for Mobile Communications (an institution whose key responsibilities included, for example the management of the funds allocated to this initiative), states that he played an important role in devising the policies which gave rise to the 'e.escola' and the 'e.escolinha' and explains the ingredients at the basis of these programmes: the importance of the issue of mobility, the benefits for the information society, the development of the economic aspect.

> I always believed that mobility was an asset. On other hand, there were benefits for the information society that had an underlying philosophy, i.e., a project would have to be justifiable from the point of view of the interests of the State, the public interest, but would also have to make sense from a business point of view. Well, I was a firm believer in mobility both for computing and connectivity and it was also necessary to devise a programme which would meet the need to develop the framework and the mobile Internet business model for the service providers who were the ones that had to make the investment. Therefore, for me the 'e.escola' was something natural. And why students? Because I believed that if we sped up the contact those new generations had with these tools, as was the trend, we would be able to take a leap forward when compared to any other country. (Mário Franco, interview)

It becomes clear, thus, that the project takes shape with a view to increasing the Internet access figures in Portuguese households. As such, the school would have a merely circumstantial role in that it was used to distribute the computers among the children, who were themselves vehicles taking the computer and Internet access to homes that

did not have them. José Vítor Pedroso, Coordinator of the Educational Resources and Technologies Team (ERTE) of the Ministry of Education, has a more optimistic view for he believes that it is this feature that makes this technological measure particularly original in education: unlike all previous measures, it was not meant to furnish schools with equipment. The student and the family were the targets of this initiative. In this sense, being able to take the computer home is, as advocated by the Education Minister at the time, added-value since it will allow children to take further advantage of the different uses of the computer.

In summary, the interviewees list the following advantages that the 'Magalhães' computer brought either directly or indirectly:

- Enabling children to have access to new technologies;
- Equal opportunities, democratisation of access;
- Enabling access to families, namely to those that had never before had the opportunity;
- Improving knowledge of English, Portuguese and Mathematics;
- Improving educational attainment in general;
- Promoting digital competences;
- Boosting the national economy, interest in exporting;
- New technologies as work tools;
- Increasing computer and broadband penetration rates;

3.2. Preparing for the future, inclusion in the Information Society

When devising and implementing the initiative, the focus was on the production of a computer suitable for children and on its distribution at the expense of other strategies that included teachers, such as providing training for them and above all getting them involved in this process of change. One can see, however, that the high costs it entailed made this a very expensive initiative, giving the impression that

an opportunity was lost considering the investment made. Yet, there are those that consider that "the 'e.escolinha' programme was revolutionary", as stated by Albino Almeida, a representative of the parents. Luís Amaral, Member of the APDSI (Association for the Promotion and Development of the Information Society) High Level Group sums up the mood that can be captured in most of the interviews:

> It was an excellent idea. It came up at the right time. I get the impression that it had the potential to have a tremendous impact, however, despite all its qualities, I think it was an idea that was not developed, not by a long shot, as well as it should have been. But I believe it was visionary and an extremely intelligent measure. The way it was then implemented was what eventually limited the potential the idea actually had. (Luís Amaral, interview)

3.3. Implementation and evaluation

As far as the evaluation and appraisal of the initiative is concerned, the evaluation that is made depends directly on the perspective adopted. If the emphasis is placed on Internet access in Portuguese households, as the ratios were improved, the 'e.escolinha' naturally increased Internet consumption. If the economic perspective is chosen, then for some companies at least, this project was clearly advantageous to the point that it enabled the 'Magalhães' to break into the international market, but it nevertheless fell short of the initial expectations. However, if the pedagogical aspect is to be evaluated, the interviewees point out the various problems the project had.

When asked to give their views on the programme, there are both arguments in favour of its success as well as negative features, which are briefly summarised in Table 2.

TABLE 2: Appraisal and evaluation of the implementation of the 'Magalhães' initiative

POSITIVE FEATURES AND ACHIEVEMENTS IN THE IMPLEMENTATION OF THE 'MAGALHÃES'				
LOGISTICAL BENEFITS	**EMPOWERMENT OF THE CHILD**	**ECONOMIC DEVELOPMENT OF THE COUNTRY**	**INITIATIVE AND ARTICULATION OF THE ENTITIES**	**ACCESS OPPORTUNITIIES**
Distribution of computers Access to two operating systems Educational contents	Self-esteem, enthusiasm and motivation for children and families Children's autonomy, reinvention of the role of the teacher Empowerment of the child, learning, literacy	Exporting, national economy Information Society (future citizen) Transversal nature of ICT	Private initiative Involvement of local government Teachers' commitment, dynamism of schools Adhesion of population, social impact	Internet access Access for families Younger generations' contact with technologies.
NEGATIVE FEATURES AND DIFFICULTIES IN THE IMPLEMENTATION OF THE 'MAGALHÃES'				
TECHNICAL AND LOGISTICAL DIFFICULTIES	**USAGE DIFFICULTIES FOR CHILDREN AND FAMILIES**	**TEACHING DIFFICULTIES**	**STRUCTURAL PROBLEMS**	**POLITICAL PROBLEMS**
Internet access Distribution delays, unequal access Electrical Infrastructures Maintenance, technical support, breakdowns Computer memory Obsolete technology	Insufficient support for students and families Families' investment Using computer for fun	Distribution to teachers Non-use in the classroom Teacher resistance Teachers' bureaucratic burdens Dynamism of schools	Financial sustainability Subversion of the original objective Lack of preparation, mass access Lack of articulation Inexistence of evaluation Insufficient contents Equipping of schools Gaps in teacher training	Management transparency, direct award procurement Promotion in the media Political negativism Political proganda

The previous table reveals extreme views regarding the positive and the negative aspects of the 'e.escolinha' initiative. On the one hand, it boosted the technology and telecommunications market, enabled the computer to be exported and Portugal was regarded as an example for others to follow. On the other hand, the lack of financial sustainability, the excessive political propaganda and the schools' lack of preparation prevented full benefit from being taken of the potential that all the interviewees acknowledge the idea had.

There was a lack of time and strategy for an initiative such as this one. The first version of the 'Magalhães' had several problems with the contents, precisely because there was so much pressure to have a computer ready to be distributed, as acknowledged by Paulo Trezentos (Caixa Mágica). Decision times for implementation were very quick and the distribution of such an amount of equipment turned out to be very complex (meaning that students in the same class were getting their computers at different times). On the other hand, teacher-training was not planned in good time and neither was the involvement of families and local governments (to a certain extent, 1st cycle schools are dependent on these authorities) José Vítor Pedroso sums it up: as it was "an innovative project at a global level, we had to create it and face the first problems for the first time". Another problem was the excessive propaganda undertaken by the government, with the involvement of the Prime Minister (José Socrates) himself: "governments should promote all that they do well, since it is empowering, but the 'Magalhães' was always regarded as a propaganda tool, as something new in political innovation. Therefore it lost much of its momentum and pedagogical impact." (João Granjo, ANP)

Problems arising from the lack of quality of the contents, the poor teacher-training strategy and the distribution in different phases meant that the potential this initiative was presumed to have was not properly explored. Nevertheless, it was an important project particularly for the children, and their families, who for the first time had access to a computer, as we will see in section 5. That notwithstanding, perhaps one of the main problems affecting this initiative was the lack of a long term vision, which led to the lack of sustainability that defeated one of the initiative's main purposes: providing all children with access to a computer. By not being economically viable (which was also partly due to an economic crisis), the programme is no longer able to fulfil this purpose

> I believe that what it lacked was sustainability, in other words, it is a good idea, almost a flash of genius- from the point of view of election propaganda- which was effective for those who benefited from it. (Emídio Guerreiro, PSD)

3.4. Obstacles and continuance possibilities

As far as the continuance of the initiative is concerned, there does not seem to have been a clear and outright cut but instead it was just left to fade away. With the change in government, the new Minister of Education (Nuno Crato) did not continue the programme and there was no initiative meant to replace it. At the time of the interview, Mr.Crato showed an interest in "evaluating the programme" despite considering that "in terms of educational policy, the teaching potential of the 'Magalhães' computer was overestimated".

Luís Amaral pointed out that there was no strong statement regarding technology and the role of technology in promoting society in all its components, particularly school education, as had been the case with the XVII and XVIII Governments. It is now known that such an agenda did not exist and the 'e.escolinha' policy initiative came to an end in a low-key fashion, which was the exact opposite of how it had been launched. However, that did not mean that the 'Magalhães' computer was discontinued. According to Jorge Sá Couto, head of the company manufacturing the computers, the 'Magalhães' project became "increasingly more international rather than national and became a Portuguese flagship project abroad". In his opinion it was a mistake to cut such a programme, stating that it would have been important to rebuild the programme and improve it.

For the Minister of Education who oversaw the launch of the 'Magalhães' initiative, regardless of the continuance or not of the programme, " the first appropriation was made" and therefore, even " without any extraordinary incentives from public policies, a boost was given which may continue to take its course" (Maria de Lurdes Rodrigues, interview).

It is difficult for policies to continue from one government to the next, namely those pertaining to school and technologies (Pereira, 2013) and this case is a further example. The interviewees acknowledge the need to evaluate the measure to correct past mistakes. However, the prevailing view was the programme should continue and so ensure that new students could also have the chance to have a computer.

3.5. Perspectives and conceptions

An analysis of the interviews shows a variety of understandings of some key concepts involved in an initiative such as this one. The computer, school, the child and family are some of the most relevant ones. Given the nature of this study, media literacy is also a relevant topic.

It has become clear that the project takes shape with a view to increasing Internet access in Portuguese households. As such, the school would have a merely circumstantial role in that it was used to distribute the computers among the children, who were themselves vehicles taking the computer and Internet access to homes that did not have them, which, in fact, falls short of "a policy aimed at improving the diversification of pedagogical tools available for teaching and learning" as Maria de Lurdes Rodrigues intended.

The central role occupied by the computer in this strategy is evident- and that may be why this policy measure with such a large social and economic impact lost something along its way. The computer, which was particularly robust since it was intended for children, was in fact the rock on which the whole governmental initiative was based. And this might be its main predicament: giving more attention to the hardware than the actual strategy, discussing issues separately instead of promoting a more comprehensive view of the challenges facing the school and the involvement of the families.

As was mentioned before, some interviewees felt that schools and teachers were given the role of distribution agents throughout the process, but for the former Minister of Education, Maria de Lurdes Rodrigues, this initiative took a new approach to school: "all of it is technological, the whole school is a space where information can be accessed". This is a key concept which helps to understand how this measure fitted into educational modernisation strategy the government sought to promote, as was discussed in section 1. According to Mário Franco,

> The prevailing perception among adults, and in society in general, is that the school is the centre of modernity. In other words, modernity, which is today perceived as coming via the Internet and computing, arrives first through school. The first contact many families had with computers was through the computer that came from school, so they associate schools and teachers

> to new knowledge, which was the case a few years back. There eventually starts to be a separation between school, which represents the knowledge of the past, and technologies, which represent access to knowledge of the future. (Mário Franco, interview)

One may wonder whether this discourse, so enthralled with the technological modernization of education and, as such, denoting some kind of technological determinism (Pinto, 2003), fosters the development of competences to use and critically understand the new digital media. According to Bruno Dias, Member of Parliament for the Portuguese Communist Party (PCP), the 'e.escolinha' meant access to the machine, but, that "does not necessarily mean that it all effectively led to technological education or technological literacy which is what is expected from the so-called democratisation "

Although the interviewees understand that this measure contributed to "the decrease in digital illiteracy" (Emídio Guerreiro, PSD), it is not clear whether they all have the same understanding as to the competences we want children to develop. The issue of safety on the Internet or using the computer for learning purposes, such as improving reading skills, are some examples of digital competences given. However, competences connected with creativity and participation – relevant from the media literacy point of view- do not figure prominently.

The actual issue of teacher-training, a problem pointed out by almost all the interviewees, is mostly regarded as preparation focusing on the techniques and specific usage of the 'Magalhães' computer rather than a more holistic concern about how to teach and learn with technology.

It is,nonetheless, certainly worth emphasising that there were many initiatives that creatively explored the 'Magalhães' with great benefit to 1st cycle schoolchildren, such as the innovative projects headed by Maria do Carmo Leitão- 1st cycle school teacher at the Centro Escolar de Lamego. Also, the way the families appropriated the computer should yield results which cannot as yet be evaluated.

The former Minister of Education briefly summarised the nature and goals of this measure as follows:

> Besides being a policy aimed at equipping schools, its main goal, the main goal of all these initiatives, per action line, always remained the same:

> providing students with better conditions to access technology both at home and at school. This is why we linked the development of the information society to educational policies since it was not just an issue of having access to a computer at school or accessing the Internet on school grounds. It was about maximising the combination of school space with family space. (Maria de Lurdes Rodrigues, interview)

However, in covering both school and family, with the children being the connecting element, this educational policy seems to have lacked more purposefulness as well as a media literacy strategy.

4. SOCIAI AND EDUCATIONAL IMPACT OF THE 'E.ESCOLINHA' PROGRAMME AND THE 'MAGALHÃES' COMPUTER

One of the issues most often raised while the 'e.escolinha' programme was being implemented, and which the media themselves took up a number of times, had to do with the impact and the significance the 'Magalhães' computer would have for the children, particularly as regards their school work.

The campaign undertaken by the government to publicise the programme it had created, which at times resembled a form of political propaganda carried out by the Prime Minister himself (José Sócrates), appeared to envision a programme that would have important repercussions on the educational process and the pedagogical practice in the classrooms. In fact, 'e.escolinha' was launched with great expectations as to how it would revolutionise the teaching-learning process, with its promoters believing it could raise students' educational attainment.

As the actual name suggests, the 'e.escolinha' [little school] was a programme meant for 1st cycle students and 1st cycle schools, however, on various occasions the family was said to be its target group. Although it is clear that it was a personal computer to be used by children in their daily activities, both at school and at home, the question arises as to what the real *locus* of the programme was. Several of the documents setting out the Technological Plan for Education, particularly those pertaining to the 'e.escolinha' initiative, do in fact establish 1st cycle students as the targets of this governmental measure and the

school as the context it is meant for. This information is confirmed in the Audit Court reports[10], as the following quotes show:

> The 'e.escolinha' initiative, beginning in the 2008/2009 school year, is aimed at students attending the 1st cycle (1st grade to 4th grade) and seeks to equip them with a laptop computer and computer programmes that are suited to their needs and characteristics, and makes provision for their access to a broadband internet connection. (Tribunal de Contas, 2010, p. 27).

> Ensuring 1st cycle students have access to personal computers with educational contents;/ Generalise the use of the computer and the Internet in early learning; /Ensure thousands of families have access to their first computer (Tribunal de Contas, 2012, p. 96).

The objective stated in the last quote extends the programme's objectives to families, seeking to create the necessary conditions for all families to have access to a computer. This intention is reasserted by several interlocutors connected with the Technological Plan for Education in their statements to the Temporary Parliamentary Committee of Inquiry on the Government's Actions Regarding the Foundation for Mobile Communications [11]. The hearing with Maria de Lurdes Rodrigues is one which most highlights the family as the target group of the various e-initiatives. In the former Minister of Education's opinion, placing the emphasis on supporting families (particularly those with children and teenagers in school) so they can have access to means that enable them to gain access to information and knowledge has "much greater potential bearing in mind the objectives of the development of the information society" (CIP, 14th Meeting, 24 March 2010, n.p.).

It is true that the objectives are not incompatible. Apparently, at the centre of the process there is a child-student, who has been given access to a personal computer which is carried from home to school, and

10 Reports written in the context of the audit " Public Funding of the e.Initiatives ('e.escola', 'e.professor', 'e.oportunidades', 'e.juventude' and 'e.escolinha') (2010) and the audit to the Education Statistics and Planning Office of the Ministry of Education (2012).

11 Committee approved through Parliamentary Resolution no.8/2010. Its main purpose was, in broad terms, to look into the management of the public funds allocated to the Foundation for Mobile Communications (FCM) and to the Fund for the Information Society.

this may actually serve both purposes. Nevertheless, the documental analysis undertaken within the scope of this research shows a lack of clarity when defining who the main target of the initiative is thereby raising doubts as to whom the programme was intended for after all.

In her hearing before the Parliamentary Commitee of Inquiry Maria de Lurdes Rodrigues stated, with reference to 'e.escola', that " we are talking about families, we are not talking about schools because the Programme is intended for families" (CIP, 14th Meeting, 24 March 2010, n.p.). Maria de Lurdes Rodrigues also explained that in relation to 'e.escolinha', the mode of access to the programme changed, with the school being its centre. However, as the quote below shows, the school is mostly a mediator between the children and their families for the acquisition of the computer:

> (...) 3rd cycle and secondary education students are one thing, as, in fact, their autonomy is different and it is clear to families how important a computer is for their homework and for their individual development; that is not so much the case for 1st and 2nd cycle students so we need to mobilise other resources since these children, particularly those from certain backgrounds, cannot do it by themselves.
> And this is where the school comes into play, in the 1st cycle. Having a Programme in which the family's initiative is assumed and both this initiative and the teenagers' autonomy are respected is very different from having a Programme for 1st cycle students, who do not have such autonomy and, therefore, it is the school that is able to overcome the autonomy deficits and the difficulties families have in accessing information, to take them out of such a ghetto and bridge the gap. We have never been able to come up with anything other than the school to mediate this relationship.
> Therefore, in the programme for the 1st cycle we radically changed the process of adhesion with this mediation being carried out at school, but we also respected the family's interest for nobody ever imposed anything on the families." (Maria de Lurdes Rodrigues, in CIP, 14th Meeting, 24 March 2010, n.p.).

The former Minister of Education acknowledges the support that both schools and the teachers can provide to children in their relationship with computers, but the role they each play remains nuclear. Do they merely mediate the access to the equipment or are they expected to promote the use and critical analysis of the 'Magalhães' computer,

integrating it into pedagogical activities in the classrooms? Official discourse was never very clear on this issue. In some cases, emphasis was placed on the school, in others on the family. As a result, the practices surrounding 'Magalhães' were developed without a monitoring plan. As will be seen from the data presented further on, in the schools participating in this study the 'Magalhães' was used incidentally and sporadically. Most of the activities were carried out depending on the circumstances and the teacher's knowledge.

However and in general terms, the programme deserves credit for democratising access. As can be seen in Table 3, between 2008 and 2011 the 'e.escolinha' enabled approximately 500,000 children to have access to a personal computer, despite not having achieved the distribution target of 750,000 computers[12].

TABLE 3: Distribution figures for 'Magalhães': target vs actual

No. of computers	1st phase	2nd phase	Total
Target	500 000	250 000	750 000
Actual	401 711	94 091	495 802

Source: Audit Court Reports (Tribunal de Contas, 2010 and 2012)

According to data provided by the Ministry of Education (GEPE, 2011), the 'e.escolinha' contributed significantly towards reducing the ratio of students per computer. Before the measure was implemented (2005-2006), the student-computer ratio in 1st cycle schools was 15:9 for public schools and 9:5 for private ones. This figure decreased substantially the year the 'Magalhães' computers were distributed (2008/2009), having fallen to 1:1 and 1:2 for public and private schools respectively. Merely a year after the implementation of the initiative, the

12 The distribution of 'Magalhães' was suspended at the end of the 2010-2011 school year, which may have contributed to the target number not being reached. By December 2009, €85million had been spent on the 1st phase of the 'e.escolinha' initiative, according to analysis of the expenses undertaken with the several e.initiatives (Tribunal de Contas, 2010).

student-computer ratio reached the maximum rate of 1:1 in both types of schools. In terms of students per computer with an internet connection, the situation was similar, dropping from 26:5 in public schools and 13:08 in private ones, in 2005/2006, to a ratio of 1:1 and 1:2 respectively, in 2008/2009 (GEPE,2011).

Therefore, as far as access is concerned, the programme seems to have been successful and met the objectives in terms of student-computer ratio. The adhesion to the programme was also noticeable in the schools participating in this study. Of the 1 517 children surveyed, 1490 (98%) obtained the 'Magalhães'[13] computer, only 27 (2%) chose not to purchase it. The same percentages were obtained from the parent questionnaires: of the 1264 surveyed, 98% stated they had purchased the computer[14]. It was thus an overwhelming majority of children (and families) that joined the initiative.

When questioned about the reason for not purchasing the computer, of the 27, eleven stated they already had another computer, five said it was their parents' decision, five children were immigrants who had recently arrived in the country, while two mentioned errors or delays in subscribing to the initiative. Only one child stated lack of financial resources as a reason for not purchasing 'Magalhães'. Another said he had not been given the computer by his parents as a form of punishment while two others claimed not to know the reason why they did not get the computer.

The parents' answers are similar to the children's as far as the reasons for not purchasing the equipment are concerned. When questioned about the reasons for joining the programme, the parents mention mainly the learning advantages the 'Magalhães' could bring their children and the fact that they would not like their child to be at a disadvantage in relation to their classmates. The low price charged is also

13 During the course of the programme, two versions of the computer were distributed. The second version (MG2) was more advanced in terms of hardware. Of the children surveyed, 53,5% received the MG1 and 47,5% got the MG2. Most of the 3rd grade students got the second version of the computer (93.6% got the MG2 and only 5.6% the MG1) whereas the majority of the 4th graders got the first version (94.4% got the MG1 and only 6.4 the MG2). This issue is connected with the year it was distributed. Some 4th grade children got the MG2 due to delivery delays.

14 Regarding the cost of the computer (N= 1182), 62% spent 50€, 19% paid 20€, while the remaining 19% got it for free. These figures show that the majority of children paid the highest price. Of these, 38% benefit from the School Social Services.

mentioned by several parents, particularly by those that did not have to spend any money at all. It should be mentioned that some parents clearly show some disappointment with the infrequent use of the equipment in the classroom, and were uncertain as to what their decision would be if the issue of purchasing the computer was raised at that moment.

Both the children and the parents' answers as to why they hadn't purchased the 'Magalhães' show that the main reason was not financial difficulties. When cross-referencing this variable with the parents' education level and professions, we did, however, find five cases of unemployed mothers and two of unemployed fathers (in one of these cases both mother and father were jobless), but these situations may have arisen after the computer had been bought. In general, the number of students who do not have the 'Magalhães' is significantly higher among those who with less skilled jobs.

In terms of education level, although 13 children stated they did not know or were unsure, it was found that in five families both parents had completed basic education, in two cases they had completed secondary education and in four others they had a degree. There are also two cases in which the mother had the secondary education level while the father had a degree and another case in which the mother had completed secondary education and the father had done basic education. Based, then, on the information collected on the families that did not purchase the computer, it can be assumed, according to the answers provided by the children and the parents, that the financial component was not the main reason behind that decision. In addition to this conclusion, we may add the fact that only two children from the group that did not buy the 'Magalhães' stated they did not access to the Internet at home (there were also two cases where no answer was provided to this question).

What about the children who purchased the 'Magalhães'? Was it the first computer in their household? According to the children's answers (N= 1436), 92% already had a computer at home, while for a mere 8% it was the first computer they had at home. Of those who already possessed one, 36% stated they owned one, 35% had two computers and 30% three or more computers. The Internet access figures are very

similar to these. Of the 1456 answers, 91% mentioned having Internet access at home and only 9% stated they did not have such a service. The fact that the vast majority of the families had Internet access at home may have been the reason that made 95% of the parents decide not to subscribe to the broadband service when purchasing the computer. Of the 60 families (5%) that subscribed to the service, only four did not have Internet access at home.

When characterising the group of students (N= 113) for whom the 'Magalhães' was the first computer at home, it can be said that there is no pattern as far as their parents' school qualifications are concerned. The various school levels are represented with a slightly higher number of fathers who have the 4th grade (16 cases, 15%) and mothers who have the 6th grade (19 cases, 18%). In terms of occupations, the scenario is slightly different. Most of the households where the 'Magalhães' was the first computer consist of families with low skilled or unskilled jobs or who are unemployed. This analysis is equally applicable to the 9% (N= 129) of households that did not access to the Internet, i.e., they have a similar characterisation in terms of school qualifications and types of occupations.

In short, it can be said adhesion to 'Magalhães' computer was practically on a massive scale. In fact, the reason most often mentioned for not purchasing it is ownership of other computers, which means that they are children who already had access to this technology before 'Magalhães'. Although we acknowledge the initiative was successful in terms of access, we believe that for most of these children and families, access to their first computer was not what was at stake. In that sense, the grand objective established by the government to raise computer and broadband penetration and broadband rates simply does not do apply to the group studied. Most of the families already had access to a computer and saw the 'Magalhães' as an opportunity to purchase a computer at a very affordable price, thereby giving their children the chance to have their own personal computer. This aspect is frequently emphasised in both the children and the parents' answers: having a computer just for the child (which she can personalise), which she can use without having to ask adults or older siblings for permission. The children's questionnaires contain some statements that illustrate how

important this is: “this one is only mine and the others are my father’s”; “the computer is only mine and I can use it when I feel like it”; “it was good to have a computer just for me”; “I was able to know what it was like to have a computer of your own”.

The surveyed parents also mentioned the importance of the ‘Magalhães’ for learning, particularly school learning deriving from its use at school. These were, in fact, their expectations when they purchased the computer. As it was a measure aimed at ensuring ‘one computer per student’, they presumed it could be a medium and a resource that would be used frequently in the classroom, facilitating and aiding in the educational process and preparing the children for the digital world. However, this was not what the parents saw happening in their children’s daily school life, and it became clear in some of the answers in the questionnaire that there were doubts about the compliance with the objectives set by the government and, therefore, about the advantages of having bought the ‘Magalhães’.

In the next section, we will focus on these issues. It is our intention to go beyond the issue of access and analyse how the children used the computer at school and at home, seeking to ascertain whether the ‘Magalhães’ was in fact an asset for these children in terms of school, creativity and digital literacy.

5. THE ROUTES OF THE ‘MAGALHÃES’: BETWEEN HOME AND SCHOOL

5.1. Valorisation of the media

Before discussing the issues specific to this section, we will examine the importance children, parents and teachers assign to digital media in young people’s daily lives and in their school learning process.

With regard to children, Figure 2 shows how important the different media are for them when it comes to learning.

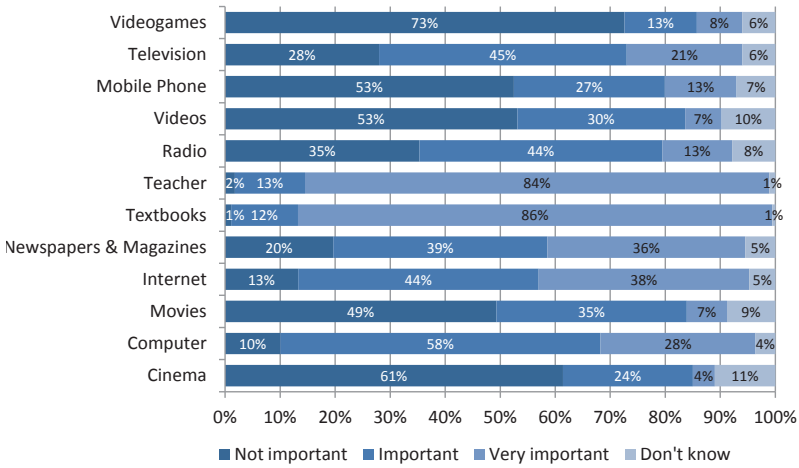

Figure 2: Level of importance children consider each medium has in their learning.
Source: INQCHILDREN

As can be seen, the more traditional learning means- textbooks and the teacher- are those considered to be the most important. Only very few children do not regard them as important. The children's opinions seem to reveal the representations they make based on what they hear and what is passed on to them by the adult generation about what is important and appreciated in learning. Media are more associated to entertainment and pastimes than to learning. Videogames, the cinema, videos, and films are the ones the children mention as being less important when it comes to learning whereas the computer, television, the internet, as well as newspapers and magazine are regarded as the most important. These answers may derive from the representations children have of these media, but also from the different uses they make of them, i.e., some of them might be more associated to entertainment and fun (for instance, videogames) while others to work and information (for instance, the computer and newspapers). In these representations, there is a separation between entertainment and learning as if the media that entertain could not be used to learn.

Parents' opinions regarding which media should be used and analysed at school are not very different from the children's answers. As

can be seen in Figure 3, parents mention the computer (92%) as the technology that is mostly required in the school context. It is followed by the Internet (85%) and by newspapers and magazines (75%). As for the remaining media and technologies, more than half of the surveyed parents considered they should not be used and analysed in class. Videogames and mobile phones get the most negative answers in this respect. Again, this may be due to the connection that is made between these media and entertainment. At any rate, most parents (83%) consider that school should help children to develop a more critical and attentive relationship with the media, while only 3% disagree and 14% neither agree nor disagree. These opinions may be associated to the almost unanimous importance parents assign to the role of media digital technologies in their children's lives. In fact, 52% consider them important and 43% very important; only 5% state they are unimportant or not very important. It should be noted that there appears to be a dependency connection between the variables "importance assigned to media" and the "level of education" and "profession" (value- $p < 0.05$). On the whole, more importance is assigned to the role of media by parents whose education levels are higher and those who have more skilled jobs than by those with lower education levels and less skilled jobs.

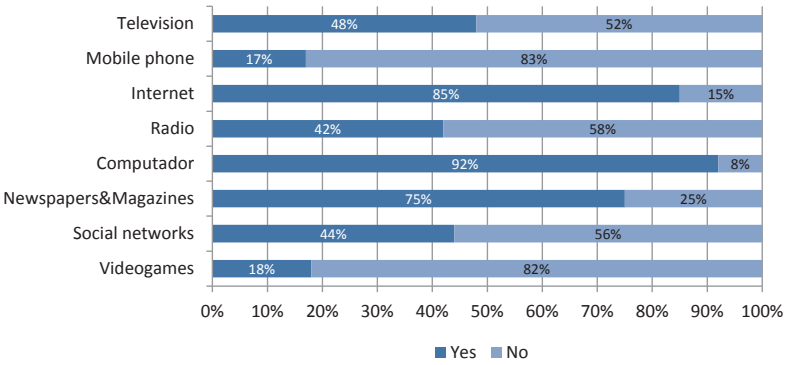

Figure 3: Parents' opinion on media and technologies that should be used and analysed in class.
Source: INQPARENTS

The overwhelming majority of the teachers (99%) regard media as very important (36%) or important (63%) for the children's lives. A similar percentage (97%) considers them to be very important (39%) or important (58%) for curricular activities. Only 3% regard them as not very important and there were no replies in the "unimportant" category.

Despite the importance assigned to media, not all of them are regularly integrated into the teachers' pedagogical activity. (Figure 4) Teachers with fewer years of teaching service use the different media more regularly in their pedagogical activity. It should be stated, however, that using them in their pedagogical activity does not mean it is necessarily in the classroom or in interaction with students. Other questions on this topic show, for instance, that when teachers state they use the computer in their pedagogical activity they do so mainly to plan their lessons (84%) and to communicate with colleagues (76%). Therefore, sending emails, conducting Internet research and planning lessons are the activities the teachers mention as doing the most often on the computer in their pedagogical activity, with percentages over 80% in all three cases. In contrast, playing games, listening to the radio, and downloading music, films and games are the activities which most often get the highest percentages in the " never" frequency.

Newspapers and magazines are the media teachers use the most after the computer and the Internet, although the percentage is not particularly high (36%). This answer, which may reflect the tradition of exploring materials from the written press in schools, is also in line with what children and parents had to say about the relevance of using the written press in class. In fact, on the whole, the media teachers mention as using most often in their pedagogic activity are the ones parents and teachers assign the most importance to and the reverse is also true. We do not believe, however, that this situation occurs by "contagion" from teachers to students and/or parents. Rather, we believe it to be a reflection of the way the different media and technologies are perceived by society, the place they occupy, the roles they play and the value they are assigned in general terms.

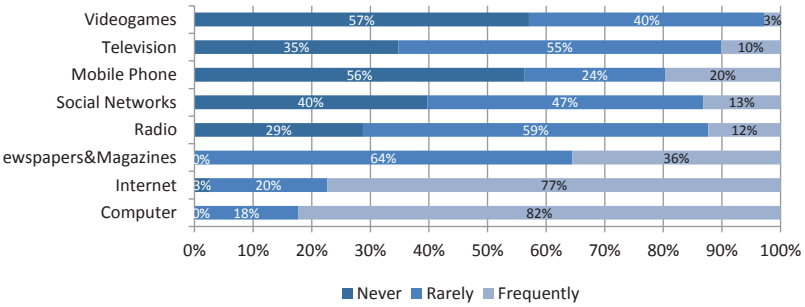

Figure 4: Frequency with which teachers use media and communication technologies in their pedagogical activity
Source: INQTEACHERS

Taking into account the opinions of the three groups surveyed, it is clear that media are regarded as having an important role in young people's lives nowadays. The computer and the Internet are the most valued media for learning and are also the ones teachers state as using the most frequently in their pedagogic activity. The acknowledgement these groups give to these media is shared by society as a whole as they are seen as working tools which can help promote teaching and learning.

As there is no doubt about the importance given to digital media and technologies by the three surveyed groups, the next point analyses the uses and non-uses of the 'Magalhães' computer at school and at home.

5.2. Uses and non-uses of the 'Magalhães' computer

Despite the adhesion to the 'Magalhães', the percentage of students actually using it was not as high. In fact, of the children who answered this question (N= 1490), 65% stated they used it as opposed to 35% who said that they did not use it or stopped using it. The data shows that girls (70%) use the 'Magalhães' slightly more than the boys (61%.) Computer breakdown is the reason most often given for it not being used and other reasons include preferring other computers or not liking to use the 'Magalhães'. These last two reasons reveal the children's

disappointment, even among those that actually used the computer, with its poor performance ('it's slow', 'it's limited', they said). This was particularly the case for the MG1. The breakdowns were a frequent problem, which was more acute for the first version. Other issues were the loss (or even theft) of the computer and the loss of the battery charger. Parents were not always willing or able to have the equipment repaired since the cost could often be higher than the price paid for the actual computer.

There seems to be a dependency connection (value-p < 0.05) between the variables 'parents' qualifications' and 'use of the 'Magalhães' computer'. On the whole, use of the 'Magalhães' is higher among children whose parents have higher qualifications. Similarly, the data shows a significant dependency connection (value-p < 0.05) between the variables 'parents profession' and 'use of the 'Magalhães' computer', i.e., the use of the 'Magalhães' is higher among children whose parents have more skilled jobs.

When it comes to the use of the computer in class, 52% of the children who replied (N= 969) stated they did use it whereas 48% said they never did. Of those who did use it, only 9% did so on a regular basis and the remaining stated it was infrequent. It is worth mentioning that a high number of children who never used the ´Magalhães' in class stated that they would like to.

When asked about the reasons for not using the computer in class, the main reason given is that it was not required (by the teacher). There are other reasons that are stated in the open-ended questions, which seem to confirm some of the information that was collected informally from teachers and schools. They include, for instance, inadequate electrical power supply in schools; difficulty or even impossibility to charge batteries simultaneously and the high number of computer breakdowns. There are also cases of children whose parents did not allow them to take the computer to school in case it got damaged. This argument illustrates how difficult it is to know what in fact was the objective for the computer and the context it was primarily meant to be used in, as mentioned previously when discussing the *locus* of the programme.

The children who stated they used the 'Magalhães' did so mainly in the Portuguese Language subject, followed by Environment Study,

Mathematics and finally Artistic Expressions. Some children also mentioned using it in the Curricular Enrichment Activities, particularly when they included ICT lessons.

Although they stated they considered textbooks as one of the most important means for learning, as seen before, when the children were asked whether they preferred to do their work on the 'Magalhães' or in their notebooks/textbooks, of the 303 replies, 75% mention the 'Magalhães' and only 25% notebooks and textbooks.

The not very frequent use of the computer at school, which is clear from the children's questionnaires, is confirmed by the data from the teachers' questionnaires: 8% state they never used it; 28% used it before but not any longer; 42% use it sporadically and only 22% state they use it quite frequently. The reasons given by teachers who never used or stopped using the 'Magalhães' are shown in Figure 5. As can be seen, damaged computers, the fact that not all students have them, the lack of electrical outlets in the classroom and students forgetting to bring the computer to class are mentioned by more than 40% of the teachers. Technical and logistical reasons seem, therefore, to be the main reasons hindering the use of the computer in the classroom. Less frequently the respondents also reported difficulties that arise from work organisation and management and from training

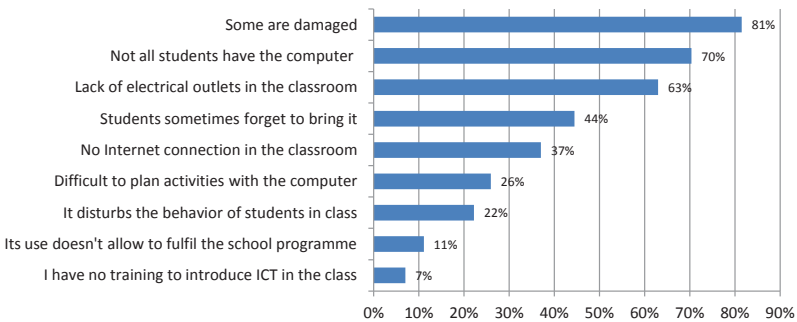

Figure 5: Reasons for the non-use of the 'Magalhães' computer reported by teachers
Source: INQTEACHERS

As for the teachers who stated that they use the computer, be it sporadically or frequently, only one mentioned using it on a daily basis; 18 teachers reported using it one or more a week while 14 stated they used it only on a monthly basis. In other words, the use of the computer in educational activities is still sporadic, being a resource to carry out specific tasks. It is an auxiliary tool used occasionally and not one which is integrated in the teaching-learning. The activities teachers say students carry out most often on the 'Magalhães' computer in the classroom, which will be discussed in the next point, are indicative of this sporadic practice.

This scenario is also confirmed by the parents. When asked about the frequency with which the children took the computer to school, 37% (N= 1187) stated they had never taken it while less than 0.5% stated they took it every day. The numbers are similar to one another when it comes to those who stated once a week (18%), more than once a week (17%) and less than once a month (16%). When inquired about the reasons for never having taken to the computer school, the majority (63%) stated that the teacher did not require its use in class, while 40% said it was due to computer breakdown. Other reasons include the excessive weight in children's backpacks (3%), the fact that ICT classes were cancelled or issues with the school's electrical power supply.

With regard to its use at home, there were some disparities between the children's and the parents' answers, which may be explained by different understandings of what it means to use the computer. We assume that the fact the children had the computer at home may have led them to answer affirmatively to the question about other spaces (besides school) where they used the computer. According to the children's questionnaires, 8% do not use the computer at home; in the parents' questionnaires (N= 1220), 25% state that their children never use it at home. The highest percentage occurred in the option 'more than once a week' (35%) and only 10% chose 'every day'. The main reason for not using it at home is also computer breakdown (64%). Other reasons mentioned included the children using other computers (28%), the fact they did not find the equipment interesting (11%) and that the teacher did not require its use at home (8%). The children use the 'Magalhães'

mainly in social spaces of the house, such as the living room or the kitchen, but the bedroom is also mentioned by the parents as a place of choice for using the computer.

Still on the subject of uses, we sought to ascertain whether the children had rules regarding the use of the computer both at school and at home. As far as the home context is concerned, more than half (68%) state they do while 32% say they do not. The rule most often mentioned refers to the amount of time they are allowed to spend on the computer: despite not being a considerable number, 33% do state they are not allowed to use the computer for a long time. Few children (only 12%) report that their parents impose restrictions on Internet access from their 'Magalhães' computer, but when asked about Internet access at home regardless of the device, 83% state they had to follow some rules. Some of those most often mentioned are related to issues of personal and family safety: 'I cannot talk to strangers' (81%) and 'I cannot give personal information about me or my family' (70%). Despite the parents' concerns, as reported by the children, about preserving their children's privacy and keeping them safe, a little over half (56%) the number of children mention having rules about posting photographs or videos of themselves, their family or friends. Considering their ages, one could expect there to be a greater concern regarding the public availability of this type of content.

Among the parents surveyed, great care appears to be taken to supervise their children when using the computer and the Internet. Thus, 85% state they monitor or accompany their children on the computer, although 72% of the children report that they are not accompanied / do not get help when using the 'Magalhães'. Restricting the time their children can spend on the computer (67%), 'not allowing them to talk to strangers on the Internet' (66%) and 'not allowing access to certain sites' (63%) are the parents' major concerns, which are line with what children had to say on this issue.

Application of Chi-Square tests revealed the existence of a dependency connection (value -$p < 0.05$) between parents' 'education level' and the acts of mediation regarding their children's use of their technology, namely:

- Restricting the amount of time spent of the computer/Internet;
- Not allowing access to certain sites;
- Not allowing access to certain programmes or games;
- Not allowing the downloading of games/programmes from the Internet;
- Not allowing children to talk to strangers on the Internet;
- Monitoring/accompanying children on the computer.

In all the above cases, the frequency is significantly higher for parents with higher levels of education. There is also a significant dependency connection (value -p < 0.05) between parents' 'profession' and all the acts of mediation undertaken with the exception of 'restricting the amount of time spent of the computer/Internet' (value-p > 0.05). In other words, parents with higher skilled occupations undertake those acts of mediation much more frequently when compared to parents with lower skilled jobs.

Rules were also established for using the 'Magalhães' at school. Of the 44 teachers who discussed this issue, only one reported not having set down rules. These were mostly about bringing the computer to school with a charged battery (36) and using the computer in the classroom under the supervision of a teacher (31).

When discussing the rules established for children when using the media both at home and at school, we must always bear in mind children's age group. These are children who are progressively building their autonomy, namely in using the media, and who are still very dependent on their parents. This dependency occurs in the children's relationship with their parents, but also in the parents' relationship with their children as they seek to fulfil their parental role of protecting their children. In a previous study (Pereira, 1999) focusing on television, it was ascertained that there was a predominance of restrictive parental mediation to the detriment of mediation based on negotiation or dialogue. Rather than forbid or restrict, this type of mediation seeks to prepare children to deal with the risks and the opportunities that the media present. The need to raise parents' awareness to this and to encourage them to have a more active mediation is another reason why it is important to promote media education.

Before moving on to the next point about the activities carried out on the 'Magalhães', we will briefly mention the programmes the children like the most and the least as well as the ones they use most often. After all, these programmes may also stimulate or discourage computer uses.

Although there was a wide variety of an answer as regards the programmes the children liked the most and the least, it was possible to group the answers and categorize them by groups. In terms of the programmes the children most like, games in general take first place, particularly action and adventure games, followed by educational games and resources installed on the 'Magalhães' (for instance, 'Eu Sei' [I know], 'ClicMat', 'A cidade do faz-de-caso' [Pretend City], 'Super Tux', 'À descoberta do ambiente'[Discovering the Environment], 'English is Fun', 'Diciopédia'), Microsoft Office programmes (Power Point and Word) and programmes which allow them to paint, draw, listen to music and watch videos. The programmes children say they like the most are also the ones they use most often. Oddly enough, with the exception of the games they play for fun, the other programmes are also the ones which appear in the 'I like the least' category and no reason could be found to explain this discrepancy in opinions.

5.3. Activities

By analysing the activities carried out on the 'Magalhães', we can ascertain the range of activities the computer enabled the children to do and the type of experiences it may have stimulated.

The range of activities is not very wide or innovative, as can be seen in Tables 4 and 5, as the activities mentioned are often those which children already usually carry out on some other medium (for example, reading and writing texts and playing games). Of the 18 activities presented to the children (see Appendix A), this study focuses on the five activities children carry out the most often and the five they never do, at home and at school, according to the children, the parents and the teachers. As can be seen, there is a great similarity in the three groups' answers both in terms of the activities undertaken and those not. The data obtained from the children's questionnaires do not show

a dependency connection with the variable 'parents' qualifications' and the various types of activities carried out with the 'Magalhães', the same is true for the variable 'parents' profession'. The activities children do on the 'Magalhães' are, thus, similar among the various socio-economic groups, despite the fact that children whose parents have higher qualification and higher sklilled jobs use the computer more frequently, as mentioned before.

When it comes to gender, there is a significant dependency connection ($p<0.05$) between this variable and the types of activities done at home. For example, drawing, reading and writing texts, editing images and photographs are activities more often carried out by girls than boys. Conversely, downloading music, films and games and watching and producing films are activities that boys do more. As for the activities carried out at school, there is no dependency connection between this variable and gender, which can be explained by the way work is organised in the classroom.

Playing games is the activity most often done at home, according to children and parents. It is an activity that attracts the interest of both boys and girls, but the percentage of boys who state they do it many times (80%) is slightly higher compared to girls (72%). Some of the games are those which are installed on the computer and others are available online. At various points in the questionnaire, and not only in this question, we were able to ascertain that the computer served mainly for the purpose of playing, being more associated to entertainment and fun than to work and school learning (despite the fact that school learning can also be fun). Indeed, some of those games, particularly those that are frequently used at school, have educational purposes and are linked to some of the subjects studied in 1st cycle schools (for example, Mathematics and Environment Study)

Activities such as reading and writing texts, as well as drawing, which are usually associated to school tasks, are frequently mentioned both at home and at school, more so by girls. Still within this category, one can include 'doing exercise' and 'making powerpoints' (usually for small assignments). Of the activities mentioned in the "frequently" column, the only one which could not be done without a computer is "doing an Internet search". Despite being one of the activities most often

mentioned, only half of the children report doing it frequently (50% of the boys and 46% of the girls) at home; the other half either state they never do it (29% girls and 28% boys) or not frequently (26% girls and 22% boys). This scenario changes completely when we look at what happens at school: more than half (54% boys and 52% girls) state they never do an Internet search at school while only about a third report doing it frequently (27% girls and 26% boys). This finding may be linked to Internet access at school: although only nine teachers mentioned not having Internet access at school, a much higher number of them (31) report not having access in the classroom. Besides this, even when there is access, the connection is not always very good and in some schools Internet access in classrooms is only via the teacher's computer as there is no wireless connection.

As for the children who do carry out Internet searches, we were not able to ascertain whether they were taught how to do it, in other words, whether work was done with them on how to look for information critically, analyse search results, compare sources, identify and validate information collected and reference findings. Carrying out an Internet search according to certain objectives and guidelines is very different from one in which children aimlessly drift online without any method for browsing. Learning to do conduct a search is an essential skill, and it is above all the school which has the task of promoting children's information and digital literacy so that they are able to cope with the demands and requirements of the information and knowledge society, regardless of the context where research is done.

TABLE 4: The five activities children carry out most and least often on the ´Magalhães' at home, according to children and parents

	FREQUENTLY	NEVER
Children	Play games	Write on blogs
	Listen to music	Watch the news on the Internet
	Conduct a search on the Internet	Go to social networks
	Read and write texts	Share photos, videos or music
	Watch videos and films	Produce videos and films
Parents	Play games	Write on blogs
	Conduct a search on the Internet	Produce videos and films
	Listen to music	Send emails
	Draw	Watch the news on the Internet
	Read and write texts	Download music, movies, games...

TABLE 5: THE FIVE ACTIVITIES CHILDREN CARRY OUT MOST AND LEAST OFTEN ON THE ´MAGALHÃES' AT SCHOOL, ACCORDING TO CHILDREN AND TEACHERS

	FREQUENTLY	NEVER
Children	Read and write texts	Send emails
	Do school exercises	Watch the news on the Internet
	Play games	Chat with friends/ family on the Internet
	Conduct a search on the Internet	Go to Facebook, MSN, Hi5, etc.
	Make Power Points	Write on my own or class blog
Teachers	Read and write texts	Go to Facebook, MSN, H5, etc.
	Conduct a search on the Internet	Chat with friends/ family on the Internet
	Do school exercises	Produce videos and films
	Play games	Watch the news on the Internet
	Make Power Points	Send emails

The activities listed in the 'never' column are the ones the respondents indicated as being the least often carried out by children either at

school or at home. Among them are mostly activities connected with the production of contents (writing on blogs, making videos or films), communication (chatting with friends and families, sending emails), checking out profiles on social networks and watching the news. It is worth mentioning that of the activities at home mentioned by children only 'writing on blogs' and 'watching the news on the Internet' have percentages well above 50%, around 70%. In other words, 74% of the girls and 73% of the boys reported that they never write on blogs and 70% of the girls and 61% of the boys said they watch the news on the Internet. As far as the latter activity is concerned, what is noteworthy is the 10% difference between boys and girls, which together with the fact that 17% of the boys mentioned they do it frequently as opposed to 11% of the girls may suggest that boys seem to be slightly more interested in news than girls.

The other three activities children report never doing at home have percentages slightly above 50%. There are only very slight differences according to gender when the frequency selected for those activities is 'never'. However, there are clearer differences when the answer is 'I do it frequently'. For example, going onto social networks is an activity which 52% of the girls and 48% of the boys never do, but, on the other hand, 30% of the girls say they do it frequently as do 37% of the boys. Also, producing videos is something 47% of the girls and 49% of the boys never do while it is done frequently by 22% of the females and 28% of the males.

The five activities children say they never do at school obtain much higher percentages than was the case at home. All the activities are mentioned by over 80% of the children, both by girls and boys. The option 'I do it frequently' for these activities obtains less than 10%; watching the news on the Internet, for example, has the lowest percentages as it is reported by only 5% of the girls and 6% of the boys as a frequent activity.

These findings clearly show that the 'Magalhães' is used much more often at home than at school as the children's answers are unequivocal as to the frequency with which they carry out certain activities in the two environments. In fact, there are higher percentages for the 'never do it'

option at school than at home; conversely the percentages are higher for the 'I do it frequently' option at home than at school.

The children's young age may explain the low frequency of these activities. Some require a certain level of autonomy and initiative which the children may not yet possess. Others may even be considered 'risky' for this age group, although it is necessary and important to strike a balance between the risks and the opportunities the digital media can offer. That balance may be achieved precisely through parental and teacher mediation. According to stipulations, to create a profile on a social network, namely on Facebook one would have to be at least 13 years old, which may, incidentally, help to explain the results. However, many children create their profile before that age, some with the help of older siblings or even their parents. In these cases, what is important is for the child to understand the opportunities this medium can offer but also to be aware of the risks the network presents and know what behaviour can be considered as risky and should therefore be avoided. Preparing and empowering children so they can deal with online (and other) environments should be part of children's education process and the family and the school are the main agents responsible for it. What we mean by this is that although some of the activities may be slightly premature or risky for these children's age group, they may also challenge youngsters' creativity and critical attitude. It all depends on how they are carried out, monitored and mediated.

If there was mass access to the 'Magalhães' giving every child the chance to have a computer, it would have been an opportunity to encourage other types of uses, both of the computer and the Internet, other than those which they already know, do and enjoy. More proactivity, particularly by schools might have made it possible to explore the potential of these media even further, contributing, thereby, to reduce social differentiation not only in terms of access, but also of use practices.

5.4. Advantages and shortcomings of the 'Magalhães'

In this last point, we would like to report on the children, parents and teachers' opinions on the potential advantages for 1st cycle schoolchildren of the distribution of the 'Magalhães' computer. On the whole,

opinions are quite favourable although it is admitted that the governmental programme fell short of expectations based on the objectives that were set and there was criticism, particularly by parents, of the manner the initiative was managed and implemented.

Despite the constant equipment breakdowns which prevented children from using the 'Magalhães', they did mention many positive aspects the distribution of the computer had. We sought to generate a "word cloud" with some of the words or expressions the children used most often to describe the benefits that the 'Magalhães' brought to their lives.

Figure 6: "What benefits did the 'Magalhães' bring to your life?" – Words and expressions used by children

The word children most often use to describe the most important benefit they got from the computer is 'Learn' which they use in the broad sense or actually specify the type of learning they engaged in through the computer. However, the word 'nothing' is not too far behind, with some children explaining that computer breakdown did not allow

them to benefit much from it; others that they expected a better performance from the computer, and there are those who said 'nothing' simply because they could not fathom any benefits the computer may have brought to their lives. Other words that stand out are 'games' and 'personal computer', which is in line with what was discussed before about the importance of the 'Magalhães' for children. In fact, games and playing are greatly appreciated, as a good way to spend free time and also to have fun and to learn. The chance to have a computer that is 'only mine', in their words, is another feature which the children greatly appreciated, as mentioned earlier on in this chapter. Being the 'owners' of the equipment, using it when they please, not having to ask for permission or wait to use the computer provided children with a certain sense of autonomy and confidence in their ability to explore and use the computer on their own. Another word which frequently appears is 'the Internet', i.e., the possibility of accessing and surfing the Internet. But there are also words which express feelings: joy and happiness are used the most, particularly in connection with what it means to have a personal computer and with the activity they do the most on it: play.

Used less frequently are words such as 'search', 'study', 'write', 'homework' and 'talk to others'. In other words, much of what was said to be the objectives of the programme was not particularly valued by the children. The 'Magalhães' was mostly regarded as a medium to be used for their entertainment and fun rather than as a work and learning tool. These accounts also enable one to detect flaws the programme had both in its design and implementation. An initiative whose major concern is access to technology, neglecting other types of objectives and dimensions (selection, analysis, critical understanding and production, for example) has to be regarded as an incomplete project. We do not mean to say that it was not an important initiative, but we do believe that considering the human and financial resources invested in the programme, it should have offered its target groups other experiences and opportunities, particularly in terms of digital literacy competences, which are today regarded as fundamental to exercising citizenship (European Parliament and Council of the EU, 2006).

Undoubtedly, the emphasis of the programme was on access to technology, which is where some of the advantages mentioned by parents

and teachers derive from. For example, more than half of the teachers (56%) highlight the contribution made by the 'e.escolinha' programme towards reducing social inequalities among the children by allowing every student, regardless of socio-economic status, to have access to a computer. A significant number of parents (80%) also state that having access to and learning to use a computer was an advantage.

Despite the not very frequent use and the types of uses, 55% of the teachers (N=40) consider that the distribution of the 'Magalhães' contributed to the increase of the children's digital literacy levels, even though the remaining teachers either disagree or neither agree nor disagree. When asked about the dimensions they considered important for the development of the children's digital literacy, 'know how to protect yourself from possible risks' obtained 100% agreement. Other dimensions that obtained very high percentages, over 90%, were 'know how to use technology' (99%), 'have access to technology' (97%), 'know how to select and evaluate information' (96%) and 'read information critically' (95%). Close to these figures was the dimension' develop competences which will enable them to have a higher skilled job' (89%). Less valued, but still with 70% of answers was "be able to produce digital contents' (70%). The teachers answers include the various dimensions that comprise the concept of media literacy set out in the European Commission Recommendation of 20 August 2009 (European Commission, 2009), even though they assign less importance to production than to access and to analysing and critically understanding messages. Therefore, since it is possible to conclude that the teachers are aware of what it entails to carry out work in this field, we draw the conclusion that when they state that the 'Magalhães' contributed towards increasing the children's digital literacy, they are referring above all to one dimension of the concept, i.e., access to technology.

In teachers' discourses there seems to be a mismatch[15] between how they evaluate the impact of the programme and how they describe

15 Another mismatch was detected in discourses on teacher-training. On the one hand, they state it would have been fundamental for the government to have proposed training sessions for teachers together with the programme, which would prepare them for ICT use, namely the 'Magalhães', in classrooms, thereby indicating they lacked preparation in ICT use. But, on the other hand, when asked about the major constraint for the use of the 'Magalhães', training and pedagogic preparation are the factors which are least mentioned, while logistical and technical issues come up most often.

their classroom practices with the computer. Their evaluation is always much more positive than what they state was the case in terms of practice and then what was understood to have happened based on the children's and parents' questionnaires. This mismatch is also visible when cross-referencing the analysis of the question about the contributions made by the 'Magalhães' (Figure 7) with other questions such as the shortcomings of the computer's distribution programme, the factors constraining its use and aspects they would like to see changed if the 'Magalhães' were still being distributed to schools. The teachers are much more optimistic evaluating the contributions than when answering the other questions, as they criticise the manner in which the programme was designed and implemented. In general, the criticism would actually call into question some of the contributions mentioned in Figure 7 which got answers above 90%. Some of the issues that sparked criticism were: the lack of a pedagogical project to accompany the distribution of the computer (mentioned by 64%); the lack of teacher –training (57%); not taking account of the diversity of educational contexts (46%). The suggestions put forward relate to aspects that derive from difficulties encountered when using the computer. In order to improve this process, suggestions include: shoring up the technical support centres that assist schools in repairing breakdowns (79%); distributing the 'Magalhães' to all 1st cycle school teachers (71%) so they can become acquainted with and explore its contents; carrying out training sessions for teachers (67%); providing more specialised contents for teaching/learning certain subjects (66%); keeping the computer at school instead of taking it home (62%).

Taking all these aspects in account, considering how the 'Magalhães' was not used or only used sporadically in classrooms as well as the narrow range of activities carried out with this computer, the question that remains is how it was nevertheless able to bring the benefits mentioned by the teachers which are shown in Figure 7.

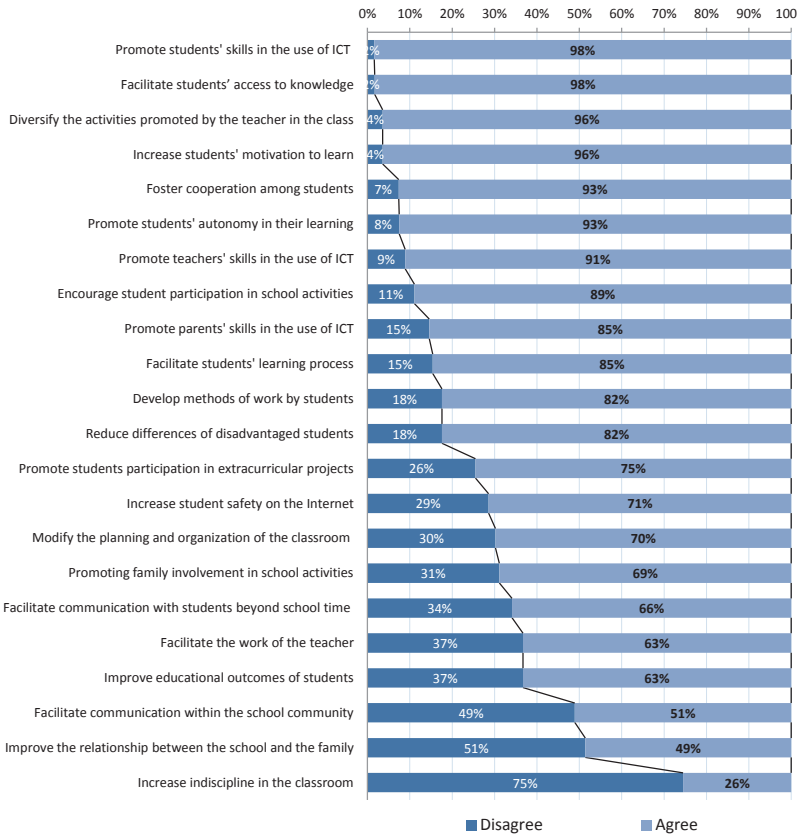

Figure 7: Main contributions of the 'Magalhães' computer pointed out by the teachers (first published in Pereira, 2014, p. 227)
Source: INQTEACHERS

As far as the advantages or shortcomings mentioned by the parents, the vast majority considered that the 'Magalhães' was useful for their children in that it enabled them to have a computer and to learn how to use it, much more than motivating or helping them with their school learning. On the whole, they have a favourable opinion on computers, stating advantages such as 'increasing knowledge in general', 'having a better future since jobs increasingly require the use of computers'. It is also true that they mention disadvantages, and among their concerns

are ‘access to inappropriate content for children’, ‘dependence on technology’ and ‘taking time away from healthier pursuits’.

A significant percentage of the parents consider the ‘Magalhães’ has advantages over other computers, mentioning as examples, the fact it comes with educational programmes (78%), it being for suitable for use by children (more resistant and lighter) (76%) and the fact it is portable enabling continuity of work between school and home (76%).

On the whole, parents take a positive view of the governmental initiative Once again, the main benefit being that it allowed children to have access to a personal computer (mentioned by 74%). The fact that the programme contributed to reducing the disadvantages of underprivileged children and that it enabled families to have access to a computer are the advantages mentioned next most often, with 60% and 56% respectively. It is worth noting that practically half of the respondents (48%) disagree that it was an unnecessary expense, but 41% agree that it was a measure at odds with the reality of Portuguese schools, while 40% agree that it was, above all, government propaganda.

6. FINAL REMARKS

The ‘e.escolinha’ initiative and the ‘Magalhães’ distribution programme were presented in a scenario of fascination and wonder for technology and for the power that ‘Magalhães’ would have in revolutionizing the teaching and the learning process. The presentation of the programme to society was characterized by a certain technological utopia, giving the computer an intrinsic power of innovation and change.

The generalized distribution of the laptop ‘Magalhães’ to primary school children cannot be fully understood without a broader political economic approach. Indeed, in Portugal – like in most Western countries – successive governments (particularly since the XIII Portuguese Government) have developed the so-called Information Society policies in order to promote the intensive use of ICTs.

ICTs in general are bandwagons for the economy and serious attention has been paid to numerous initiatives to promote the commercialization and use of new technologies and new media. Although the distribution of the laptop had underlying economic and industrial objectives,

the political discourse regarding this initiative has been focused on the pedagogic potential of the computer which has caused some social outcry. In a country where basic needs have not been fulfilled in many schools, teachers, parents and other social actors have strongly voiced discontent regarding this expensive government' 'pedagogic' priority. In fact, this governmental programme has sparked off a great public debate in Portuguese society. Arguments in favour of and against the initiative had a significant expression in media, namely in the press (Pereira & Pereira, 2013; Melro, 2011). A columnist from a reference Portuguese newspaper expressed ironically how the Prime Minister was extolling the virtues of the computer:

> The Prime Minister looks at the 'Magalhães' and sees information highways and communication bridges and, road metaphors aside, he sees a future which is the same as the present that other people are living abroad. Inside [Portugal], unfortunately, Portuguese people look at the Magellan and enact the fable of the ox and the palace (Gonçalves, 2009).

In this debate of pros and cons, Alice Vieira, a well-known Portuguese writer, redirects the discussion to what should be truly important in this debate, arguing that

> If kids are not taught how to think, to conduct a search, to use a text as it should be, instead of just copying what they see on the screen - the 'Magalhães' is worth nothing (Vieira, 2009).

The uses of digital technology in education are not a new issue nor a consensual one. Almost three decades ago, Seymour Papert announced that computers would considerably transform education. In his first book,'Mindstorms', written in 1980, Papert proposes that using computers provides a more motivating means of teaching areas like science and mathematics. In subsequent books (Papert, 1994, 1997), Papert continues emphasizing the importance of computers in education, criticizing the schools for resisting the challenges thrown by computers. These ideas are also shared by Nicholas Negroponte. In the book 'Being Digital' (1996), Negroponte explores the impact of digital technology on the world, explaining what being digital means and how

people's life could be enhanced by it. These perspectives emphasize the benefits of the computers' uses in education and are indeed very optimistic about computers in education. In Papert's case he criticises school, regarding it as an inefficient institution and considering that education will transform itself into a private process. But this perspective is centred on technology and devalues social interaction and social uses and practices around technology. The author looks at children as if they are all equal, presenting all a kind of innate skills and an intuitive knowledge to use computers.

These fervent points of view have been challenged by other ones that look suspiciously at technology in education. Neil Postman, for instance, refutes the 'technopoly', i.e., "the submission of all forms of cultural life to the sovereignty of technique and technology" (Postman, 1992, p. 52). His view, based on a strong technological determinism, conceives the media audience as an undifferentiated mass of people. Children, concretely, are seen as passive human beings, unprotected before the manipulation of the media. In his book 'The Disappearance of Childhood (1982), Postman defends that the barriers between adults' world and children's world are being blurred and that this blurring is due to the cultural environment created by the media.

In recent years, more specific criticisms of children's uses of computers (and the Internet) have emerged from diverse domains. Therefore, computers are accused of promoting poor school performance (Dwyer et al., 2007), poor concentration, social isolation, the displacement of other activities (such as reading) and the deprivation of essential sensory and physical experiences. These criticisms and many others are presented in a report entitled "Fool's Gold: a critical look at computers in childhood" (Cordes & Miller, 2000). At the same time, other arguments have -emerged considering that nowadays a learning environment without technologies will be out of step with student's own reality. The appropriate use of ICT is considered essential to develop independent learning skills and to foster social interaction and participation. Arguments for or against, what the huge number of publications on this topic show is that ICT, and its use in education, is a bigger issue without large consensus.

The theoretical perspectives that framed and substantiated this research project were those placed on an ecological perspective which takes into account individual, social and contextual factors that could enable or constrain the use of technology in education. Moreover there are macro questions, such as national and - global economics, which should also be addressed. The British researcher Neil Selwyn, currently professor in the Faculty of Education, Monash University, Australia, in his vast work on technology and education (see for instance Selwyn 2010, 2011, 2013, 2014) debates the use of digital technologies in educational settings and how schools are dealing with digital technology. Selwyn problematizes "the universalising nature of the discourses that have come to surround technology use in education (Selwyn 2013, p. ix) by addressing fundamental questions focused on technical, social and economic aspects. He gave particular attention to dimensions often disregarded in the Portuguese initiative: people, practices, contexts, structures and practices behind the use of technologies. Some problems within the 'e.escolinha' programme were actually related to the lack of attention to these dimensions. The governmental discourses embodied a form of technological determinism making believe that the 'Magalhães' computer would by itself solve the teaching-learning problems and contribute to the children's school success, as these two quotations from the former Prime Minister and the former Minister of Education can illustrate:

> When a 'Magalhães' enters a household, this household will never be the same. 'Magalhães' is a computer for all ages, it is a computer that does everything we need" (statement of the former Prime Minister to the news bulletin 'Jornal da Tarde', RTP - Public Television, October 23, 2008).

> The programme is an overpowering means that can make everything change: it can make a child who has difficulties in learning how to read, learn faster and better. (statement of the former Minister of Education to the newspaper 'Diário de Notícias', September 22, 2009).

In an optimistic political discourse, children are seen as the discoverers of the present. As Fernão Magalhães in the XVI navigated through unknown oceans, children will use their 'Magalhães' computer

to explore new worlds and new oceans of knowledge. This is a beautiful image, but not all children are 'techno savvy' and the new conditions of education with computers also require new competencies and new literacies that children should develop. The digital divide is not just a question of access to technology – to have or not to have a computer, to be connected or not to the Internet. The fundamental divides are related with the modalities of meaning construction (Pinto, 2003) and how children are empowered to critically analyse and construct meanings. From a technology-driven perspective children can simply acquire media and digital skills without adult intervention or supervision. But "if they are to be full, active, creative, and ethical participants in this emerging participatory culture" (Jenkins 2006, p. 105) there are "a set of core social skills and cultural competencies that young people should acquire" (idem) and for this, teacher, parental or even peer mediation is fundamental. This reflection can be extended to the uses and the kind of activities children in our study developed through the 'Magalhães', either at school or at home. As we analysed, the set of activities performed by children was not very innovative or diversified. Children took few advantages of the potential benefits of the computer and the key point here is that they need the informed intervention of their educators to exploit the resources and the opportunities provided by digital technologies and to extend their prior experiences. For sure they can also explore and learn by themselves but if the objective is that they develop critical and creative competencies the adult support is essential.

The research project 'Navigating with Magalhães' was elaborated with a main assumption in mind - delivering computers to schoolchildren does not automatically lead to knowledge and learning. At the end of the study this assumption was confirmed and became a main conclusion. Digital technology could offer an important potential for education but, in this case, access to technology was merely instrumental. From the results of the study, we observe that this governmental policy was not consistently meaningful in the everyday of schools and in classroom contexts. The 'Magalhães' computer was not more effective than traditional methods in terms of involving and stimulating children in the learning processes because any technology motivates learners by itself.

As Buckingham states (2007), "the idea that digital technology will fundamentally transform education is obviously part of a bigger story" (p. 31). And to tell this 'story' we need to understand if policies are mostly centred on technology and its access or if their main centre are people – learners and educators – and their uses and life circumstances. We also need to be aware that this issue is not free of political substance and that it serves neo-liberal values. Selwyn (2014) pointed out that "over the past 30 years, technology-based education provision appears to have been reshaped along ever more individualistic and market-driven lines, working primarily to satisfy the demands of contemporary capitalism" (p. vii), and we need to think about this when we analyse or evaluate a technological policy for education. We also need to acknowledge that computers and other digital media are not neutral tools for learning and "yet it is only in the social contexts of use that technologies have any meaning" (Buckingham, 2007, p. 177).

We are not saying that this programme was not important and meaningful for children, schools and families. In fact, in some contexts it brought new practices into being. But the question is that it was far from achieving the aims promised when it was launched. We agree with Buckingham (2007) when he says that "there is frequently a significant gap between the imagination of policy makers – and of more academic accounts of educational technology – and the realities of teaching and learning (p. 30). Perhaps one problems of this policy is that it was mandated from the top to down, the opinions of schools administrators, teachers and even children's opinions tended to be marginalized. Teachers were collaborators only for the administrative registration of children who wanted to acquire the computer. They weren't involved in nor prepared to integrate one computer per child into the classroom. The initiative was not also preceded or accompanied by neither a pedagogic programme nor a teacher training plan. Using the words of Marçal Grilo, a former Minister of Education in the XIII Portuguese government (1995-1999), quoted from an interview he gave to a magazine of a national newspaper[16], "no equipment by itself solves a problem if it is not at the service of a pedagogical project conducted by the school leader-

16 In Revista 2, Jornal Público, February 16, 2014, p. 14.

ship and by teachers prepared to use such equipment". And this is the core point of all this discussion about the 'e.escolinha' programme.

The evidence from this study clearly shows that the use of the 'Magalhães' at school was sporadic and it was neither effective nor embedded in teachers' and classroom pedagogical practice[17]. The most common reasons cited by teachers for this underuse were logistical aspects. Difficulties that arise from work organisation and management and from teachers' training were less underlined, although in other questions our sample of teachers pointed out the lack of training as a major failure of the 'e.escolinha' programme. And in fact, the 'Magalhães' uses and the specific training for using this computer in the classroom revealed a dependency connection (at a confidence level of 95%), which means that teachers who had the opportunity to have training specifically on this topic were most ready to use the laptop (Pereira, 2014). In general, the number of years of teaching service does not influence how students use their 'Magalhães' computers in the classroom (idem).

With regard to the kind of uses and the activities, schools do not foster children's critical perspectives very much and do not stimulate creative opportunities to use the computer and specifically the 'Magalhães' laptop. The 'e.escolinha' programme played an important role throughout schools in equalizing children's access to technology, although we have seen that in this group in particular, the vast majority already had a computer at home. However, the role of schools and the role of a governmental programme such as this one should not only be to guarantee access but also to develop skills required to use it, which means acquiring forms of media literacy. Therefore, it is in this way that schools will likely to compensate for inequalities and give unprivileged children access to learning opportunities that they might otherwise not encounter at home or elsewhere.

When it comes to the context of home, the 'Magalhães' seems to be more often used by children than at school, despite the huge number of damaged computers. Although many parents acquired the 'Magalhães'

17 For a more detailed analysis of the 'Magalhães' uses at school and how teachers deal with it in the pedagogical practice, see Pereira, 2014.

computer in order to support their children's education and school learning process, the laptop was not mostly used for these purposes.

The activities performed in this context were also limited and not very diversified, with games dominating the uses at home. Internet searches were another activity reported by children and by parents but we do not have enough information about how it is done and it is very important that this search does not mean a copy-paste of the first results found. This will not revert into knowledge for children. The use of the computer and the Internet for communicating, chatting and interacting with friends and members of the family is not yet something that children are engaged in, unlike the results of other studies, one involving Portuguese young people (Ponte, 2012) and the other with the same age group (Selwyn, 2010). This can happens in fact due to the younger age of the children but it could also be a question of social and cultural context.

In general, the surveyed parents were conscious of the role played by technologies in today's society. They were willing to invest in computers to secure their children's success and to assure their preparation for the labour market. In the case of the 'Magalhães', parents bought the computer believing it would be used in a different way at school and because they didn't want their children to be left behind, although the majority had at least one computer at home. The discourses saying that the computer was for all primary school children and that it was important that every child had a laptop, could have led parents to believe in the need to invest in one.

In the contemporary globalised society, technology is not only an educational, social and cultural issue. It is - and perhaps more prominently – a political and an economic affair. Even within the educational side of technology we have to read its ideological dimensions. According to Selwyn (2011) "the apparent 'clash' between educational technology policy and educational technology practice does not necessarily represent a failure of policy-makers to 'understand' schools and digital technology. Rather, policy-makers may well not have developed such policies and initiatives with purely 'educational' intentions in mind" (p. 59). We are not saying that the Portuguese programme did not have educational intentions behind it but the evidence from the data of this specific study

is that digital media literacy objectives were completely marginalized. In our view, media education or media literacy could have provided a conceptual framework for this initiative. This could have been an excellent opportunity to promote media literacy at a national level, empowering children to understand, analyse and critique technologies and media and creatively produce their own contents. This will enable schools to respond to the increasing role of media in society and in children's lives.

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APPENDIX A

TABLE 1: Frequency of activities performed on the 'Magalhães' laptop at home and at school, reported by children

	NEVER				RARELY				FREQUENTLY			
	SCHOOL		HOME		SCHOOL		HOME		SCHOOL		HOME	
	N	%	N	%	N	%	N	%	N	%	N	%
Download music, movies, games	327	68,6	381	45,0	104	21,8	274	32,3	34	7,1	192	22,7
Draw	145	30,2	182	20,9	249	51,9	410	47,1	84	17,5	279	32,0
Edit images and photos	211	43,9	255	29,9	177	36,8	308	36,1	85	17,7	291	34,1
Write on blogs	343	71,5	586	73,3	75	15,6	125	15,6	30	6,3	88	11,0
Talk to friends or family on the Internet	387	81,0	404	47,5	44	9,2	173	20,4	46	9,6	273	32,1
Do school exercises	68	14,1	319	37,4	150	31,2	288	33,8	261	54,3	245	28,8
Do an Internet search	251	52,5	245	28,8	97	20,3	201	23,6	125	26,2	404	47,5
Make Power Points	225	47,4	331	42,8	107	22,5	225	29,1	112	23,6	218	28,2
Go to social networks	373	80,0	409	49,9	29	6,2	141	17,2	48	10,3	269	32,8
Play games	100	21,0	29	3,4	174	36,6	183	21,2	200	42,0	653	75,5
Read and write texts	41	8,6	161	18,9	152	31,9	336	39,4	284	59,5	355	41,7
Send emails	384	81,7	467	55,3	37	7,9	185	21,9	40	8,5	193	22,8
Listen to music	247	52,7	163	18,9	127	27,1	258	30,0	94	20,0	440	51,1
Share photos, videos or music	295	62,1	427	49,9	110	23,2	224	26,2	69	14,5	204	23,9
Produce videos and movies	309	65,3	407	48,2	100	21,1	230	27,3	53	11,2	207	24,5
Use the computer's camcorder	242	51,2	235	27,5	155	32,8	332	38,9	76	16,1	287	33,6
Watch the news on the Internet	390	81,6	556	65,5	58	12,1	173	20,4	27	5,6	120	14,1
Watch videos and movies	281	58,5	275	32,6	121	25,2	256	30,4	78	16,3	312	37,0

TABLE 2: Frequency of activities performed on the 'Magalhães' laptop at school, reported by teachers

	NEVER		RARELY		FREQUENTLY	
	N	%	N	%	N	%
Download music, movies, games	23	69,7%	5	15,2%	3	9,1%
Draw	3	8,3%	23	63,9%	6	16,7%
Edit images and photos	9	24,3%	18	48,6%	7	18,9%
Write on blogs	18	54,5%	7	21,2%	5	15,2%
Talk to friends or family on the Internet	25	75,8%	4	12,1%	2	6,1%
Do school exercises	0	0,0%	16	45,7%	17	48,6%
Do an Internet search	6	16,2%	9	24,3%	20	54,1%
Make Power Points	10	29,4%	14	41,2%	8	23,5%
Go to social networks	26	83,9%	2	6,5%	0	0,0%
Play games	6	17,1%	18	51,4%	10	28,6%
Read and write texts	0	0,0%	6	14,0%	36	83,7%
Send emails	22	68,8%	5	15,6%	1	3,1%
Listen to music	13	37,1%	16	45,7%	4	11,4%
Share photos, videos or music	16	45,7%	11	31,4%	4	11,4%
Produce videos and movies	25	69,4%	5	13,9%	1	2,8%
Use the computer's camcorder	16	45,7%	12	34,3%	3	8,6%
Watch the news on the Internet	20	62,5%	7	21,9%	2	6,3%
Watch videos and movies	15	44,1%	13	38,2%	3	8,8%

TABLE 3: Frequency of activities performed on the 'Magalhães' laptop at home, reported by parents

	NEVER		RARELY		FREQUENTLY	
	N	%	N	%	N	%
Download music, movies, games	560	65,7%	214	25,1%	70	8,2%
Draw	101	11,5%	448	50,8%	329	37,3%
Edit images and photos	244	28,4%	367	42,7%	241	28,0%
Write on blogs	677	79,7%	111	13,1%	38	4,5%
Talk to friends or family on the Internet	526	61,1%	172	20,0%	163	18,9%
Do school exercises	217	24,6%	439	49,8%	224	25,4%
Do an Internet search	261	29,9%	240	27,5%	369	42,3%
Make Power Points	433	51,1%	239	28,2%	143	16,9%
Go to social networks	562	65,0%	140	16,2%	157	18,2%
Play games	29	3,2%	257	28,7%	606	67,7%
Read and write texts	103	11,8%	443	50,8%	323	37,0%
Send emails	603	70,5%	181	21,2%	64	7,5%
Listen to music	225	25,7%	314	35,8%	337	38,5%
Share photos, videos or music	558	64,9%	202	23,5%	96	11,2%
Produce videos and movies	633	74,5%	149	17,5%	64	7,5%
Use the computer's camcorder	363	42,3%	356	41,4%	139	16,2%
Watch the news on the Internet	601	70,0%	182	21,2%	73	8,5%
Watch videos and movies	443	51,3%	270	31,3%	150	17,4%

TABLE 4: Activities performed on the 'Magalhães' laptop at school by gender, reported by children

		GENDER				
		FEMALE		MALE		
		N	%	N	%	VALUE-P
Download music, movies, games	Never	171	69,8%	155	70,8%	
	Rarely	62	25,3%	42	19,2%	
	Frequently	12	4,9%	22	10,0%	
	Total	245	100%	219	100%	p<0.05
Draw	Never	73	29,4%	71	31,1%	
	Rarely	133	53,6%	115	50,4%	
	Frequently	42	16,9%	42	18,4%	
	Total	248	100%	228	100%	n.s.
Edit images and photos	Never	105	42,5%	104	46,4%	
	Rarely	101	40,9%	76	33,9%	
	Frequently	41	16,6%	44	19,6%	
	Total	247	100%	224	100%	n.s.
Write on blogs	Never	184	80,0%	157	72,7%	
	Rarely	33	14,3%	42	19,4%	
	Frequently	13	5,7%	17	7,9%	
	Total	230	100%	216	100%	n.s.
Talk to friends or family on the Internet	Never	205	82,0%	180	80,0%	
	Rarely	22	8,8%	22	9,8%	
	Frequently	23	9,2%	23	10,2%	
	Total	250	100%	225	100%	n.s.

Do school exercises	Never	27	10,7%	40	17,9%	
	Rarely	78	30,8%	72	32,1%	
	Frequently	148	58,5%	112	50,0%	
	Total	253	100%	224	100%	p<0.05
Do an Internet search	Never	127	51,8%	123	54,4%	
	Rarely	53	21,6%	44	19,5%	
	Frequently	65	26,5%	59	26,1%	
	Total	245	100%	226	100%	n.s.
Make Power Points	Never	109	48,2%	115	53,0%	
	Rarely	61	27,0%	46	21,2%	
	Frequently	56	24,8%	56	25,8%	
	Total	226	100%	217	100%	n.s.
Go to social networks	Never	196	83,8%	175	81,8%	
	Rarely	16	6,8%	13	6,1%	
	Frequently	22	9,4%	26	12,1%	
	Total	234	100%	214	100%	n.s.
Play games	Never	46	18,4%	52	23,4%	
	Rarely	103	41,2%	71	32,0%	
	Frequently	101	40,4%	99	44,6%	
	Total	250	100%	222	100%	n.s.
Read and write texts	Never	19	7,6%	21	9,3%	
	Rarely	80	32,1%	72	31,9%	
	Frequently	150	60,2%	133	58,8%	
	Total	249	100%	226	100%	n.s.
Send emails	Never	200	85,5%	182	80,9%	
	Rarely	18	7,7%	19	8,4%	
	Frequently	16	6,8%	24	10,7%	
	Total	234	100%	225	100%	n.s.

Listen to music	Never	122	50,0%	123	55,4%	
	Rarely	73	29,9%	54	24,3%	
	Frequently	49	20,1%	45	20,3%	
	Total	244	100%	222	100%	n.s.
Share photos, videos or music	Never	152	62,0%	141	62,1%	
	Rarely	61	24,9%	49	21,6%	
	Frequently	32	13,1%	37	16,3%	
	Total	245	100%	227	100%	n.s.
Produce videos and movies	Never	159	67,4%	148	66,1%	
	Rarely	50	21,2%	50	22,3%	
	Frequently	27	11,4%	26	11,6%	
	Total	236	100%	224	100%	n.s.
Use the computer's camcorder	Never	118	47,6%	122	54,7%	
	Rarely	86	34,7%	69	30,9%	
	Frequently	44	17,7%	32	14,3%	
	Total	248	100%	223	100%	n.s.
Watch the news on the Internet	Never	206	83,4%	183	81,0%	
	Rarely	28	11,3%	29	12,8%	
	Frequently	13	5,3%	14	6,2%	
	Total	247	100%	226	100%	n.s.
Watch videos and movies	Never	140	55,6%	139	61,5%	
	Rarely	74	29,4%	47	20,8%	
	Frequently	38	15,1%	40	17,7%	
	Total	252	100%	226	100%	n.s.

TABLE 5: Activities performed on the 'Magalhães' laptop at home by gender, reported by children

		GENDER				
		FEMALE		MALE		
		N	%	N	%	VALUE-P
Download music, movies, games	Never	208	47,5%	171	42,3%	
	Rarely	151	34,5%	122	30,2%	
	Frequently	79	18,0%	111	27,5%	
	Total	438	100%	404	100%	p<0.05
Draw	Never	59	13,0%	122	29,7%	
	Rarely	221	48,7%	186	45,3%	
	Frequently	174	38,3%	103	25,1%	
	Total	454	100%	411	100%	p<0.05
Edit images and photos	Never	107	24,3%	146	35,9%	
	Rarely	172	39,0%	134	32,9%	
	Frequently	162	36,7%	127	31,2%	
	Total	441	100%	407	100%	p<0.05
Write on blogs	Never	295	73,8%	285	72,5%	
	Rarely	66	16,5%	59	15,0%	
	Frequently	39	9,8%	49	12,5%	
	Total	400	100%	393	100%	n.s.
Talk to friends or family on the Internet	Never	213	48,2%	189	47,0%	
	Rarely	93	21,0%	77	19,2%	
	Frequently	136	30,8%	136	33,8%	
	Total	442	100%	402	100%	n.s.
Do school exercises	Never	150	33,9%	167	41,4%	
	Rarely	158	35,7%	126	31,3%	
	Frequently	135	30,5%	110	27,3%	
	Total	443	100%	403	100%	n.s.

Do an Internet search	Never	128	29,1%	114	28,2%	
	Rarely	112	25,5%	88	21,8%	
	Frequently	200	45,5%	202	50,0%	
	Total	440	100%	404	100%	n.s.
Make Power Points	Never	153	39,3%	175	46,2%	
	Rarely	113	29,0%	110	29,0%	
	Frequently	123	31,6%	94	24,8%	
	Total	389	100%	379	100%	n.s.
Go to social networks	Never	217	51,5%	189	48,2%	
	Rarely	80	19,0%	59	15,1%	
	Frequently	124	29,5%	144	36,7%	
	Total	421	100%	392	100%	n.s.
Play games	Never	13	2,9%	15	3,7%	
	Rarely	115	25,6%	66	16,1%	
	Frequently	321	71,5%	329	80,2%	
	Total	449	100%	410	100%	p<0.05
Read and write texts	Never	53	12,0%	107	26,5%	
	Rarely	182	41,2%	154	38,1%	
	Frequently	207	46,8%	143	35,4%	
	Total	442	100%	404	100%	p<0.05
Send emails	Never	249	57,1%	216	53,6%	
	Rarely	94	21,6%	88	21,8%	
	Frequently	93	21,3%	99	24,6%	
	Total	436	100%	403	100%	n.s.
Listen to music	Never	67	15,0%	95	23,2%	
	Rarely	156	35,0%	100	24,4%	
	Frequently	223	50,0%	214	52,3%	
	Total	446	100%	409	100%	p<0.05

Share photos, videos or music	Never	217	49,2%	206	50,5%	
	Rarely	124	28,1%	100	24,5%	
	Frequently	100	22,7%	102	25,0%	
	Total	441	100%	408	100%	n.s.
Produce videos and movies	Never	203	46,9%	200	49,3%	
	Rarely	137	31,6%	93	22,9%	
	Frequently	93	21,5%	113	27,8%	
	Total	433	100%	406	100%	p<0.05
Use the computer's camcorder	Never	103	23,0%	130	32,3%	
	Rarely	193	43,2%	137	34,1%	
	Frequently	151	33,8%	135	33,6%	
	Total	447	100%	402	100%	p<0.05
Watch the news on the Internet	Never	309	70,2%	244	60,5%	
	Rarely	82	18,6%	90	22,3%	
	Frequently	49	11,1%	69	17,1%	
	Total	440	100%	403	100%	p<0.05
Watch videos and movies	Never	146	33,4%	126	31,5%	
	Rarely	153	35,0%	101	25,3%	
	Frequently	138	31,6%	173	43,3%	
	Total	437	100%	400	100%	p<0.05

2. The Evolution of the One-Laptop-Per-Child Model in Uruguay

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ABSTRACT

In this chapter we analyze the changes in the digital divide caused by the implementation of the One Laptop Per Child (OLPC, or "1-to-1") model in Uruguay under the Ceibal Plan. Our analysis is based on data from the Annual Survey of Households conducted by the National Statistic Institute of Uruguay. Supplementing this is an analysis of the Plan's contribution to social inclusion through a study conducted in four schools located in impoverished areas of the Montevideo metropolitan region. Through analysis of this empirical information we produce findings and arrive at conclusions that enrich the conceptual discussion. The quantitative data show almost no gap between the richest and poorest households. The qualitative data from 23 interviews confirm some of the expected outcomes of the Plan, but also reveal problematic situations in relation to the availability of the computer for use in the classroom and at home. The poorest children have more difficulties using the technology and deriving benefits from it. Social factors prevent them from taking proper care of their laptops to keep them in working condition. Another finding at schools is that

the teachers experience ongoing tension between the difficulties arising when they lack computers for all the students, including their own challenges in using the technology for education, and the stimulating environment for learning that progressively unfolds when they do use it. Our main conclusion is that a universal policy of access to information and communication technologies, like the Ceibal Plan, from the outset needs to address problems in the schools in the poorest socioeconomic situations that prevent those students from gaining competencies and well-being in the Information and Knowledge Society. We assert that the institution responsible for the Ceibal Plan is continually taking actions intended to overcome such difficulties in the long run.

Keywords: ICT, education, digital divide, social inclusion, inequality, Information Age.

1. INTRODUCTION

Information and communication technologies (ICTs) are among humanity's greatest technological achievements of recent decades. They have penetrated and transformed many areas of the economy, society, culture and politics, and have made profound societal changes possible. Our very social structures have been modified, such that the information and knowledge society is the Network Society, communicated through the Internet. (Castells, 2000)

However, this transformation has been neither homogenous nor linear, and brings with it inequalities -- the most prominent being the digital divide. This type of inequality, specific to the Network Society, is multidimensional and is not limited to a mere dichotomy between those who have access to it and those who do not. It extends to the interaction with other inequalities, such as economic and social inequalities. (Norris, 2001; Mística, 2003; Hargittai, 2004; Sassi, 2005)

ICT access and connectivity are the basic variables, and must be accompanied by the scope of their uses. Various authors have emphasized the important contribution ICT use has made to human development. To achieve this, a "meaningful use" and a social "appropriation" of the ICTs are necessary. (Mística, 2003; Sassi, 2005; Gascó et al., 2007; Mansell, 2002)

This more complex view of the digital divide means considering various dimensions of digital inclusion policies as well as those seeking to promote human development. This implies a process in which the users

take ownership of ICTs and incorporate them into daily life. From that point, users produce new actions and practices that change their living conditions in a positive way, thus meeting their needs and resolving problems. (Martínez, 2001; Warschauer, 2003; Selwyn, 2004)

This process occurs in a specific social and cultural context. Local cultures undergo changes in their symbolic systems and in the circulation of knowledge, which should be seen as both engines and brakes in the appropriation of ICTs (Bonilla & Cliche, 2001; Cortes & Dubois, 2005). Finally, the capacity for appropriation itself must also be generated. (Mansell, 2002) It is here that the various policies and actions for ICT use in different spheres are established. Education is one of the policy pioneers in the development of initiatives for ICT use.

The specific uses of ICTs in education can be categorized in three levels: use by the administration of the educational center; the pedagogical use that enables changes through digital resources and methods more centered on the student's active effort; the complementary curricular use in learning new subjects through the development of skills and abilities linked to meaningful use of ICTs, which facilitate the student's future social and economic integration. (Claro et al., 2011)

These possibilities for the educational use and appropriation of ICTs are conditioned by the quality of access (connectivity, equipment availability, among others). The significance relative to education lies in whether the appropriation of ICTs provides new opportunities for the students, and particularly whether the ICTs produce benefits at the educational level. Hargittai, Robinson and DiMaggio (2003) have named this differentiation the "second digital divide", and it refers to the unequal abilities within the population to take advantage of ICTs.

The case of the Ceibal Plan in Uruguay is unusual because despite being an education initiative, from the outset the focus was on social inclusion goals rather than educational goals. It was when the programme became more consolidated that it expanded its objectives to include educational transformations. Our aim here is to discuss the extent to which the implemented actions of the Ceibal Plan have contributed to the reduction of the digital divide through more complex ICT uses and greater emphasis on education.

2. THE CEIBAL PLAN

The President of Uruguay created the Ceibal Plan in April 2007.[1] A board of directors was established, composed of delegates from various government agencies.[2] The Executive Branch's decree to create the Ceibal Plan was the first public document in which the government's primary motives for the formulation of this policy were expressed. The decree states that the Plan is framed by the need to advance towards becoming a Society of Information and Knowledge in social and educational terms. Because it was designed as a public education policy, it meant advancing in that direction from a pedagogical perspective. And, in Uruguay, because the school is a symbol of social inclusion, the school environment promotes a greater sense of social equality.

Over the years, the institutional traits of the Ceibal Plan have changed, as have the specifics of its objectives. Initially, its goals focused on promoting social inclusion. Beginning in 2010, with the National Budgetary Law in Article 842, the stated purview of the Ceibal Center is to: promote, coordinate and develop plans and programmes to support educational policies for children and adolescents developed by the relevant bodies; contribute to the exercise of the right to education and to social inclusion through actions that foster equal access to knowledge; develop informal educational programs for the population directly related to the beneficiaries of the Center's activities.

As for the educational foundations of the plan, the integration of ICTs into the classroom is not an end in itself, but rather that the integration should occur as a function of the pedagogical goal. For the Ceibal Plan, teacher mediation between the object of knowledge and the active development of meanings by the students is essential for the construction of knowledge. (Rivoir & Lamschtein, 2012b)

The implementation of the Ceibal Plan marked the launch of a major organizational structure and logistical system. Based on a pilot

1 Decree No. 144, 18 April 2007

2 Technological Laboratory of Uruguay (LATU), National Public Education Administration (ANEP), Central Directive Council (CODICEN), Council on Primary Education (CEP), Ministry of Education and Culture (MEC), Agency for Government Development of Electronic Administration and the Information and Knowledge Society (AGESIC), National Agency of Research and Innovation (ANII), and National Telecommunications Administration (ANTEL).

experience in a rural town in Uruguay in 2007, the Plan gradually expanded geographically until it covered the entire country in 2010. In that year, it was also expanded beyond primary schools to include the first three years of secondary education.

By March 2013, approximately 600,000 laptops had been distributed to students and instructors; 2,790 educational institutions were connected to the Internet, which represent 99% of students; 7,014 wireless access points had been installed; 50% of students had Internet access less than 300 meters from their homes; 30,000 instructors had been trained; and 723 public spaces and 332 low-income neighborhoods had wireless signals.

Meanwhile, direct trainings that targeted instructors through optional courses or workshops were conducted with the support of volunteer networks. The figure of "Maestro Dinamizador" (*Dynamizing Teacher*) was created to promote a more effective use of the XO laptops[3] among instructors and children in the educational experience. There is also the "Maestro de Apoyo Ceibal" (*Ceibal Support Teacher*), who numbered more than 400 in 2009, to work with and support their colleagues in providing new teaching ideas for using the XO laptops. (Rivoir & Lamschtein, 2012b)

A set of digital resources were developed for teaching and interaction within the educational community, including: the Educational Portal (www.ceibal.edu.uy) to support and promote the educational use of the laptop and critical use of information; the Institutional Portal (www.ceibal.org.uy), where one can find information about the Plan, including news, services, contacts, etc.; a Ceibal Channel on YouTube http://www.youtube.com/user/canalceibal, which was later broadcast on both open and subscription television channels. Ceibal also has a radio presence, where listeners have the opportunity to discuss questions about technical issues and computer applications. (Rivoir & Lamschtein, 2012a)

There is also the Ceibal bus, which tours the Uruguayan capital, repairing laptops and providing both educational and recreational

3 The XO of Ceibal Plan is a small laptop by Brighstar with the following properties: AMD processor 400 MHertz, 128 MiB of dynamic memory, 512 MiB flash memory, monitor of 7.5 inches an 1200*900 resolution, camera, wifi and other network capabilities, low consumption, USB ports.

workshops for the children and adolescents participating in the Ceibal Plan.[4] The maintenance and repair of the XO laptops was decentralized to local businesses and a free telephone help center was created. Software and hardware problems are repaired free of charge if they are not the result of misuse; users receive individualized attention when seeking guidance; laptop chargers are available for purchase; and connectivity problems are resolved.

In short, the Ceibal Plan utilizes a variety of actions in the distribution and maintenance of the laptops, development of infrastructure, creation of digital educational content, training of instructors, and various activities to promote the use of the XO laptops. As such, we share the assertion of Garibaldi and Ibarra (2011) that this Plan differs from other OLPC plans because it is not merely a computer distribution project. In this article we examine whether digital inclusion, as it has developed so far, contributes to the social inclusion of the Plan's beneficiaries who are otherwise society's most excluded.

3. METHODOLOGY

Our research question is: *Has the implementation of the Ceibal Plan favored social inclusion through reducing the digital divide and expanding the educational use of XO laptops?*

To answer that question, we chose a combination of quantitative and qualitative techniques. For the quantitative, we studied the Annual Survey of Households from 2001 to 2011 to determine if the divide in digital access has been reduced, as well as its relation to other variables.

For the qualitative side, in-depth interviews were conducted to obtain information about the Plan's implementation and processes at four schools. There were 23 interviews involving educational staff at the selected schools, with approximately five per school: the four school principals, 12 teachers, four Ceibal support teachers, one community teacher, and the two inspectors for those school districts.

4 http://www.ceibal.edu.uy/Portal.Base/Web/VerContenido.aspx?GUID=1caaf210-1d64-4fee-804a-e9deb25ca3a1&ID=205763&GUID=ec8a563-fea3-4c32-8c58-521043aa8923-7265-4aed-915b-c8a834e02fbc

The four schools are in a critical state. Of the Uruguayan schools situated in very unfavorable socioeconomic contexts, we chose those that were not included in the Ceibal Plan pilot programmes, and which had not received additional support or complementary resources for implementing the Plan. These schools were designated by the National Public Education Administration as "model schools".

The four schools are located in areas where the population is primarily of low socioeconomic status, all in the Montevideo Metropolitan Area. Based on previous surveys and in consultation with officials, the study includes schools No. 163, No. 191, No. 245 in the city of La Paz, and No. 180 in the city of Progreso.

The primary lines of questioning in the interviews of the educational staff were: the experience of implementing the Ceibal Plan in the school; how it has contributed to the children's educational development; the main facilitators or obstacles for working with the Ceibal Plan; changes in learning that the children experienced once the Plan was implemented; changes in the children's performance, skills and autonomy; whether the Plan benefits the families, and changes that have occurred in the relationship between the school and the households; which activities best ensure that children, teachers and families benefit from the plan; whether the staff see that the Ceibal Plan fosters social inclusion; which educational experiences and practices were successful in the Plan implementation; the main obstacles and problems for the social inclusion of the area's children and other residents.

Finally, and with the aim of learning about the experience from the perspective of the Ceibal Plan's direct beneficiaries, a brief survey was conducted of children in different classrooms. The teachers were asked to pose the questions. The younger children were asked to draw pictures, and older children were asked to write a few sentences.

The questions were the following: For some time now, you have had your own XO laptop from the Ceibal Plan. What does this mean to you? Can you use the XO at school, at home, in other places? What do like best about it? Is there anything that is not going so well?

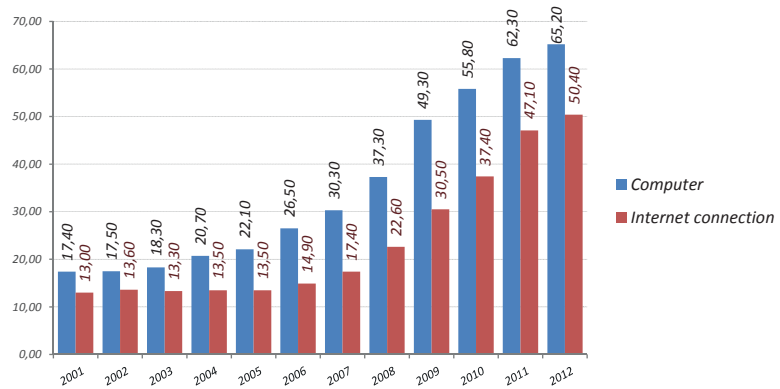
The following numbers of responses were obtained in the survey:

SCHOOL	D	A	C	B
1st grade	45	19	49	31
2nd grade	29	14	39	56
3rd grade	22	14	51	73
4th grade	38	22	16	39
5th grade	24	26	44	21
6th grade	38	29	37	22

The fieldwork was conducted throughout the month of October 2011. The interviews lasted between 30 minutes and one hour and were conducted in the main office of the school or in a room with appropriate conditions for audio recording. The recordings were fully transcribed.

4. THE DIGITAL DIVIDE AFTER THE CEIBAL PLAN

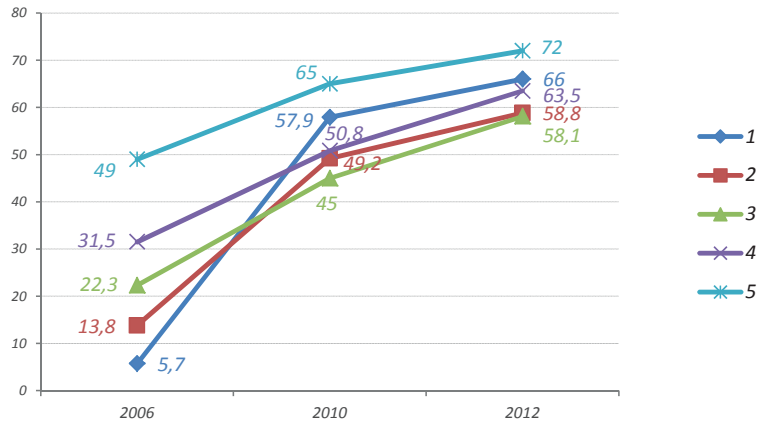
To determine whether the Ceibal Plan has produced changes in the digital divide, we conducted an analysis (below) of data from the Annual Survey of Households, from the National Statistic Institute.



Graph 1: Evolution of the percentage of households with computer and Internet from 2001 to 2012 (urban areas, including only cities with more than 5,000 inhabitants).
Source: Our own processing of the data, based on the Annual Survey of Households of the National Statistics Institute.

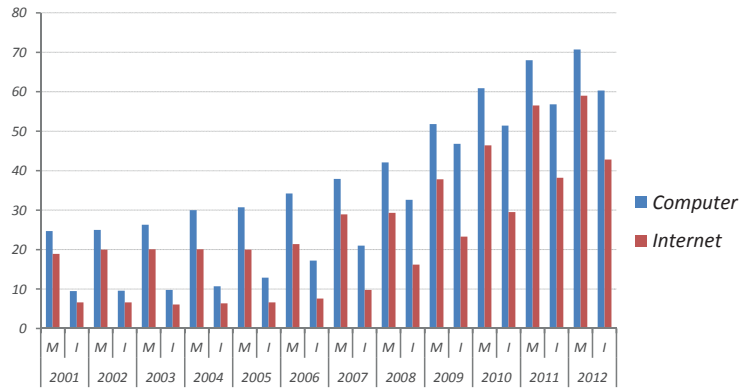
In Graph 1, one can see the percentage of households with access to computers and Internet begins to increase more markedly beginning in 2006. That corresponds both to Uruguay's economic recovery and to the Ceibal Plan.

In Graph 2, it is evident that the possession of a computer became more equitably distributed among households under the Ceibal Plan. Quintile 1 represents the lowest-income households, while quintile 5 represents those of highest income. It is worth noting that quintile 1 has higher rates of computer possession than quintiles 2, 3 and 4. This is due to the fact that there are more primary-school age children in the households of quintile 1 than in the households of the other quintiles.



Graph 2: Percentage of households with a computer, according to quintiles for total household income per capita, for the entire country, including small towns and rural areas, in the years 2006 and 2012.
Source: Based on the Annual Survey of Households of the National Statistics Institute.

The comparison of households in the capital, Montevideo, with those of the country's interior shows that the difference in access to computers and Internet persist throughout the decade, but increases in access have occurred in both geographical areas, as seen in Graph 3. The households of the Uruguayan interior, in towns larger than 5,000 inhabitants, do not lag far behind the capital in terms of computer possession. This is an effect of the Ceibal Plan. However, there is an important gap for households of the Uruguayan interior in terms of connectivity.



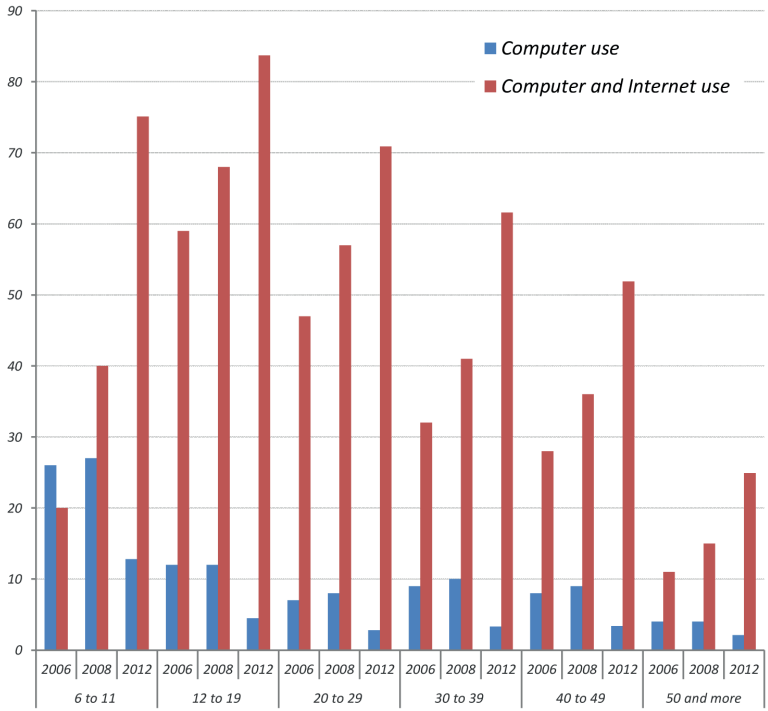
Graph 3: Percent of households with a computer and Internet, according to major area (Montevideo-Interior), from 2001 to 2012, for urban areas (towns larger than 5,000 inhabitants).
Source: Based on the Annual Survey of Households of the National Statistics Institute

Beginning in 2006, questions about the use of ICTs by each member of the household were added to the Annual Survey of Households. As a result, not only did it become possible to measure the digital divide based on possession of ICTs in the home, but also based on the population's effective use of it.[5]

With the indicators about usage, it is possible to see the generational divide in ICT use. The younger age groups have higher ICT use, and the percentages decline in successively older groups, with the elderly mostly removed from new technologies. However, all age groups have experienced a reduction in the digital divide. Furthermore, we can see the impact of the Ceibal Plan in the approximately 50-point increase from 2006 to 2012 in computer and Internet use in the group of children ages 6 to 11 years.

Regardless of age, and with the exception of children ages 6 to 11, there are very few people who use only a computer, and not the Internet.

5 These indicators encompass not only those who have a computer and Internet at home, but also those who make use of these technologies despite not having them in their homes. It also includes those who have the technology at home but do not use it. In a strict sense, the indicator in the different years is not completely comparable given that the time reference changes from one year to the next. For example, in 2006, those surveyed were asked about computer and Internet use in the past six months, while in 2010 they were asked about use in the past month.



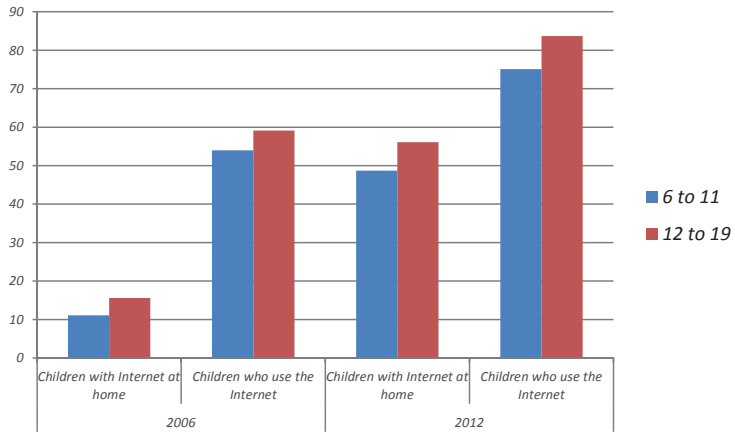
Graph 4: Percent of people who use computers and Internet, by age group, for the entire country, including small towns and rural areas, from 2006 to 2012.

Source: Based on the Annual Survey of Households of the National Statistics Institute.

(In the graph, the bars to the left for each age group are almost always the smallest.) The vast majority of people who use a computer also use the Internet, which indicates that many access the Internet outside of the home. We are interested here in particular in what is occurring in the youngest groups.

We see in Graph 5 how the number of children who used the Internet at home increased, as did the proportion of those who used the Internet outside the home. From the same household surveys, we can deduce that they use it more at school and less at Internet cafés, which was the preferred location for adolescents in 2006.

In summary, the data confirm the Ceibal Plan's contribution to reducing the digital divide in terms of computer access and connectivity.



Graph 5: Percentage of children ages 6 to 11, and 12 to 19, with Internet connection in the home, and who used the Internet, for the entire country, including small towns and rural areas, for the years 2006 and 2012
Source: Based on the Annual Survey of Households of the National Statistics Institute

5. VIEWS OF EDUCATIONAL ACTORS ABOUT THE CEIBAL PLAN IN THEIR SCHOOLS

The in-depth interviews of the educational actors in the four schools (mentioned in the methodology section) surveyed their opinions about the execution of the Plan at their school, their main difficulties, and the plan's contribution to social inclusion. We questioned these staff members about the objectives of the Ceibal Plan and the actions that were carried out at the school. Their views of the Ceibal Plan provided us with an approximation of the reduction of the digital divide and in what ways digital inclusion is favoring social inclusion in those schools. Achievements as well as difficulties were surveyed.

5.1. Opinion of Educational Actors About the Ceibal Plan's Effect on Social Inclusion

At School A, the view of its officials and teachers is that the Ceibal Plan helps reduce inequalities in terms of access to new technologies. They

believe that the new technologies are tools with great potential for developing a pedagogical project that could significantly affect children's learning. They also share the view that the ICTs are a tool for the children's future employment.

Nevertheless, at this school it is believed that the Ceibal Plan is not fomenting social inclusion. The staff members state that while the XO laptops are modernizing elements in their neighborhood, and were well received, in reality the computers are not maintained in full working order. Most of the children's computers are in disrepair. The laptops become damaged; they are repaired, and damaged again. The parents have not taken responsibility, says the staff, and computer care is left to the children and to the school.

At School B, the officials and teachers say that the Ceibal Plan has made possible an unprecedented access to culture. This strengthens some areas of learning and creates opportunities that the children enjoy. The staff believe that access to these cultural sources, whether for instruction or entertainment, is socially inclusive for the school's students. However, there is a lack of consensus as to whether the skills that they are acquiring will make them more efficient and competitive in the future. In that regard, what they do believe is that these children will not be able to close the divide in learning with respect to children in better socioeconomic conditions. They believe that the digital divide in terms of access has been reduced, but not the divide in terms of appropriating the ICTs. As they see it, the most important indicator of the latter would be that the children have the ability to keep their computers functioning.

At School C, the assessment of the officials and teachers is that Internet access opened another world for the children and their families, even if it has only been to play games and communicate. They believe that these activities are creating social inclusion. However, the lack of care for the computers is a problem, though to a lesser extent than in the schools mentioned above.

At School D, the view of the officials and teachers is that the Ceibal Plan is favoring the inclusion of the children and families despite the disrepair of many of the computers. But they indicated that resources needed to be channeled toward that problem, that is, they need to work with children and parents on appropriate use of the XO laptops.

Nonetheless, in these four schools nearly all the teachers, with a few exceptions, proved to be very motivated to use the ICTs despite the problems mentioned. This is largely due to the fact that the children are the ones motivated to use them. The students prefer to do their work on the computers rather than using traditional modes.

5.2. The Use of XO Laptops for Social Integration

Another aspect surveyed was the extent to which the Ceibal Plan computers were utilized towards the objective of social integration.

At School A, there are biweekly school-wide activities that favor inclusion. They are intended to create a collective identity through feelings of membership in a group, that is, the school and the community. The XO laptops have served this purpose as a blog was created in which children meet each other and share information. According to the teachers and principal, this has also benefited the children's self-esteem.

At School B, the older children have created a school blog, which has been a very positive experience in integration within the school, with other schools, and with the community. Another specific positive experience, but outside the school walls, are the demonstrations with other Ceibal schools of activities using the XO laptops in classes.

At School C, there have been specific activities that have significantly favored social integration. On Public Education Day, there was an exhibition of work done with XO laptops, which included the participation of many parents. They have had the support of a *Dynamizing Teacher* to participate in the *Ceibal Fair*. They feel that they have an opportunity to formulate projects for which the Ceibal Plan could designate resources. This school has not created a blog because there is no teacher trained to do so.

At School D, there are activities that dynamize the Plan while also favoring social integration. At the school festival, they present electronic books produced using the Etoys application. In addition, they have had other exhibitions of works made on XO laptops in which the parents in attendance have been able to learn how to use this resource. The *Ceibal Fair* is another occasion in which children have participated and carried out XO activities with children from other schools.

The school has a blog but the staff said that the children have shown little interest in it. It seems to be an outdated mode in comparison to

the Internet's social networks. The school staff believes that the use of social networks is attractive for the children but is often a source of conflict, arguments and fights. The staff say they do not see a productive use for them.

5.3. Difficulties Identified by the Educational Actors, and the Actions to Overcome Them

The interviews with the school officials and teachers delved into the main difficulties they encountered in executing the Ceibal Plan in their schools.

At School A, nearly all of the teachers say it is difficult to work with the XO laptops in the classroom because many of the children come without their computers. This is because many are broken, or the batteries are not charged because they do not have a charger, or they simply do not bring them to school because they are heavy to carry in their school backpacks.

At this school, the *Ceibal Support Teacher* is focusing on parents and how the computers are used. She has had good results, but her efforts have been insufficient given the scope of the problem. The endeavor has been well received by the parents, but it involves just one teacher, one day a week, and during one school shift, where most of her time is spent working with teachers and students.

To deal with the shortage of computers in the classroom, group activities are carried out with the laptops that are there. Depending on the class, there is one computer for every two to four children. This is an irresolvable problem for completing homework. However, the teachers do use them, and while they say it is beneficial that the children share the computers, they also say that situations arise in which children become angry and frustrated, which disrupts the class.

One of the teachers at School A states: *"We can't be so negative that there are few [computers] and therefore not use them. And it is a way for the child who didn't take care of it to realize the problem, and still be included and integrated."*

This reflects the teachers' willingness to take advantage of the resource in itself and as an element for learning in general.

At School B, they also frequently use group work in the classroom. Here they address the problem of poor computer care in the home. The

difference in this neighborhood is that there seem to be more parents who take responsibility when the computer is damaged. In this school, it was noted that more work is needed with the parents in this regard, and that efforts should continue along this line because the parents were not prepared to receive the technology, that is, they do not know how to use a computer, how it works, or how to take care of it to ensure that it continues to function. The school staff also says there are parents who reject the technologies and that some believe that using the Internet in the classroom is not useful for learning.

At School C, we found that there is greater exploitation of the XO laptop. At least half the children bring their computer to class. The teachers note that the parents who do not take responsibility for the computers tend to be the same ones who do not take care of other aspects of their children's lives and have little relationship with the school. The younger children are the ones who best care for the computers and bring them fully charged to school. The older children in general do not comply with such responsibilities.

The *Ceibal Dynamizing Teacher* leads demonstration classes for the parents about what their children do with the computers. The staff says this has produced very positive results. However, these activities are not organized for the parents of all the children, but rather by class, and thus depend on the initiative of the classroom teacher.

> I think that from the moment of implementation it was precisely this instruction that was lacking. The day they handed out the computers, they held a meeting with the parents, with a little book that had three words and then they give us the computers. The idea that I don't drop it on the ground, don't leave it in the sun – these things are not known in the homes because many have never had a computer. A process was needed that just recently is being remedied, and it is evident. But I think there was something missing in the meantime. – A teacher at School C

According to a teacher at this school, it seems likely that an intermediate step was missing: use the computers in the school, and once everyone has attained a certain level of mastery, then distribute the laptops to each child.

At School D, those interviewed say that a large percentage of the parents lack involvement in matters related to their children. At the time

the XO laptops are distributed, there are great expectations but they begin to diminish, which becomes evident in the high number of non-functioning or seriously damaged computers. According to the teachers, 40 to 50% of the computers in their classes do not work.

The *Ceibal Support Teacher* this year has helped distribute the laptops, instructing parents on their care and basic operation, and this seems to be an effort worth continuing. Meanwhile, many families have very precarious living conditions that make the situation difficult. For example, there may be only one electrical outlet in the home, and it is not easy to ask a family to keep the battery charged in their child's computer.

The computer-related problems take up a great deal of pedagogical time and are a bother for the teachers. For the least-skilled teachers, these problems tend to be a strong demotivator because they only add to their insecurities with respect to technology. This has consequences for the frequency and quality of the use of computers in class. The higher-skilled teachers have exploited this resource much more, and are better able to motivate the children to keep their laptops in working condition, although they are not always successful.

5.4. Educational Use of the XO Laptops

The educational use of the laptops was surveyed through questions posed to the teachers about the frequency and type of use in the classroom. They were asked about the educational benefits of usage and about the acquisition of digital skills by the children and themselves. Furthermore, from their responses we have also selected the main difficulties arising in the classroom.

At School A, the staff said that often the lack of computers in operating condition, or problems with Internet connection, or slow computers, make it impossible to complete the teaching plan or take up too much time.

What they utilize most are the computer programs to improve written expression. They also use math programs, as well as a program to draw semantic maps. In the higher grades, they frequently use the Internet to find additional information about the material they are studying. One of the teachers makes photo collages of the school's various activities. The XO laptops are also used to make student evaluations online.

The teachers say they use whatever they know best. If the students are more familiar with a programme than the teacher, to a certain degree this can create an uncomfortable situation.

> There are tons of things that are clearer to them than they are to me. They clear up my questions; they are continually looking, searching. It's the way they learn. – A teacher at School A

The teachers so far have not seen substantial improvement in school performance but do appreciate the digital skills that the children are acquiring. One type of usage that the children have quickly adopted is the search for news and communication through chat programmes or through Facebook.

They said that children only make Internet searches for educational purposes when the teacher asks them to, and that this helps in the comprehension of concepts. They also said that what students mostly use the computers for outside of class are games. They recognize that the children playing computer games are avid explorers of the XO laptops and are undoubtedly acquiring digital skills that are beyond the teachers' purview.

The teachers say that the children are more motivated to learn when they use the computer, which then makes it a stimulus to use them. But that is not the case for all teachers. Some only plan activities using the XO laptop when the *Ceibal Support Teacher* is in the classroom, because they otherwise do not feel sufficiently trained to lead a class themselves using ICTs. Nevertheless, this being the case, they do allow the children to play with the computers in class for a short time.

Generally, teachers have not participated much in the Ceibal courses that are available, due to the long distances they would need to travel. While there are many teaching courses available, they are not taken advantage of because of this problem. However, even the courses that they have taken they said were unsatisfactory because they were not practical enough, or assumed a level of prior knowledge that they did not have.

The *Ceibal Support Teacher* is currently someone who is involved in the class of a colleague and supports that teacher's work with the XO laptops with the normal day's teaching plan. This was not the case in the beginning. In the first year, the *Ceibal Support Teacher* was in

charge of the XO computer use in the classroom and the regular teacher did not participate. It was found that afterwards, the teachers did not have the capabilities to continue on their own. A 2010 inspection stated that the work should take place with the involvement of both teachers in the classroom based on the day's teaching plan.

At School B, all teachers work with XO laptops in the classroom even when not all students have one. The children share the computers but not all of the children are able to work with them, which proves frustrating for the teachers. In addition, there are frequent problems among the children when they have to share a computer.

The teachers use them in the classroom a minimum of three times a month, and two to three times a week, maximum. One teacher utilizes the XO activities, but the work is done on paper in notebooks. The uncertainty of how many computers will be available any given day in the class affects planning, reducing the number of activities that are conducted on the computer. On rainy days, plans to use the XO laptops are frustrated because children tend not to bring their computers.

In spite of the problems, according to the teachers, the classes are much better now than they were without the XO laptops. They believe the computers are very stimulating for the children. From 2009 to the present, teachers have received training from the *Ceibal Dynamizing Teacher* on some Saturdays, when there are no classes. They have also received assistance from the *Ceibal Support Teacher* to work with the computers in class alongside them, but only during the school's afternoon shift. The morning teachers have not received this support. In 2011, the *Ceibal Support Teacher* became the *Community Teacher*. She continued to serve as an informal consultant to the teachers, but no longer provides support in the classroom.

For some teachers, a negative aspect of the Ceibal Plan was that training came after the arrival of the computers. This was perceived as a lack of appreciation for the teacher. They believe that if the training had occurred from the beginning of the process, it would have been simpler. Some of the teachers interviewed said that an important point for improving the Plan is to emphasize teacher training and work with the families. As for the teacher training, they said it should be more specific, with a clear articulation with curriculum content.

According to some teachers, the students' reading and writing skills have improved and accelerated. Others have not seen substantial improvements among their students.

The ability to access information on the Internet has allowed teachers to develop more creative activities with the children, and has made traditional educational activities more attractive and stimulating for learning. Among the programmes commonly used is one that makes conceptual maps (Laberinto), a calculator, and the drawing program Tux Paint. Students also make photo collages and utilize the Dr. Geo program for geometry.

Children seem to be fascinated by anything that has to do with communication. Some classes have blogs, but the use of online social networks or e-mail was not evident in the classroom.

Teachers said that some children, but not all, turn to the Internet for everything they need. They also said there are children who find it difficult to conduct Internet searches on their own because they do not know which search words to use for unfamiliar subjects. Also, for many children it is difficult to determine whether what they find on the Internet is appropriate or not to complete the task the teacher has assigned.

The teachers said the children gain autonomy because they explore by themselves both the applications and the content of the Internet. They learn to make decisions in the usage of ICTs. They navigate the programmes alone or with their peers. Some teachers said that their students understand the XO laptops better than they themselves do.

At School C, the teachers ask the children to bring the computers every day, as the Ceibal Plan recommends. But some children fail to do so, and if they do bring the laptop, the battery is not charged. The teachers say that sharing the computers fosters teamwork, which in one sense is good for the students. But as in the other schools, sharing the laptops is also a source of conflict, and not everyone ends up using the computers.

Also similar to the other schools, some teachers criticize the Ceibal Plan because their training took place after the computers had already been distributed to the children. It has taken time to incorporate this new tool, and they still lack the knowledge for enriching the XO laptop experience in the classroom. The *Ceibal Support Teacher* helps to resolve many practical questions that the teachers are unable to themselves.

The most frequent computer activities at this school are: searching for information on the Internet; Etoys, an animation programme (often used to create cartoons and foster creativity), Laberinto, a programme that can be used to make conceptual maps; TuxPaint, for drawing; Dr. Geo, for geometry; and Memorice, for exercising the student's memory. Less frequently used are the programmes for using virtual microscopes or working in virtual laboratories.

According to most of the teachers at this school, the most widespread impact has been in reading and writing. It is believed that information searches require more reading effort. Organizing and summarizing information with a tool like Laberinto is fun and attractive for the students. As for writing, the Ceibal curriculum is accelerating learning among the younger students through the "Habla con Sara" (Talk with Sara) programme, in which a voice tells them what they are writing as they are writing it. However, the teachers in the higher grades have not seen obvious improvements in writing.

The teachers say that the children have demonstrated their ability to navigate the computer and the programmes on their own. But this is not always the case. The students work together and also need adult assistance. Cooperation and exchange among the children have improved. The youngest children, in first grade, need a great deal of adult help to learn how to use the computer.

The teachers agree that the ICTs have contributed to the children's greater autonomy. By looking for information on a variety of websites, such as educational portals, Wikipedia, or YouTube, they gradually improve their ability to evaluate the information they find, and to incorporate criteria for what is relevant – which the teachers view as greater student autonomy.

At School D, all teachers work with XO laptops in class; some almost daily, others twice a week or less. Groups of two or three children work together.

As in the other schools, the staff said that the first phase of implementation should have included teacher training, with time online, and seeing the contents of the Portal – which currently now are in place.

They said that this criticism is not about the teacher having to know more than the students, but that the children do indeed have questions

that require the teachers to know how to operate the system in order to respond to them.

They believe that if they were better trained they would be able to make better use of the ICTs in teaching and learning. But they work the two school-day shifts and do not have many opportunities to attend training courses outside the school hours.

The XO laptops are most frequently used to make cartoons and e-books, with the Etoys application or with Fototun, drawing with TuxPaint, and making photos and videos. In the younger classes, the students use the memory application Memorice. In the higher grades, the computers are used more for Internet searches, guided by the teacher.

The teachers said the computers foster learning despite the limitations resulting when not every student has a laptop in class. They said the children are acquiring digital skills and are more motivated in developing reading habits, and the older students are incorporating abilities to search, understand and evaluate information. The use of the Laberinto programme also helps to that end, given that it organizes information into conceptual maps. Nevertheless, the teachers have not seen big improvements in writing skills, though improvements are more evident among those who have laptops than those without.

In the four schools, it can be seen that the incorporation of ICTs in the classroom has been a boon for children with learning difficulties, whether physical or psychomotor. This is particularly helpful in written and symbolic expression, through drawing, because re-doing work does not become tedious (this was not found to be the case in School D, but in the three other schools). The children with attention deficit disorders can concentrate better and are able to complete their work when they use the XO laptop, while they are less able to do so when using pencil and paper (this was the case in the four schools).

On several occasions in the four schools, the teachers said that they were not trained ahead of the distribution of the XO laptops, which prevented them since the beginning from exploiting all of the possibilities the computers offer. However, to some degree, all teachers were familiarized with the ICTs before the Ceibal Plan's implementation.

The computer-related problems consume a great deal of teaching time and are a bother for the teachers. In the case of the lesser-skilled teachers, this tends to be a considerable demotivation because they are

problems that augment their existing insecurities with respect to technology. This has consequences for the frequency and quality of their computer usage. The teachers with more ICT skills have been much more able to exploit the resource and tend to better motivate the children.

6. WHAT THE CHILDREN SAY

At School A, the magnitude of the problem of damaged computers is confirmed among the younger students, but not with the older ones. Nearly all of the children in second and third grade responded that their computers are broken. They describe how the computer was broken or what was broken, or express frustration because the laptop shuts down on its own. In the writings of the children in fourth grade, there is a prevailing fear that the computer will break down, but they also say that they like everything about the XO laptops, except for the fact that they cannot connect everywhere, and that the battery charge does not last very long. Among the children in fifth grade, the most common response in their writings about the XO laptops is that they like being able to use them wherever they are, although they can only connect to the Internet near the school, and sometimes the computer breaks. The responses of sixth grade students were similar, but they more often mentioned the possibilities of studying and looking for things on the Internet.

This leads us to believe that the younger students experience more difficulties in using the computers than the older children. The younger students do not receive as much support from their parents because they do not know how to use the computers themselves, while the older students are more able to resolve the problems on their own as they arise. We can also conclude that the older children, in fifth and sixth grade, are better able to accept the system's limitations, and have more autonomy to move about. The younger students are frustrated because they cannot connect everywhere, while the older students say they connect near the school.

At School B, what the younger children – first through third grade – like best is that they can use the XO laptops everywhere. They can play games, listen to music, do schoolwork and learn. The negative, they say, is that the battery loses its charge quickly; the computer freezes, or

breaks down. But the majority sees nothing negative in the XO laptops. Some did mention that the teachers had not been taught in order to teach them, the students. This all indicates that the younger children at this school have been able to appropriate more from the XO system than those at School A. But there appears to be little difference between the older students at the two schools.

According to the students in fourth through sixth grades, the best thing about the XO laptops is that they can be used anywhere. The computers have defects but many of the students accept them, such as: slow Internet connection, they cannot connect to the Internet everywhere, they have limited capacity, the computer freezes up, or that they are not always repaired well.

At School C, the drawings that the first grade students made about the XO experience reflect a greater appropriation than the children at Schools A and B. Their drawings depict their favorite computer applications. They are similar to the drawings made by second graders at the other schools, while first graders' drawing were limited to being with their laptop, or in the yard with their laptop. What the children in third grade like most about the XO laptops is that they can be used anywhere, they can play games, download music, download information, and chat online. What they like least about the computers: they freeze, the battery loses its charge, they cannot use the computer at home, or the computer breaks. For the fourth grade students, the most frequent response is that they like to use the XO laptops to learn. For the fifth and sixth graders, the most frequent responses mention how they like to learn, work and play on the computers. What they like least is that the battery loses its charge and that they cannot connect to the Internet everywhere.

At School D, the drawings by the first grade students are similar to those of their peers at School C. They depict the XO applications that they like the best. Most are games, but also appearing frequently are drawings about "Talk with Sara", the application for learning to write. The drawings by the second graders depict the games they like, the fact that a computer was broken, that they can use the computer outdoors, and occasionally with friends. The third graders most often responded that they like the games, to work on the computer at home; and what they like least is that the games might have a virus, or that they only have

Internet connection at school. Among the children in fourth through sixth grade, what they mention most often is that they like being able to use the computer anywhere, but they are concerned that it will break, that it will freeze, or that they cannot connect to the Internet at home.

7. CONCLUSIONS

First, we can affirm that the Ceibal Plan in Uruguay, as a national 1-to-1 policy with social inclusion goals and implemented in the educational system, is not merely an initiative to distribute computers. This is evident in different types of activities related to teacher training, the production and dissemination of digital content, the combination with other communications media and in situ activities.

Second, we found that the digital divide, in terms of ICT access, was reduced as a result of the implementation of the Ceibal Plan, particularly the inequality in access to personal computers in low-income households. As for Internet access in homes, growth was less pronounced and more difficult to link to the Ceibal Plan.

Third, based on the qualitative analysis of four schools in neighborhoods of low socioeconomic status in the metropolitan area, we can confirm that the execution of the Plan has had positive effects on the children in terms of social inclusion. The elements that demonstrate this are the introduction of educational uses of these resources, the development of digital skills among students and teachers, the improvement in some curricular areas (reading and writing), as well as greater motivation among all children to learn, including those with learning difficulties.

However, the general improvements that are evident in the reduction of the digital divide mask the great inequalities existing within these data. The contributions to inclusion mentioned above are not homogenous among or within the schools studied.

We concluded that the existing social inequalities affect the children's capacity for ICT appropriation in a differentiated way. One indicator of this is whether the child maintains the computer in working condition, because it is a factor that would exclude him or her immediately from the activities, and therefore from the opportunities provided by this resource. This factor is related to the parents' interest in the XO computer and the

importance they place on it, which is also related to their socio-cultural status and to their involvement in the child's education in general.

The quantitative information from the secondary sources we referred to in the introduction does not take into account the problem of computers that break down, whether temporarily or permanently. The secondary data do not provide information about the effective usage of the XO laptops. In three of the four schools studied, there are problems with connectivity that limit Internet access, and in the four schools nearly half of the students do not have laptops in working condition. This alters the classroom activities and does not facilitate the educational use or exploitation of the computers.

The training of teachers to exploit this ICT resource and to resolve problems as they arise is limited, although the process is evolving. Some initiatives are seen as positive for promoting the appropriation and educational use of the technologies, such as the involvement of the *Ceibal Support Teacher* and the *Ceibal Dynamizing Teacher*, the free repair of the computers, and the workshops for the parents.

In summary, the elements collected here show that in order to ensure access to and maximize use of the ICTs in very unfavorable socioeconomic contexts, more specific actions are necessary to resolve problems that do not occur in more favorable socioeconomic contexts. The Ceibal Plan, as a universal policy, did not foresee this differentiation. The contrast is reflected in the varying degrees to which the students make use of this resource, according to their living conditions, such as the socio-cultural level of their household.

Finally, the testimonies of the first beneficiaries of the XO laptops, the children, reveal the significance of the Ceibal Plan. The XO laptops belong to them, and can be used anywhere; that is, the laptops are available when they want them, regardless of where they are. They learn, their playtime is enriched, and they are upset when the computer breaks, and when the battery loses its charge. For them, the XO laptop is valuable – and that is what gives it added value as a resource for their education and for their social inclusion.

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3. Technology for Inclusion and Change: comparative research studies on one-to-one programmes in Italy, Ethiopia and Brazil

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ABSTRACT

This paper focuses on the meaning of digital inclusion and its relationship to the use of one-to-one technology in didactics. It criticizes current approaches to digital inclusion as being mainly deterministic, starting from a too simple criterion of access as material availability of technology, and failing to consider the many origins and consequences of cultural differences in access to Information and Communication Technologies (ICT). Three case studies on one-to-one programmes conducted in Italy, Ethiopia and Brazil between 2009 and 2012 are used to illustrate the capability of these initiatives to effectively change teaching and learning practices, and foster digital literacy. The main questions are whether digital inclusion takes place in the contexts where one-to-one technology was launched, and what the best conditions are

to make meaningful use of these devices, both for the students and the teachers involved. While reflecting on one-to-one goals and achievements, the paper touches transversally upon three problematic issues: the importance of meaningful access to technology, the crucial role of context in adopting new technologies and the policies that should be advanced to enhance digital inclusion. The framework for sustainable one-to-one programmes that we propose is a digital inclusion concept based on cultural needs analysis, alongside the enhancement of social and human capital for innovation in teaching practices.

Keywords: *digital inclusion; one-to-one technology; teaching practices; policies; capacity building.*

1. TECHNOLOGY FOR SOCIAL INCLUSION

There is still little theoretical development regarding the nature of the relationship between digital and social inclusion. Nevertheless, the most recent sociological literature on inequalities has pointed out that the inability to access and use digital resources can be considered part of what we mean by exclusion in the contemporary world (Helsper, 2008; Neckerman, 2004). Following this idea, many initiatives have been made to address education development issues through projects of digital inclusion. The implementation of low cost personal digital devices – known around the world as one-to-one programmes – represents one of the main trends in recent years, alongside the infrastructure to provide schools with Internet access.

Before we examine what the underlying principle of this educational trend is, we would first like to discuss some enduring assumptions in the research on ICT and access. Principal among these is the long-established idea that "access" is reducible to the availability of a technology or a service. (Lievrouw, 2004)

1.1. Digital inequalities

Access to and development of information, communication and e-commerce resources are increasingly viewed as crucial for economic and social development. In fact, it is generally agreed upon that ICT has the

potential to strengthen democracy, to nourish cultural diversity, and to enhance political participation and visibility (OECD, 2011). Certainly, the Internet has already changed the structure of opportunities for political actors in many post-industrial societies. Yet the last decade's debates about digital technology have brought to attention the disparity in access to information systems, defining it as the "digital divide" (Gunkel, 2003; Norris, 2001; Van Dijk, 2005) and, more recently, as "digital inequality" (Helsper, 2008; DiMaggio & Hargittai, 2004). This concept refers to the inequalities among individuals with regard to both their opportunities to access ICT and their use of the Internet for a wide variety of activities (OECD, 2011). However, attention is focused on inequality as a result of ICT tools and infrastructure availability. When "access" is conceived in this way – that is, strictly in terms of technological Infrastructure – the analytic focus shifts to the demographic characteristics (e.g., income, education, gender, age, ethnicity) of the individuals who use the service versus those who do not (Lievrouw, 2004). Consequently, most calculations of discrepancy in access to information systems are merely based on quantitative data, and do not clarify other aspects, like the practices in use of a technology, the purposes for which it is used, or the reasons that lie behind exclusion. As a matter of fact, neither the availability of infrastructure nor the demographics of ICT users is enough to explain whether, or how, those technologies will be used in everyday life (ibid.).

If it is unquestionable that the first challenge to bridge the digital divide lies in the information or communication system availability, many policy experts now contend that it is not a sufficient condition for meaningful access to ICT. In fact, over the past decade policies merely centred on the provision of technology have not made noteworthy changes. (Bonilla & Pretto, 2011; Pischetola, 2011; Selwyn, 2004; Warschauer, 2002)

These considerations lead us to make one more step towards a re-conceptualization of the digital divide, which goes beyond technological contingency and helps to assess more structured possibilities of intervention. Not only must we assume ICT access is far from universal, but we also have to consider that there are many levels of digital inequality, which are probably a reflection of other forms of social exclusion and reinforcement of existing disadvantages (Helsper, 2008). Access to ICT, as well as access to information, is likely to vary even within groups that

are demographically homogeneous, to the extent that those individuals' interests, experiences, and skills differ (Lievrouw, 2004). Numerous studies have attempted to explain the problem, with very different approaches. From a psychological point of view, individuals' relationships to digital resources will depend on cognitive aspects, motivation, and personality (Van Dijk, 2005). On the sociological side, several authors highlight the importance of social networks, gender, ethnicity, and cultural capital (DiMaggio & Hargittai, 2004; Warschauer, 2002), while a political approach will prioritize active citizenship, participation in debates, and self-expression. (Wilson, 2004)

The aim of *this paper* is to go *one step further* by showing how fighting digital inequality is correlated to investing in human resources development. Accepting the premise that ICT, and especially the Internet, has changed the landscape of information access, we recognize that in contemporary societies it is fundamental to have access to digital resources, in order to be "socially included" (Castells, 2006). Based on this assumption, we *argue* that information could be among what Rawls (1976) identified as *primary goods*, which are basically things that every rational man is presumed to want, because they have a use whatever a person's rational plan of life. Thus conceived, access to information becomes the first step to knowledge building, and unequal access a main reason for social inequality. The relationship between access to primary goods and personal results *has been widely investigated by the economist and philosopher* Amartya Sen (1990). The author continues on the path opened by Rawls and introduces the key concept of *opportunity*. By affirming that the primary goods can be a means to achieve freedom, but do not represent the aim of freedom itself, Sen suggests that the distribution of primary goods can lead to very different levels of freedom, which depends on the capabilities of human beings to transform primary goods into the results that correspond to their personal goals. If we apply this idea to the access to information, as a primary good, we should think more generally of ICT in terms of fair distribution of opportunities that allow people to achieve whatever they may value doing or being (Lievrouw, 2004). But we must also recognize the existence of a "second level digital divide" (DiMaggio & Hargittai, 2004), which mainly depends on what people

do with the information they have access to. In fact, in order to be meaningful, information must be able to add a distinction and contribute with something new to what is already known. Information, in other words, may be conceived as "a difference that makes a difference" (Kallinikos, 2007). These reflections led to a number of studies to empirically examine the ways in which ability, or lack thereof, intensifies basic differences in the extent to which people across different segments of the population are able to benefit from use of the medium (Hargittai & Hinnant 2008; Mossberger et al., 2003; Van Dijk, 2005).

In conclusion, the key challenge is to recognize that inclusion and exclusion do not refer to material resources, but to "the ability to become people" (Melucci, 2000, p. 58). In this sense, digital inclusion should enable people to discover which technology is useful for them and for what purpose. Hence, if we are to encourage social development through technology, we must reconsider the meaning of ICT access from the point of view of the capacity to use digital technologies. In this perspective, equal educational opportunities mean that a person needs to acquire the whole repertoire of cognitive skills to learn and succeed in a complex learning environment.

1.2. Digital literacy and Education

ICT has made it necessary to create a framework integrating various kinds of literacies. What is required nowadays is a range of skills which comprise multifaceted mechanisms necessary to access and work with digital technologies (Van Dijk, 2008). This is what Gilster (1997) first defined as *digital literacy*. The term embodies a number of concepts which refer to the original meaning of literacy.

First, literacy has traditionally been described as the ability to read (decoding), and write (encoding) a text. However, the concept contains more complex aspects, which mainly relate to the ability to research information, to find it, to understand it, to use it functionally and finally to elaborate it into knowledge. These are precisely the qualities which are needed so as to give a person the motivation and mindset to make the best use of information (Bawden, 2008).

Second, literacy depends on diverse factors: family reading culture, home language, school pedagogies, social environment and cultural input (Soares, 2004). This also applies to digital literacy. Besides material and economic barriers, there are some key factors identified in the literature as elements necessary for using technology effectively: the importance of personal motivation and curiosity to use digital resources, and social support, as well as individual autonomy in finding new patterns and procedures (Pischetola, 2011; Warschauer, 2008).

Third, literacy is a continuous process in a lifetime, especially as changes in society bring the need for fresh understanding and up-to-date competences. This means refreshing and updating personal understanding and competence as individual circumstances change (Martin & Madigan, 2006).

Now, we have to consider that computer-mediated environments have radically transformed our reality into digital codes that can be shaped, shuffled, mixed and transferred across spatial and temporal contexts (Kallinikos, 2007). When information comes in a digital form, it is not only presented through text, but also through hypertext, pop-up, audiovisual tools and interactive pages (Lankshear & Knobel, 2006). Thus, nowadays literacy includes the ability to access, manage, and evaluate not only the different sources of information, but also the different shapes of it. The tasks required in this context include, for example, "reading" instructions from graphical displays in user interfaces; utilizing digital reproduction to create new, meaningful materials from existing ones; and evaluating the quality and validity of information in a non-linear navigation (Eshet, 2004). Therefore, although differences of opinion still exist, there appears to be some agreement that digital literacy refers to the attainment of the cognitive skills needed to access information in an ICT-mediated environment (DiMaggio & Hargittai, 2004). Van Dijk describes a succession of three types of skills required to work with digital technology. The basic competences are *operational skills*, which correspond to the ability to work with hardware and software. The most popular view is that access to technology is certain when these skills are mastered. However, research in recent years has called attention to the importance of a second kind of competence, the *information skills* required to search and capitalize information effectively. Finally, Van Dijk distinguishes *strategic skills* as the ability to

use digital sources as the means for specific goals. This kind of competence requires both knowledge of computer and network skills, and is regulated by the appropriate cognitive plasticity that allows an individual to adapt to new decoding-encoding procedures (Van Dijk, 2005).

Moreover, digital literacy represents, as Buckingham (2010) says, a means for *cultural understanding*. In fact, he claims, in most young people's leisure-time experiences, computers are not merely used to access information, but as opportunities for imaginative self-expression, entertainment, creative social exchange, and new ways of communicating. Children and teenagers surrounded by technology conceive media as part of their culture. Therefore, Buckingham concludes, the discussions only focused on information retrieval will end up neglecting some of the broader uses of the media. This approach relates to the emerging field of New Literacy Studies, which sees readers and writers as engaged in social or cultural *practices* (Gee & Hayes, 2011). The idea presented here is that what determines how one reads or writes in a given case is the set of norms, values, and practices of different social and cultural groups. Therefore, there is more than a single way of conceiving literacy: we should rather talk about "literacies". At the same time we should consider that digital tools are changing the nature of groups, social formations, and power (ibid.).

To summarize, we might set out the four generally agreed components of digital literacy, as they emerge in the literature, as follows:

- Technical and operational skills for ICT use and Internet access;
- Information literacy skills, comprising all the aspects of a linear process of information handling: recognizing a need for information, identifying what information is needed, choosing the sources, finding the information, organizing and using it;
- Cognitive competences, including the ability to construct creative strategies for locating information in a network environment, a critical attitude towards the sources, and the engagement in independent self-directed learning;
- Cultural competences, consisting of a creative use of the digital resources, original productions, remix skills (Pretto, 2013) and a general understanding of the social significance of information.

On the one hand, the first two aspects – or sometimes even just the first one – are at the centre of a model often used for planning training courses and interactive tutorials in information literacy. On the other hand, with an emphasis on critical thinking and communication, the last two aspects are those of most interest for the issues we are facing. As with traditional literacy, digital literacy sets a goal for reading and writing abilities that has to be more forward looking than simple decoding and literal comprehension (Gee & Hayes, 2011). Children need to get ready for the increasing language demands. So, if we recognize education as the main factor in granting access to knowledge, we should be aware that it is of increasing importance for the school to be able to provide both effective cognitive skills development and cultural understanding of the media. In our study, these turn out to be the two key elements for digital inclusion.

1.3. One-to-one technology for school innovation

In the last decade, many projects worldwide have addressed social development through low-cost personal digital devices – a portable laptop, notebook or tablet PC – to be used by school-aged children both in school and at home. Known around the world as one-to-one programmes, these initiatives call for technology to be integrated into teaching and the related need to adapt teaching/learning practices to a new educational paradigm. Laptops and tablet PCs are expected to transform the learning experience towards interactivity. Ideally, teachers no longer stand in front of their students to deliver a presentation but, instead, use multimedia tools to access content and take an active role by moving about the room and monitoring student activities.

Relatively few studies have focused on one-to-one laptop programmes and even fewer have used the theoretical lens of literacy as a research focus. The research presented in the next section aims at identifying the elements of successful programme implementation. The main issue under scrutiny is the evidence of a change in the learning environment. The study draws upon the assumption that technology represents only one of the aspects that will promote digital inclusion.

2. ITALY, ETHIOPIA AND BRAZIL: A COMPARATIVE ANALYSIS

In the following, we will present empirical evidence from three case studies conducted in Italian, Ethiopian, and Brazilian primary schools, where almost identical one-to-one programmes have been implemented. In 2008 the Provincial Office for Education of the city of Brescia, in Northern Italy, acquired 700 laptops of the OLPC programme, within the *Give One, Get One* formula: half of the laptops were donated to Ethiopia, the other half distributed in primary schools in Italy. Given the possibility to study the same programme implementation in two different countries, both were chosen as fieldwork research sites. Later, Brazil was included as a third fieldwork site, in the context of a post-doctoral fellowship held at the Universidade Federal de Santa Catarina (UFSC).

The research was set up to investigate whether the projects have provided the envisaged access to expanded learning opportunities and whether the initiatives will be sustainable in the future in order to foster educational changes and social inclusion.

2.1. Theoretical framework

The key pedagogical stance behind one-to-one programme design is the Activity Theory framework, which argues that students can generate new knowledge from their direct experience of the world (Papert, 1980; Varisco, 2002). Students should learn by doing, while the teacher's role is to mentor the learner, as a facilitator of the whole process. This idea is inspired by the constructivist approach, which argues that students generate new knowledge from their direct experiences, building on the notions and information they already hold (Vygotsky, 1992). The basic premise of this theory is that knowledge is first constructed in a social context and is then taken up by individuals, influenced by their background, culture or embedded worldview. A key aspect in this mode of learning is communication, as a prerequisite for effective collaboration. Pupils are encouraged to ask their own questions, carry out their own experiments, make their own analogies, and come to their own conclusions. On these grounds, every child who has access to a mobile

digital device is expected to become an active participant in a learning community, and contribute to a substantial change of the traditional school environment, where students are generally passive consumers of knowledge (Fosnot, 2005). The idea is based on the assumption that giving children direct access to personal technology can involve them actively in knowledge construction processes, improve their approach to learning and therefore broaden their opportunities for social inclusion. Innovation in learning practices is thus expected to come from exploring, inventing, expressing and sharing.

The emphasis is placed on self-directed learning rather than on teaching. In fact, in a one-to-one perspective, teachers have to guide their pupils towards the development of meaningful and complex digital skills, which comprise the ability to use the media strategically (Jenkins, 2006; Van Dijk, 2005). The model is that of a community of learners (Ligorio, 1994), where the process of sharing the points of view of others results in learners building understanding together that would not be achievable alone. This process is known as collaborative elaboration (Brown & Campione, 1994) and allows learners to discover principles, concepts and facts that make sense for them. As a consequence of a new learning setting, teachers have to adapt to the role of facilitators, paying attention to both content and cognitive strategies (Vattimo, 2002). Instead of didactic lectures that cover the subject matters, the teacher is expected to support the learner to achieving his or her own understanding of the content, through a process of heuristic problem solving.

2.2. The researched contexts

Launched in 2005 by the Massachusetts Institute of Technology, the *One Laptop Per Child* (OLPC) initiative, and its design of a $100 laptop for developing countries, first popularized the concept of one-to-one technologies (OLPC website: http://one.laptop.org). Using different devices, many other projects around the world have reproduced the OLPC pedagogical idea in recent years. One of them is the Brazilian project *Um Computador por Aluno,* which, besides the use of a different laptop, is an exact reproduction of OLPC.

OLPC Italy

In the last few decades Italy has attracted many immigrants from all over the world in search of work opportunities, especially from Morocco, Albania, India, Romania and Pakistan (ISMU, 2007). This data is interesting as 18% of children in primary schools are second generation immigrants, who often do not speak or even understand the language well, and have difficulties in achieving good results at school (ISMU, 2007). Moreover, they face poor life conditions and we might suppose they are at a disadvantage in terms of access to technology. A number of studies have focused on digital inclusion in Italy, but none has yet faced the topic by distinguishing between Italians and non-Italian immigrants or ethnic minorities. If we take the Internet Penetration Rate (IPR) as a measure of infrastructure spread in the country, the latest available data show that 79% of the Italian population has Internet access (Audiweb, 2012) and 12% of this is from mobile communication devices.

Slowly, Internet is also becoming a reality in the public education system, after the Italian Ministry of Education launched the National Plan for Digital Schools, in 2007, with mainstream ICT in Italian classrooms and the use of technology as a resource for teaching practice innovation, new models of school organization, and new tools to support quality teaching (Avvisati et al., 2013). Still, the small budget for the plan has limited the effectiveness of its diverse initiatives. For example, only 30% of Italian students in 8th grade use ICT as a regular instruction tool in science classes, compared to 48% on average in the OECD countries (ibid.).

In 2008, the Provincial Office for Education of Brescia – an industrial city in northern Italy – participated in the OLPC *Give One, Get One* formula, which promoted an institutional purchase of laptops to be partially used for international cooperation (G1G1 website: http://wiki.laptop.org/go/G1G1_2008). A total of 700 XO laptops were purchased by the government, half of them were sent to Ethiopia, and the other half was distributed to fifteen classrooms spread throughout six primary schools in the Brescia area. The main objective of this initiative was to introduce the laptop in daily activities, encouraging teachers to adopt innovative working practices with media. Surprisingly, the programme turned out to have a major impact on digital inclusion among children of immigrants, who often did not have a computer at home before receiving the XO laptop, as the following chart shows.

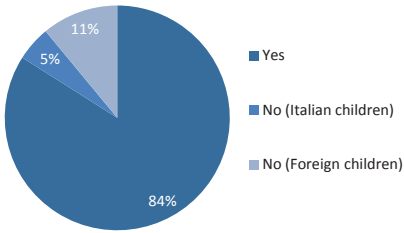

Figure 1: Possession of computer at home in the classes of the Italian sample

OLPC Ethiopia

Despite having experienced considerable growth in recent years, Ethiopia remains one of the poorest countries in the world and faces significant educational challenges (UNICEF, 2013). Current national figures demonstrate that only 60% of children are enrolled in school at the suitable age, and that the teacher-student ratio is 1 to 55 (World Bank, 2012).

Ethiopia's telecommunications infrastructure is among the least developed in Africa and is almost entirely absent from rural areas, where about 85% of the population resides (ITU, 2011). The combined cost of purchasing a computer, initiating an Internet connection, and paying usage charges places Internet access beyond the reach of most Ethiopians. That is why the Internet Penetration Rate in the country is 0,7% (ITU, 2011). The majority of Internet users rely on cybercafés to access the web, though connections there are often slow and unreliable. A broader expansion of Internet access has been hampered by the government's refusal to permit any privatization of the telecommunications market. In fact, the state-owned Ethiopian Telecommunications Corporation is the sole Internet service provider in the country. Furthermore, most recent independent tests conducted by international NGOs (Freedom House, 2012) indicate the existence of online censorship, although Ethiopian authorities persistently deny this.

The government has sought to increase access via satellite links for government offices and schools in rural areas. WoredaNet, for instance, connects over 500 local districts to regional and central government offices, providing services such as video conferencing and Internet access. Similarly, SchoolNet connects over 500 high schools across the country to a gateway that provides video and audio-streamed

educational programmes (Kinde, 2007). However, the impact of such projects has been limited by very limited Internet speed and frequent outages (Freedom House, 2012).

In 2005 the Ethiopian government, with German cooperation in the form of the Engineering Capacity Building Programme (ECBP), planned the distribution of 5,000 XO laptops to Ethiopian primary schools (Everts et al., 2007). These laptops were partially donated to the country as a result of the *Give One, Get One* promotion. Specific goals of this plan were set out as follows:

- A change in children's learning processes, through problem solving and organizational skills development, productivity increment and high personal engagement. The XO laptop should transform the educational ethos from an emphasis on content to strategies for learning.
- Teachers' professional development focused on the uses of technology in the context of innovative pedagogy. Stress is placed both on interactive group work and "learning by doing", which should lead teachers to handle basic computer applications.
- Transformation of learning environments, where information is not transmitted unilaterally from teacher to children, but through an action-oriented approach, which engages students in authentic tasks and through active interaction among them (Rolf & Hermes, 2008).

For the great majority of families in Ethiopia the XO laptop represents the first contact with a computer: only 6% of the children of our sample said they had a PC at home before the OLPC programme implementation, as the graph below illustrates.

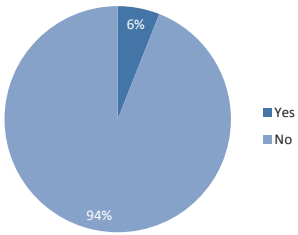

Figure 2: Possession of computer at home in the classes of the Ethiopian sample

UCA Brazil

A large number of studies have highlighted the inefficiency in Brazil's schooling system (UNESCO, 2006). Even though the country has reached almost universal enrollment in primary education, grade repetition and school drop-out are still widespread. As a result, completion rates are substantially lower than enrollment, and many children abandon school with relatively low levels of school completion. The problem is particularly acute in the poorer neighborhoods of urban centres (ibid.).

Brazil dominates the Latin American Internet market in terms of user numbers. In terms of penetration, it shows a rate of 42% (World Bank, 2012), which is rapidly growing thanks to the spread of mobile Internet services. Nevertheless, the socio-economic inequities in Brazil strongly contribute to prevent a significant portion of the country's population from benefiting from access to ICT.

The actual plan of the National Programme for informatics in Education (Proinfo) consists of supplying public schools with computer labs and broadband Internet connection, and offering training in educational technology for teachers of all regions of the country. Proinfo is the result of a partnership between the federal government, states and local municipalities to equip schools with computer technology (Nascimento, 2003). As part of this policy, Brazil announced its One Computer per Student programme, *Um Computador por Aluno* (UCA), in 2005. Since then, three types of laptops – Intel Classmates, Mobilis Encores and OLPC XOs – have been implemented on a large scale in each of Brazil's 27 states. The project is coordinated by the President's office and implemented by the Ministry of Education. The federal government is responsible for purchasing the laptops and local governments cover the costs of school infrastructure, training and contents.

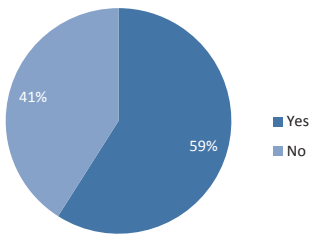

Figure 3: Possession of computer at home in the classes of the Brazilian sample

For almost half of the children in our Brazilian sample (41%), the UCA laptop represents the first computer their family has ever owned, as shown below.

2.3. Research objectives

The purpose of the research here presented was to identify what the rationale is for this educational trend, to examine what the first observable students' achievements are through the access of one-to-one technologies, and to illustrate what could be considered the positive and negative aspects that make a difference in a classroom where every child owns a connected computer.

The study starts from the **initial hypothesis** that a change in the way children learn through technology will mainly relate to three areas of skills development to be observed in the classroom:

1) *Students' problem solving skills development*

   Logical-mathematical intelligence – as Gardner (2006) points out – is available to the individual as a means to enhance his or her adaptation to the environment, finding the best solution to the problems that could be offered. According to the OLPC mission statement, giving children direct access to personal technology is a way to improve their autonomous approach to learning.

2) *Students' digital literacy skills development*

   It is clear from the above that in our perspective digital literacy is simply literacy in the digital age (Bawden, 2008; Gilster, 1997). It includes technical skills, operational skills and information literacy skills, but has at its core the ability to use the multimedia tools strategically (Jenkins, 2006). All these aspects were taken into account in the fieldwork study.

3) *Collaboration practices among students*

   According to constructivists, the process of sharing the points of view of others results in learners building understanding together that would not be achievable alone (Vygotsky, 1992). This process is known as collaborative elaboration (Brown & Campione, 1994) and allows learners to discover principles, concepts and facts that make sense for them.

A **second hypothesis** that guided the research is that there are important motivational aspects that influence the process of acquiring new skills. Although we know that it is difficult to isolate factors of motivation, several studies have revealed that it relates to personal enjoyment, interest, or pleasure (Eccles et al., 2002; Lai, 2011). In empirical studies, researchers observed that children's motivation can be influenced by certain instructional practices, such as positive and negative reinforcements (Stipek, 1996). It is thanks to such practices that they develop an awareness of their improvements and they feel they are in control of their own successes and failures (Eccles & Wigfield; 2002). In this essay, we attempt to verify if a correlation exists between the pupils' awareness about the new skills they have achieved, and the interest they have shown in the laptop.

Finally, a **third theoretical hypothesis** is that all the mentioned aspects will relate to teachers' reaction to the laptops' presence in the classroom. As a consequence of a new learning setting, the teacher has to support the learner in achieving his or her own understanding of the content, through a process of heuristic problem solving, instead of didactic lectures that cover the subject matter (Vattimo, 2002). That is why systematic observations of teaching methodologies will be determinant in understanding how children can develop awareness about their improvements, and get motivation from this awareness. The main issue under examination is how teachers deal with the new conditions of work, and if they manage to pay attention both to the content and the cognitive strategies that we suppose engender digital inclusion.

The foregoing discussion aims at identifying the elements of a successful programme implementation.

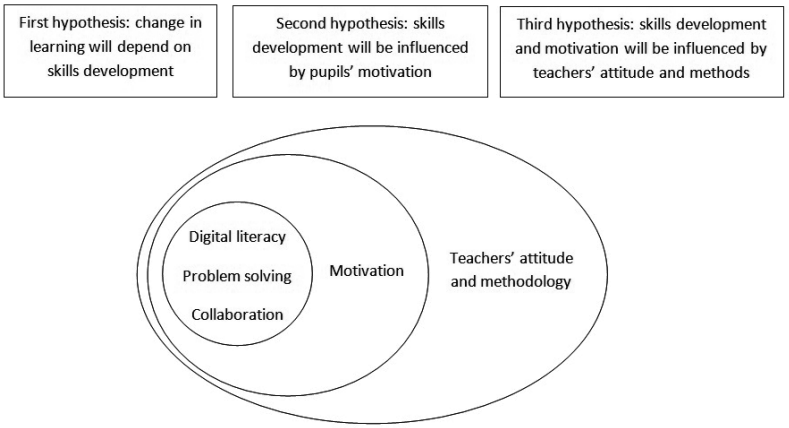

Figure 4: Research hypothesis

2.4. Research methodology

The first two case studies were carried out in the school year 2008-2009 in the Italian and Ethiopian primary schools where the OLPC project was implemented. The third case study was held in Brazil in 2012, involving four primary schools where the UCA programme was carried out. In all three contexts the sample was composed by schools equally distributed in rural and urban areas. The fieldwork research followed a qualitative methodology, based on three different tools:

- Extensive and regular observations in the classrooms (10/country) throughout the school year. The number of students per class varies to some extent in the different contexts. In Italy the sample was composed of 268 pupils and 20 teachers, in Ethiopia it involved 579 children and 20 teachers, in Brazil 302 pupils and 20 teachers;
- Focus groups with children at the end of the school year (10/country), with about 6 to 8 students from each classroom observed, in order to represent the student diversity at the schools;
- Intensive interviews with teachers and coordinators throughout the school year (20/country).

The overall data collection involved 30 classrooms in 16 different schools. It led to a final number of 30 focus groups with the pupils and 60 interviews with the teachers and coordinators. A total of 240 hours of classroom observations were conducted at the 16 schools, with detailed field notes taken during all observations. In addition, in the Italian research site parents completed a voluntary anonymous questionnaire. Finally, in all three contexts we collected school documents, teaching materials, and student assignments.

The study was based on the following set of questions:

— What is the impact of one-to-one technology introduction in the local educational system?

— How was technology integrated into the existing teaching methodologies?

— How does the laptop influence both children's and teachers' skills development?

— Does the development of new skills result in a change of the learning environment?

— If there was a change, can it be considered towards school innovation, and why?

— Is there evidence of the hypothesized relationship between developed skills and social inclusion?

The research involved discovering how the school community reacted to the introduction of a new didactic tool in a traditional educational setting, considering both advantages and disadvantages. It is premised on the awareness of the difficulty of isolating one variable – such as technology – in a complex phenomenon such as student achievement, especially considering that the data were gathered in the relatively short time of a school year. No data were collected from classrooms or schools not using the laptop. However, we were able to make comparisons by interviewing and surveying pupils, teachers, coordinators, and parents about the perceived differences between the laptop and non-laptop classrooms.

Focusing on systematic analysis of qualitative data is consistent with the theoretical model of situating literacy practices in their social and cultural context (Gee & Hayes, 2011). The method used for data

analysis was the one suggested by the authors of Grounded Theory (Glaser & Strauss, 1967). The transcribed texts were read with an inductive approach, in which individual events, situations and personal opinions were grouped to form general categories of interpretation. First we identified key patterns within each research site, and then we made comparisons to find commonalities and differences across research sites.

2.5. Main findings

Findings are reported in three predetermined categories: (1) students' achievements and motivation; (2) teachers' attitude and methodology; and (3) institutional support. Within these categories, we examine the common patterns that emerged from the data of the multi-case study, as well as the specificities of each context.

1) Students' achievements and motivation

Collaboration and problem solving skills were comprehensively detected in different proportions in all the examined contexts. On the one hand, students owning a laptop spend more time engaging in collaborative work, interacting and helping each other with their tasks. On the other hand, they readily engage in problem solving and consistently show flexible and even creative uses of technology. Nevertheless, digital literacy was not attained by many: the skills achieved by students and teachers are mainly technical, operational competences. With few exceptions, laptops did not improve students' reading and writing skills. Of course, they proportioned an increased access to information, but did not have a direct impact on learning strategies or the improvement of research analysis skills.

The results show that the valorization of children by teachers is the first key to the growth of motivation. Both the OLPC and the UCA laptops have many technical limitations. Among the reported problems we might list the short life of the battery, malfunctioning data storage, sudden tilts of software, blackouts, etc. However, during the lessons observed many teachers were publicly acknowledging students' concentration and persistence in completing the assigned work, despite

the difficulties encountered. This reinforcement produced very effective results, even in the case of tasks for which the initial motivation was low. Achievements act on pupils' self-esteem, and motivate them to accept difficult challenges.

A brief look at the results of each research site confirms this general picture.

Italy: children skilled in problem solving

The youngest Italian generation has been exposed to a wide range of network communications and technological services. The OLPC laptop is an additional tool, which often does not meet the standards of technology children are used to. However, the majority of students who participated in the focus groups perceive it as a novelty in school life, appreciate the specific child-centered design of the laptop, and the responsibility they hold towards a computer that is *created for them*. Most of the teachers interviewed (70%) observed some changes in children's skills during the year. What is primarily noticed is a general development of autonomy in problem solving, which is also connected to an improvement in logical procedures. This data emerged sometimes during the focus groups concerning children's perception of their own work with the XO laptop:

> I chat, I draw, I play Memory, I go on paint, and sometimes when I don't understand how to do things, I go on the question mark which means "help" and they tell you how to open all the XO parts (Boy, 4th grade).

> Here I put some colours, they represent the creativity that drives my work with the XO. And then I put some pillows, 'cause when I work with the XO I relax (Girl, 5th grade).

The ability to manage a new set of tools and the greater self esteem children gained from it seem to have an effect on the general behavior towards classmates, especially in promoting collaboration (Pischetola, 2010). As one teacher says about her students,

> From being students they became teachers. They had to give the laptop instructions to make it work the way they wanted and, by doing this, they acquired security and self-esteem. They also started to collaborate...they

didn't so much before, because the exercise book was very personal. They were used to protecting it from their mates' look, to avoid cheating. Now there's great collaboration. They enter in the mesh network[1], chat, and create groups of friends. The concept of "cheating", even the word itself, does not exist anymore. Cause they just help each other. I also ask them to consult each other with some of the uses.

Many teachers also notice how changes in the collaboration dynamics have an especially positive impact on social inclusion, both concerning students with cognitive difficulties and children of immigrants (17% of the sample).

I would have never expected two children of my class to have such good results in this project. I mean, we're talking about children who've always had the role of "followers". 'Cause it was always someone else who was the leader, who knew better how to communicate, and so on. But now, for instance, one of these children is a lightning: he goes everywhere, he knows a lot, and he manages the group!
In our class there's a vast mixture of cultures. And I can tell you: this laptop improved the relationships among children. Because we're talking about children who are – well, who *were* – relatively marginalized. But they happen to be very good with this laptop, and so now the other ones call them and ask for help.

Observations confirm that weaker students are more than willing to comply with prescriptions given by teachers when the laptop is the tool to work with. Many are (consciously or unconsciously) working to bring about change in their learning results, and they end up also changing their relationship with the others.

It emerged in many cases that the children who were most active with the laptop were the ones who usually have most difficulties or are not used to exposing themselves to others. The opportunity to present their own discoveries to the rest of the class has certainly led to an important public recognition of these children, not only by the teacher, but also by their peers. As one of the interviewed teachers reports:

1 The XO laptop implements a proposed wireless mesh standard. Because of this, the machine can communicate with the other XO laptops switched on in the same local area.

> Since the project started I have seen how the laptop has been helpful for children with problems. If you're able to motivate them...well, they become teachers of their mates! Their self esteem increases, because if they prove to be able to succeed in this specific context, I mean with the access to technology, well, then... they can learn in general.

Ethiopia: collaboration at the core of learning

The study showed that Ethiopian pupils have great awareness of the potential uses of the laptop, and they prove themselves experts in the most difficult activities uploaded onto it. Self initiative, autonomous discovery and social support among peers enhanced the students' communication and negotiation skills. The shortage of connectivity options to the Internet seems to give more value to the one provided by the laptop, which allows communication by chat and file sharing. Besides, as teachers prefer the traditional way of teaching, children do not have other support than the one provided by classmates. They always exchange content, discover new features of the laptop, share their documents, and learn new procedures through an interactive process. This mechanism enables the peer community to share interests and content. The enthusiasm for the features of the laptop is evident in the following answers given by children during the focus groups:

> I saw this image on TV and I recorded it. I also recorded a video of this actor and of the coach of the Arsenal team. Then...I was watching a movie, I saw a beautiful car and I recorded it...This one is an image of the area where I live. I also recorded it from TV. When I'm bored I like to watch things again... that's why I record them (Boy, 3rd grade).

> I've got two pictures; one of them is a greeting card. I made it from a picture I took of my brother's birthday. I've got another camera at home, but I prefer taking pictures with the laptop, because then I can edit them (Girl, 5th grade). I have this picture of a player from Manchester United on my laptop. Every time I open it, I remember him. The same with Obama. Whenever I open my laptop I have his picture in my journal, I really like him (Boy, 6th grade).

> I write something in the writing activity and then I combine it with a picture I took. I use the texts uploaded on my laptop to know more about people like Mandela and also to know more about languages spoken in the world. And also to know about different historical places that are out of Ethiopia. I like to read history. I use the writing activity to write my biography, different cities and their names, these kinds of things (Girl, 6th grade).

The uses of the XO laptop among Ethiopian children match the one-to-one purpose of creating a community of learners (Ligorio, 1994), based on sharing procedures and ideas, contents and products. The direct consequence of these new practices is a great motivation to discover more about the laptop, and to access even more information. Ethiopian teachers mainly see it as a spontaneous process:

> Most of them became aware of how to handle these computers, how to write, type, use writing on the computer, and I see that it's very interesting for them [...]. And so, students after some time are encouraged to improve their skills, to follow their interests.
> They're interested in using it. They're very motivated. If I ask them to bring the laptop, all of them will do that. There's nobody who leaves it at home! And since they got it, they're improving a lot by using it. I mean, they're not improving the learning in itself, but they improve in technological skills.
> Before most of the students did not participate actively in class, after getting the laptop they now participate much more!

Brazil: a model of self-regulation and disseminated leadership

In Brazil, one of the most striking results to emerge from the data is that older students, who also received the laptop, imposed a self-regulating frame on themselves for the use of the Internet at school. Whenever the rules for the use of the laptop were not clear and led to distraction (or web addiction), teenagers reacted by building their own set of rules, basically looking for self-discipline.

> Here in my collage I put on the negative side all the icons of social networks, because this thing is destroying the studies. Many people don't listen during lessons, they're all addicted to games. I don't even bring the laptop to school, only to do some work on it. I had to repeat the year, this is my second time in the 8th grade, but now I got it. I don't even access facebook anymore. It harmed me! (Boy, 8th grade)

> [The laptop] is addictive...my sister even cries to use it. I sleep with it on my side, and with the MSN open.
> *Researcher*: Does it have some positive aspect for school?
> It's positive when people know how to use it, and there's a good reason to use it, like research on the Internet, something that has to do with the assigned work. But there are some mates who're lost...they just like to spend their time on social networks.

Researcher: Don't you use them?
I used to, but I decided not to enter anymore (Boy, 8th grade)

Another issue that is worth commenting is the very positive results from collaboration between children and teachers, in those schools where the director asked students to contribute to laptop integration. In two different schools a "monitoring project" was implemented, where a group of selected students would come in the second shift of lessons, to help teachers in different classes.

> We learn many things with the laptop, and we can talk to our teachers too. I like it. And I like to teach other students who don't know how to use it. Sometimes it's difficult to explain to them, especially the youngest ones. But then you can see how they evolve! (Girl, 5th grade)

The correlation between these results is interesting because of the value that pupils' help represents for teachers, both through self-regulation against the misuse of the laptop and concrete support during lessons. From these findings, we see that the traditional hierarchal ways of doing things has to be transformed into a culture of "*disseminated leadership*", which allows teachers to challenge students and to celebrate their role as agents of change (Mangiatordi & Pischetola, 2010). Concretely, this means ensuring that students' advice and ideas are shared among peers and with teachers, and that these directly influence decisions that are made on a day-to-day basis in the classroom. The clearest advantage of such an approach is the value given to children's aptitude towards technology. They are very flexible with the use of new devices and motivated from their own discoveries. Their help can be of an enormous importance for teachers, if they allow children to adopt the role of leaders.

2) Teachers' attitude and methodology

The most crucial point which arose in the research is that the integration of a new technology at school represents an enormous challenge to teachers' established methodology. The OLPC/UCA constructivist approach expects the teacher to mentor the learner by enabling problem solving and allowing creation of new knowledge (Calvani, 2001). Nevertheless, the evidence from the examined programmes' findings in Italy, Ethiopia and Brazil suggests that often teachers do not have the

required capability to adapt their method to participatory learning. Most of the interviewed teachers pointed out the difficulty of managing the role of facilitator of a discovery process, and explained their resistance to this methodology with three main reasons.

Firstly, there is the challenge related to class size and student-teacher ratio. The laptop easily becomes a source of distraction in classes of 40 to 60 students, which are often very heterogeneous in terms of the students' age (Ethiopia), knowledge of the language (Italy) or literacy levels (Brazil).

Secondly, giving space to collaboration concretely means that the teacher has to face a setting where children move in the classroom, compare their results and help each other. Many teachers experience this as a very difficult situation to handle, both in terms of time and space.

Thirdly, OLPC and UCA state that the laptop should be transversal to all disciplines. This means teachers should collaborate in designing the content and building interdisciplinary projects. But the way schools structure teachers' time do not give them any spare time to meet and discuss their teaching practices together. There is a general need for extensive training, but it is even more difficult to fit this into the schedule.

Hence, the teachers' role is extremely difficult in an environment where every pupil possess a connected laptop. Children are by nature curious and eager to learn. But the communication and sharing features enabled by the Internet services – being in touch with friends through the social network, playing online, and sharing music videos on YouTube – represent a major source of distraction. For many students in the sample, the OLPC/UCA laptop also represented their first contact with the infinite amount of information available on the web. It is inevitable that these elements would lead the children to distraction and that sometimes this distraction results in real confusion. How do teachers lead with the challenges the new setting presents? In the cross-analysis of the data collected in Italy, Ethiopia and Brazil we can identify methodological differences among the teachers, which we have grouped into four categories (Pischetola, 2011).

Traditional method: Some teachers have received the laptop with caution. Their manner of using computers in teaching has been the traditional one, where the children were asked to follow the steps outlined by the teacher. This has prevented the children from learning by discovery

and, in general, increased dispersion in the classroom. Whenever this approach has not changed during the school year, a gradual loss of authority was observed among teachers, with a feeling of frustration that turned into a negative perception of the project.

Free experimentation: The teacher gives full freedom for learners to experience individual paths of discovery, and assumes that the child possesses a greater curiosity than the adult, as well as better technological expertise. Moreover, the teacher puts himself at a peer level with the pupils, sharing the learning process with them, both of the laptop features and their application in teaching. Interestingly, observations have demonstrated this method to result more commonly in distraction than in focused work practices, as the students often perceived the free experimentation of the laptop as simple recreational activity.

Interactive method: The attitude of the teacher is open to dialogue with the students, with the results of much greater participation than the traditional teacher fronted method. Children are often called to the blackboard and there is always an involvement of the class, with competitive dynamics that act as a positive stimulus for attention. The computer is partially integrated in teaching, although more as a tool to support education than as an element of structural change.

Driven experimentation: Instead of waiting for the teacher's instructions, pupils are encouraged to direct the desire for discovery to solve specific tasks. Their assignment concerns not only searching for new information, but also using their existing knowledge to build new skills. It goes without saying that a methodology of this kind encourages collaboration between students, joined with the search for a solution or with the advancement of a task. As for what concerns the teacher, he or she controls the progress of activities by giving constant feedback to the pupils and reinforcing their motivation.

Interestingly, we also detected a correlation between teachers' teaching method and pupils' attention/participation, as shown below.

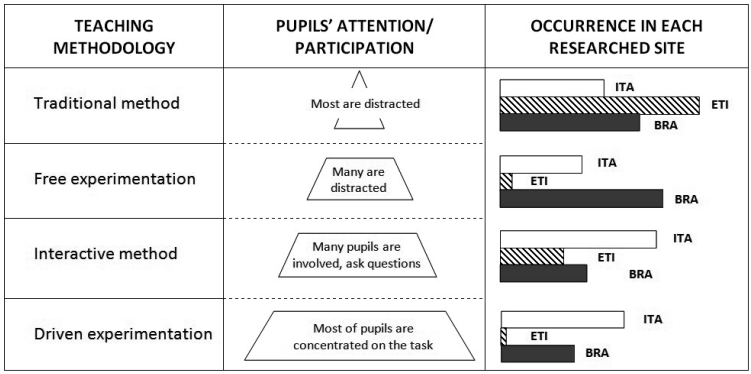

Figure 5: Teaching methodologies and their correlation with pupils' attention and participation

A comparison of these results reveals that the approach that can be considered closest to the constructivist model of teaching is the one we called *driven experimentation*. However, this is also the teaching method that was least observed in the surveyed classes. The most striking observation to emerge from the data comparison of the OLPC/UCA programmes in Italy, Ethiopia and Brazil is that often teachers do not have the required capability to adapt their method to participatory learning. In fact, the one-to-one formula brings into focus the need for a change in the traditional hierarchal relationships between teachers and pupils. It calls for a new learning paradigm, but at the same time it does not consider how teachers will coordinate the use of a new device in their overcrowded classrooms without receiving any methodological assistance. One major drawback of this approach is that a connected laptop on every student's desk is obviously not only a tool, but more – in the words of a Brazilian teacher – *as giving children the world*.

In all the researched sites, the majority of interviewed teachers recognized the importance of technology for school innovation, but also expressed their frustration for a loss of authority over their students and a general lack of pupils' interest in the subjects. They universally agreed on the need for more assistance in incorporating technology into the curriculum, and for a slower assimilation in their teaching through training.

In conclusion, it appears that the integration of a one-to-one technology in teaching practices cannot be considered a spontaneous process: it depends on the teacher's socio-cultural background, the working context and conditions, the school administration, technical support, and exchange and collaboration with colleagues.

3) Institutional support

Ultimately, the main findings call for the need to place value on the local institutions' role, and its ability to support teachers with innovative uses of technology in education. There should be well-developed plans and programmes for the development and training of officials in a range of new individual skills and institutional capacities to assess educational needs, monitor progress, and provide supervision. In fact, a number of common difficulties are identified in the examined contexts. Technology, for instance, is mostly delivered to schools without a previous needs analysis; teachers are often not involved in decisions; methodological training and technical support is usually not provided. That is to say, aspects of the programme implementation that are mainly considered secondary or collateral become the core problems in the school's daily life, demeaning the goals of the project and pushing its realization further away. On the other hand, the programmes seem to be successful where the emphasis is put on teachers' training and mutual collaboration, where technical assistance is provided and local institutions make themselves present in schools' daily activities, with significant support for the work with technology in the classrooms.

One unanticipated finding was that a strong link between technology integration in schools and a more democratic process of decision making appears to exist. Concretely, this means that students' advice is appreciated and given value by the teachers. Hence, to foster children's participation and involvement, in the first place it is necessary to promote innovation in teaching. The focus should be on how to make technology more effective by encouraging teachers to change their teaching methods, and students to use digital media as tools to explore their areas of interest (Papert, 1980). The first step should then be to encourage teachers to become digitally literate, in order to motivate them

to integrate technology in their daily work. Ideally, they should have sufficient incentives to review their learning needs and to acquire new knowledge.

Overall, our findings suggest that introducing a one-to-one device in a traditional school setting engenders a completely new educational situation, which generally neither pupils nor teachers know how to face. It might seem obvious, but nonetheless many one-to-one programmes lack these essential considerations, and suffer from the inability to recognize that digital inclusion means more than simply distributing digital devices in schools. As a matter of fact, having access to ICT is only one of the factors that produce differences in social, cultural and economic outcomes. These outcomes, in turn, are also influenced by the cultural differences which produce alterations in ICT access in the first place (De Haan, 2004; Sartori, 2006; Warschauer, 2008).

3. A FRAMEWORK FOR SUSTAINABLE ONE-TO-ONE TECHNOLOGY INTEGRATION

The one-to-one approach puts forward the view that technology will bring about a change in learning practices, encouraging active exploration, expression and discovery. Nevertheless, two serious weaknesses appear in this argument.

First, it seems to consider technology as the main driver of change, which will spontaneously result in the development of new learning practices (Hooker, 2008; Pischetola, 2011). As we have argued throughout this paper, simply having access to technology is not enough to ensure participation and inclusion. So far, the main lesson the one-to-one projects have taught us is that it is counterproductive to choose models of mere engineering intervention, which see the technical solution as the only way out of digital exclusion.

Second, this approach fails to take cultural and methodological aspects into account. A question that was not asked before both programmes' implementation is how teachers would deal with a new setting for their teaching, and what would be the necessary training and institutional support to provide them with, in order to enhance a meaningful

process of school innovation. The lack of a needs analysis before the laptop programmes' implementation might even result in a distortion of the concept of innovation and lead to a reproduction of the same traditional teaching method, rather than being a driver for change.

Bearing this in mind, we define three goals to be achieved by future policies aiming at promoting digital inclusion through one-to-one programmes.

Point one: *Focus on human capital, not technology*

Any technological change is likely to produce some social change, but the consequences of it do not depend on technology itself (Warschauer, 2002). A structured project for digital inclusion should explore how collaboration can be encouraged among the community, organizations, and local politicians, in order to ensure digital resources are used efficiently in the school context. This basically means considering the availability of human resources as a principal issue (Pischetola, 2011). This research identified a number of teachers as pioneers in innovative teaching strategies with the use of technology. This small group of leaders can do much for the achievement of the one-to-one goals and should be supported in this role. At the same time, children's capabilities can be extremely helpful for teachers, if the environment supports active interaction and authentic engagement. In students' hands, ICT can become a powerful engine of change. As one World Bank report concludes, *young people can contribute enormously to their own well-being, and that of the nation, if policymakers recognize young people as decision-making agents who define their own goals and act on them (*World Bank & World Development Report, 2007, p.23). If students are engaged as active participants who can contribute to the improvement of the school agenda, they can make a positive difference and be agents of innovation. In the future it will be necessary to identify measures and benchmarks to foster favorable conditions for students' participation and teachers' openness towards innovation in teaching practices.

Point two: *Focus on methodological and long-term training*

Teachers' technological skills and self-organization should not be taken for granted, especially when the envisaged outcome is a

methodological change in their practices. The analyses in the previous paragraphs affirm that the ideas provided by the discovery learning approach can be effectively applied to teaching through ICT. However, active learning requires carefully constructed activities that challenge the learners to perform the tasks the instructor has in mind.

To make sense of one-to-one programmes around the world it is necessary to invest in methodological training for teachers, where a different model of learning is proposed and discussed in a bottom-up process. Year-round, school-based training is generally considered the most effective form of professional development for introducing new teaching practices as it encourages informal sharing among teachers (Avvisati et al., 2013). Strategies of ICT integration in teaching methods must be rethought and readapted to the cultural context, avoiding giving a laptop the whole responsibility for the success of the project. This means considering the availability of human resources as an overriding issue.

Point three: *Provide institutional and technical support*

A major problem of projects for digital inclusion concerns sustainability. So far, some excellent projects have proved unsuccessful because, even though some goals have been achieved in the first phase, they were not sustained later. This research made it evident that a sustainable approach to digital inclusion cannot consider social and mutual support as a secondary aspect. This means that the role of existing social networks in the school and the community must be acknowledged and further promoted as a resource for the programme to be successful. Moreover, it is of great importance to invest in practices and competences in planning, monitoring and evaluation, in order to ensure gradual ICT assimilation. By reflecting on these issues, international and local initiatives can find appropriate means to channel specific activities into poverty-targeted media use and to embed ICT content as part of local life and local culture.

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4. One laptop per student in Spain: its assessment using the media literacy approach

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ABSTRACT

The chapter provides an analysis of the *one-to-one* projects developed in Spain during the years (2009-2012), and proposes an assessment for these projects taking into account several criteria that go far beyond the access and use of ICT: specifically, using a European approach linked to media literacy. In this sense, the main theoretical framework considered is related to the *Study on Assessment Criteria for Media Literacy Levels* (Celot & Pérez Tornero, 2009). In this way, the work makes an overview of the nationwide *Programa Escuela 2.0* project (School 2.0 Plan), which supplied 600.000 laptops to primary students, and adds two case studies of two autonomous regions, Andalusia and -mainly- Catalonia (first and second regions with the highest number of inhabitants in Spain, respectively) and their *one-to-one* projects. The analysis takes into account the aims of these technological initiatives to analyse in which topics (media availability, context, individual skills, critical thinking, communication and participation) these projects have developed their actions. The study shows that

not only could the economic recession be responsible for the possible failures of the *one-to-one* implementation, but also that the strong orientation towards access and use of computers must be defeated. Therefore, these kinds of projects ought to consider critical understanding and communication production, which are important parts of media and digital literacy.

Keywords: ***one-to-one; schools; media and digital literacy; computer skills; Spain***

1. INTRODUCTION

It had been four years since the *One Laptop per Child Project* (OLPC[1]) was announced in Tunis (2005) by Nicholas Negroponte, director of MIT's (Massachusetts Institute of Technology) MediaLab, when policies of the distribution of one computer per student reached Spain. Of course, other initiatives aimed to introduce technology in education had been implemented beforehand in the country. However, it was in 2009 when the Spanish government decided to adopt the *Escuela 2.0* (School 2.0) Plan, which provided for the distribution of laptops to students in the fifth and sixth grades of primary schools.

While Negroponte and his foundation's project aimed to bring inexpensive computers specially designed for educational purposes, and equipped with free software to developing countries, the *one-to-one* project took different paths in Spain, especially taking into account that Spain is divided into 17 autonomous regions -and two autonomous cities-, each of which has the power to determine its own educational plan. Moreover, anyone can also say that the Spanish projects were more ambitious than OLPC, because besides the distribution of personal computers to students, they also included objectives such as the massive use of interactive whiteboards and, in some regions (such as Catalonia)

1 "The One Laptop per Child initiative was undertaken by a team at the Massachusetts Institute of Technology (MIT) Media Lab. In 2005, it was announced that laptops especially designed for learning in poor regions were going to be sold for $100 (and hence they were referred to as the '100 dollar laptops'), but the actual price paid by governments for them was closer to $200. Mass production started in 2007, and the first handouts took place between 2007 and 2008. [...] Additionally, the Foundation states five core principles: i) children are the owners of the laptops, ii) beneficiary children are aged 6 to 12, iii) every child and teacher receives a laptop, iv) children are connected through a local network or the Internet, and v) software is open source and free. From the stated mission and five principles, the underlying vision is that students will improve their education by using the laptop and through collaboration with their peers" (Cristia *et al.*, 2012, p. 6). See the OLPC´s web page: http://one.laptop.org/

the project aimed for the complete replacement of paper textbooks for digital books or materials.

Due to the relative success that these kinds of projects had obtained in nations like the U.S., the 1x1 projects had "captured the imagination of many educational and political leaders looking to reform educational practices and improve underperforming schools" (Bebell & Kay, 2010, p. 7). In 2009, Spain bet on the digitalization of schools, thanks to the promise of a government investment of 800 million euros in a 4-year project. However, the economic recession that hit Europe, especially Spain beginning in 2011, halted these projects, or at least changed the nature of them, suspending the distribution of computers to students.

Thus, with a first stage over, it is now possible to take stock of 1x1 projects carried out in Spain since 2009. In this sense, many conferences, surveys and discussions have been held on the subject, allowing discussion questions such as "How do the people involved in this process, school principals, teachers and students, evaluate the Spanish *one-to-one* projects?" or "Was the recession the only thing responsible for their closure?". After all, in the landscape of global 1x1 initiatives around the world, we can debate their effectiveness. There are those who even say that there is little evidence about the cost-effectiveness of these initiatives and how to operate them and maintain them over time. Because of this, some countries made designs from limited information and made decisions with virtually no planning (Céspedes & Quiróz, 2011, p. 91).

To analyse this issue, we propose to observe the Spanish *one-to-one* projects using the framework proposed by Celot and Pérez Tornero (2009) in their study "*Assessment Criteria for Media Literacy Levels*", delivered to the European Commission. This research proposes several criteria and indicators for assessing the levels of media literacy. In this way, we could observe which areas (technical skills, use, critical thinking, content creation, etc.) are more relevant for Spanish projects related to ICT in schools.

To discuss these questions, we begin from the Spanish context related to the Information Society as a backdrop, and go on to the history of ICT policies in education. Issues such as teacher training, infrastructure and connectivity problems always come up when we debate these

kinds of projects and it is not different when we talk about Spain and the particular projects of its autonomous regions. Through a literature review and an analysis of these projects made by interviews with school principals and teachers, thanks to several previous studies, we can see that -always- the *one-to-one* projects evaluation will overcome the technological issues, turning, as was expected, a discussion on subjects into broader pedagogical, educational and social themes.

The analysis of Spanish 1x1 projects as proposed takes into account the media literacy approach, specifically in this case with digital literacy, because we believe that the use of ICT in education goes far beyond the election of technological tools and developing individual skills. The same approach could be used to evaluate other programmes that intend to introduce technologies and media in the schools.

1.1. Fact sheet about Spain

Spain, a state member of the European Union since 1986, with more than 40 million inhabitants, a parliamentary monarchy and 17 autonomous regions (plus two autonomous cities), has an educational system that is divided in several levels: Pre-School (under-6 years of age), Primary School (6 to 12), Compulsory Secondary Education (*ESO*) (12 to 16), Post-Compulsory Schooling (*Bachillerato*) (post-16), Middle Grade Vocational Training (*ESO diploma or Middle Grade Vocational Training as a* requirement), Superior Grade Vocational Training (*Bachillerato* diploma as a requirement), and university.

According to the OECD report (National Institute of Educational Evaluation, 2012, p. 27), whose data are related to the 2009-2010 academic year, at that time Spain invested a public expenditure of USD $10,094 a year on each student in public education, 21% more than the OECD countries and the EU. This expenditure is higher at all educational levels: Pre-School, Primary, Secondary and Tertiary. These data showed a better picture than previous ones: between 1995 and 2005, the public expenditure on education related to GDP had fallen, increasing its difference from the average of the OECD and the EU (OECD, 2009, p. 25).

In 2009, the OECD's PISA report (Programme for International Student Assessment), which measures the performance of international

students from 15 years old and up in reading comprehension, mathematics and science, showed the following results in Spain: an average score of 481 points, 20 more than in 2006, and regained the scoring above reached in 2003 (OECD, 2010, p. 15). Meanwhile, the number was still slightly below the OECD average, which was 493, and it was very well below the best-rated country (Shanghai, China), with a score of 556, and the first European one, Finland, with 536 points.

1.2. ICT programmes in Spain

Since the 1980s, several projects related to policies on the Information Society were developed in Spain. According to Martín Hernández (2011, p. 1), the first step was the creation in 1982 of *Subdirección General de Documentación e Información Científica* (General Directorate of Documentation and Information Science), from which the IDOC plan (1983) on Information and Documentation was derived. Subsequently, several laws and plans tried to push advancing innovation and technological development.

Thus, various development plans for the introduction and use of technology were implemented in Spanish society, especially from the year 2000.

We can mention (Jiménez & Martínez, 2008, p. 147) the main plans put in motion: *Info XXI*, *España.es* and *Avanza*. The first one, the *Info XXI* Plan, effective from 2001 to 2003, was motivated by the e-Europe project, approved by the European Union in Lisbon in 2000, and set goals for the regions for the following 10 years: "Computer literacy must be turned into one of the basic skills of young Europeans. The Internet and multimedia resources must be introduced in schools and education must be adapted to the digital age" (European Comission, 1999).

The *Info XXI* Plan proposed several projects. Among what stood out, from the point of view of the educational sector were the initiatives that were intended to bring the Internet and broadband to schools. This plan was replaced by the *España.es* Plan, and soon disappeared, after the Presidential elections in 2004, when the government changed.

In 2005, the Spanish government launched the *Avanza* Plan spanning from 2006-2010. In this programme, the measures were divided

into five major areas of action: home and digital citizens, competitiveness and innovation, education, digital services and digital context.

1.3. ICT in schools

In Europe, several documents and plans have attempted to boost not only the Information Society, but the use of technology in education as well. Next to the aforementioned e-Europe programme, the e-Learning programme was also approved in Lisbon, which had as its primary goals to provide all European schools and classrooms with Internet access before the end of 2001, and also invest in teacher training on new technologies before the end of 2002 (Moreira, 2008, p. 6).

In this context, it can be said that Spain had a series of "implementing educational programmes incorporating computer / digital technology to the school for nearly three decades" (Moreira, Sanabria & Vega, 2013, p. 75). The process of incorporating technology in schools had begun with the Atenea Project, sponsored by the Ministry of Education and Science in the 1980s. The Plan aimed to equip schools with computers and software and worked with the Mercury Programme, which provided for the incorporation of audiovisual media in schools (Cano *et al.*, 2012, p. 87).

In the 1990s, the transfer of educational responsibilities to the autonomous regions spurred several regional programmes, also intended for the use of new technologies in schools. We mention a few here: *Plan Zahara XXI* and *Plan Alhambra* (Andalusia), *Programa d'Informàtica Educativa* and *Proyecto EAO-Toam* (Catalonia), *Plan Vasco de Informática Educativa-PVIE* (Basque Country), programmes of educational computing called *Abrente* and *Star* (Galicia), *ABACO* (Canary Islands) and *Informàtica a l'Ensenyament de València* (Valencia Region) (Hernández, 2011, p. 2).

In April 2002, a plan was presented by the Spanish government: *Internet en la escuela* (Internet in school), and the change of government in 2004 caused this plan to halt, but a year later a new plan was approved specifically for education, in the context of the *Avanza* Plan: "Internet in the classrooms".

Currently, as a result of the various plans developing technology in education, Spain ranks third (only behind Denmark and Norway) in the

statistics that measure the number of computers per 100 pupils in primary (4th grade), with 32 computers. The number is well above the EU average, which has a figure of 12 computers. In the second grade of secondary school, Spain was again in the same third position with 31 computers per 100 students, behind Sweden and Norway (European Schoolnet & University of Liège, 2012, p. 5).

2. A CONCEPTUAL FRAMEWORK

We aim to observe the projects of introduction of computers in schools from the perspective of media literacy, thinking that the use of technology and media in education go far beyond simple tools and teaching resources. The effective interface between ICT and education requires media literacy in all subjects involved in the educational process, either directly (teachers and students) or indirectly (family and community). For this reason, it is of paramount importance to analyse the use of ICT in schools from the broader concepts related to media literacy, in which digital literacy is also included.

According to UNESCO,

> media literacy is a basic skill, one that supports many others; therefore, it should not solely be taught as a specific field of knowledge, nor simply as a skill, nor as a collective practice. Rather, it should be viewed as the systematic integration of all of them at the same time that combines values, critical perspectives and creativity so that the autonomous, aware individual may actively participate in an updated public sphere. (Tuominen & Kotilainen, 2012, p. 6)

Although there are many definitions of media literacy by international organisations and scientific and academic institutions, this study references the EC definitions: media literacy is the competence to cope, autonomously and critically, with the communication and media environment established within and as a consequence of the "Information Society".

The concept of media literacy used by the European Commission is based on the definition proposed in 1992 during the *National Leadership Conference on Media Literacy*, and says that media literacy

is the capacity for accessing, analyzing, evaluating and producing messages in various formats and media (Aufderheide, 1992). This concept, with small variations, was also adopted by several international organizations, such as UNESCO and UNAOC.

The European Commission proposed a framework in which two fundamental dimensions can be clearly distinguished: (a) Individual Competences (technical use, critical understanding and social skills); and (b) Environmental Factors (defined as media availability, media education, policies and regulation and other stakeholder roles, *i.e.*, media industry and civil society) (Celot & Tornero, 2009, p. 21).

Though informed by models of classic and basic literacy, 'media literacy' is much broader in scope and ambition. It includes the consideration of all media, traditional (analogical), novel (digital) and their convergence. The term 'media literacy' offers the most inclusive interpretation and can include 'digital literacy', 'computer literacy', 'cultural literacy', 'information literacy', 'audio-visual literacy', and 'media education'.

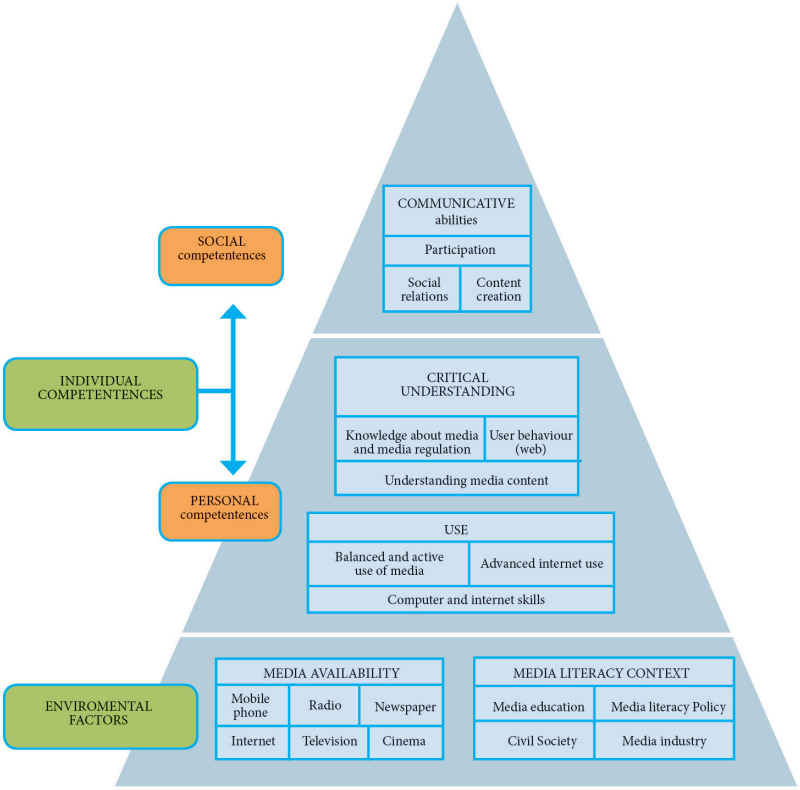
It takes the form of a pyramid in order to represent the various criteria of media literacy and the ways that they are reliant on each other, and it seems obvious that the higher steps cannot exist without the lower ones. The base of the pyramid illustrates the Environmental Factors, *i.e.*, the pre-conditions of the Individual Competences: media availability and media literacy context, which are the activities and initiatives of institutions and organisations in order to foster media literacy capacities.

The Individual Competences are in the second level of the pyramid, which begins with Use, a secondary pre-requisite of media literacy development. Use is the intersection between availability and operational skills. They are practical skills with a low degree of self-conscious awareness. The next level is Critical Understanding, which is the knowledge, behaviour and understanding of media contexts.

The apex of the pyramid represents Communicative Abilities, that are skills that one manifests in communication and participation with social groups via the media, and content creation. This is the highest degree of media literacy. Our proposal is to observe Spanish *one-to-one* programmes from this framework.

The following diagram illustrates the conceptual map. (Figure 1):

FIGURA 1: EUROPEAN COMISSION AND ITS MEDIA LITERACY FRAMEWORK



Source: Celot & Tornero (2009, p. 8)

3. ONE-TO-ONE COMPUTER PLAN IN SPAIN

While in the middle of the 1990s almost all Spanish schools had computers in their departments or boards, the massive use of these technological tools in the context of the classrooms, especially for students, was still rare (Moreira, 2008, p. 2). It was in the period of 2009-2012 that there was a huge change in the focus of policies pursued in Spain

regarding the use of ICT in the classrooms. The new programme, called *Escuela 2.0* (School 2.0), was designed from the central idea of the *one-to-one* model.

Approved by the government in 2009, the programme began to be implemented in the 2009-2010 school year. Agreements were signed between the Ministry of Education and governments of the autonomous regions, which established 50% funding of the cost for each part. Almost all of the 17 autonomous regions have participated voluntarily in *Escuela 2.0*, except the autonomous regions of Madrid and Valencia (Hernández, 2011, p. 4).

The initial plan provided that it would be developed over four years and a distribution of 1.5 million laptops to students was estimated in this period, in addition to 80.000 computers for teachers and classrooms. Besides, they also predicted that 80.000 classrooms would be equipped with digital resources, such as projectors and interactive whiteboards. The plan was intended for all students of schools maintained by public funds that were attending the 5th and 6th grades of primary education (10-12 years old) and 1st and 2nd grades of compulsory secondary education (12-14 years old). The overall budget for the four academic years was estimated at 800 million euros (Sanz, 2011b, p. 76).

The School 2.0 plan was based on the following areas of focus:

- Digital classrooms. ICT resourcing pupils and schools: laptops for students and teachers and classrooms effectively digital.
- Ensuring Internet connectivity and interconnectivity within the classroom for all teams. Possibility of Internet access in the student's home at special times.
- Promoting teacher training in the technological, methodological and social aspects of the integration of these resources into their daily teaching practice.
- Generalizing and facilitating access to digital educational materials tailored to the curricula, from teachers and professors to students and their families.
- Involve students and families in the acquisition, custody and use of these resources.

The actions focused, in its first phase, on the third stage of primary education, beginning with the 2009-2010 academic year the 5th grade in all schools supported by public funds, and then extended to the 6th grade of primary and the first two ESO courses. In each region, the School 2.0 Plan would adopt different characteristics and denominations, such as *Eskola 2.0* (Basque Country), *eduCAT 1x1* and *eduCAT 2.0* (Catalonia), *Click-Escuela 2.0* (Canary Islands), *Abalar* (Galicia) and *Escuela TIC 2.0* (Andalusia).

According to the ITE (Institute of Educational Technologies), subordinate to the Ministry of Education, in charge of coordinating the School 2.0 Plan, "over the first two years of the programme, about 650,000 students in the third stage of primary education and the first stage of ESO possessed a laptop as a learning tool" (Sanz, 2011b, p. 78).

4. CASE STUDIES: ANDALUSIA AND CATALONIA

Our consideration of Andalusia as a case study is clear, as it is the most populous region and, for years, has been promoting ICT projects in the classrooms, such as one project related to the use of an operating system called Guadalinex, which is based on Linux, and was launched in 2004. Thus, we offer various data that provide insight into the evolution of the implementation of laptops in classrooms in Andalusia thanks to *Programa Escuela TIC 2.0* (ICT School 2.0 Programme), and also offer an analysis of the impact of the current economic recession existing in Spain, which has caused a serious impact of several ICT initiatives, such as laptops delivery to primary pupils. In fact, Andalusia was the region with most laptops given to them: 400.000.

Regarding our consideration of Catalonia as a case study, it is also relevant, since it is the region with the second highest number of inhabitants, and it has its proper culture and identity, clearly related to its own language. In this region, the *eduCAT 1x1* Programme, launched in 2009, has also been eliminated as a result of the economic recession and governmental changes.

4.1. Andalusia and *escuela TIC 2.0* (ICT school 2.0)

Since 2003, the Education Law of Andalusia assumed a strong bet for accessing Information and Communication Technologies (ICT) in educational practices. Through And@red Plan, it had set in motion 1.495 ICT schools in this (Consejería de Educación. Junta de Andalucía, 2010, p. 22). The region came to be considered one of the best for the incorporation of ICT in education (La Salle Technova Barcelona, 2010, p. 12).

Upon joining the *Escuela 2.0* Programme, the government of Andalusia had to consider that, in four academic years after the implementation of the plan (2009-2010), all public schools would be transformed into the ICT School 2.0 Plan.

In the following list, we can check the objectives of Andalusia Government (Junta de Andalucía, n.d.):

- Deepening the quality of education and the equal opportunities.
- Ensuring that ICT is becoming the commonly-used teaching tool in the classroom.
- Improving educational practices to achieve greater development of students' skills.
- Transformation into four academic levels, 5th and 6th grade and 1st and 2nd ESO, in public schools, in classrooms with interactive whiteboards and wireless Internet, where teachers and students have a personal computer and connectivity.

In another paper (Consejería de Educación. Junta de Andalucía, 2010, p. 24), these objectives were drafted differently:

- Ensuring the access and use of current ICT technologies by each of the members of the educational community, in the 5th and 6th of Primary and 1st and 2nd of Secondary Education, whatever their social and economic status.
- Preparing future generations in their digital competences and competitiveness: in the use of information on strategies to get it and turn it into knowledge, and skills in ICT tools in the use of free software and proactive and free participation in construction of knowledge.

- Improving teaching practices and fostering the development of basic skills.
- Enhancing the quality of education at all levels and equal opportunities for accessing information and the labor market.

In addition to planning training for teachers, who according to official documents continue "being the central figure of the education system" (Consejería de Educación. Junta de Andalucía, 2010, p. 23) the plan also provided for the involvement of families, to be co-responsible for the custody and use of the equipment delivered to the students, and also involve them in co-participation of the use of computers in the students' homes.

According to Hernández (2011, p. 7), we can say that Andalusia "is one of the autonomous regions that has followed more strictly School 2.0 Programme and many initiatives have been promoted by teachers, so that anyone can see on the Internet". The author emphasizes that teacher's blogs were created, school webpages and other platforms to provide teachers with ICT resources to use in the classroom or personal experiences. Furthermore, *Escuela TIC 2.0* also included webpages with varied content, such as manuals, family commitments to the programme, FAQ, a guide for the delivery of the laptops; contents for primary and secondary school students, materials, links to resources, etc.

An interesting aspect of the plan was the fact that Andalusian computers distributed by 1x1 programme may rely on free software developed in the previous project aimed at using ICT in schools: *Guadalinex-EDU*.

4.2. Catalonia and *eduCAT 1x1*

In the autonomous region of Catalonia, the School 2.0 project was materialized from an agreement between the Departament d'Educació (Generalitat de Catalunya) and the Ministry of Education, with the name of *eduCAT 1X1*. Officially presented in 2009, this agreement provided an investment of 31 million euros, financed in equal parts by the central government and Generalitat. Different from the general design of the Spanish Ministry, the initiative in Catalonia was directed to schools of

secondary education, specifically for 1st and 2nd levels (students from 12 to 14 years old) (IMAE, 2009).

EduCAT 1x1 was driven by the Catalan Foundation for Research and Innovation (FCRI), subordinate to the Catalan government. The Department of Education was responsible for coordination thanks to Innovation and Educational Research Service (SIRE), part of the Directorate General of Basic and Secondary Education. Its aims:

- Converting the personal computer in a work tool for students.
- Providing a free textbook to Catalan students based on the use of the digital model and 1x1 (one student - one computer).
- Providing the basis for the education of students in the "Life in a Connected World".
- Putting Catalonia in the group of leading regions in the use of ICT in education.

The project was initiated with the possibility of voluntary membership of schools in two modes (IMAE, 2009):

- 1x1 mode: 63 schools participating, with a total of approximately 6,222 students. The eligibility requirements for this category were: classrooms with an interactive whiteboard and Wi-Fi network. In 60% of the subjects (at least 5 subjects), the teachers would use textbooks and exercise books in a digital format and all students would have a personal computer.
- Coexistence mode: the classrooms would be equipped with interactive whiteboards and 25% of the subjects taught with a laptop. In this way, the schools had areas that enabled students connecting to the Internet. There were 137 participating schools, with a total of approximately 15,775 students. Until December 2009, this group was combining the use of textbooks with electronic documents, both in the classrooms and at home, and did not need computers. During December 2009, some schools could ask to move to 1x1 mode.

In the first year of the project, at the end of the 2009-2010 academic year, 527 secondary schools were registered in the project. Additionally, 63,836 computers were distributed among students (51,602) and schools (10,351) (Cano *et al.*, 2012, p. 91).

It is necessary to take into account that the *eduCAT1x1* neither opted for computers designed especially for didactic purposes or limited to the use of free software. The laptops (300 euros per device) were funded in equal parts by Generalitat de Catalunya (regional government) and families (150 euros each).

From the point of view of infrastructures, an aspect also came to be problematic: the 1x1 programme also provided for the adequacy of electrical installations in schools, as well as the installation of networks that could allow connectivity for students and teachers from the classrooms. However, numerous problems have arisen in this regard (Consell Superior d'Avaluació del Sistema Educatiu. Generalitat de Catalunya, 2010, p. 18).

The lack of content was another important and controversial question. Since the beginning, there was only a single publisher who provided the digital contents. Subsequently, other publishers were registered but continued the debate about the acquisition of these contents, mainly because the digitalization of paper books was supposed to be free. However, the system of content acquisition / books became a paid service. The Catalan government created an electronic system that paid for the digital books with values around 30 euros per student. An educational portal, called Atria, was developed as a platform for digital educational content, in order to include materials from large and small publishers.

In theory, *eduCAT1x1* digital books would have to have in their content, in digital format, the totality of the official curriculum, and utilize reasonably the potential of digital media (animations, simulations, videos, etc..). However, the development of the project showed that the contents of digital books ended up being the object of a lot of criticism of teachers. Moreover, the stipulated amount of 30 euros would be enough only for digital books in all subjects that were bought from the same publisher.

4.3. Comparative overview

An overview is shown below comparing the plans analysed before: *Escuela 2.0* / School 2.0 (Spain), *Escuela TIC 2.0* / ICT School 2.0 (Andalusia) and *eduCAT 1x1* (Catalonia). (Table 1)

TABLE 1: ONE-TO-ONE SPANISH PROGRAMMES – GENERAL DATA (JANUARY 2011)

ONE-TO-ONE SPANISH PROGRAMMES	LAPTOPS DISTRIBUTED TO STUDENTS	DIGITAL CLASSROOMS	TEACHERS TRAINED
Andalusia	282,082	9,551	34,832
Catalonia	100,209	3,519	17,120
Total (Spain)	619,872	26,037	146,899

Source: Institute of Educational Technology. Ministry of Education (Pérez Sanz, 2011b, p. 78)

As we can see, in Andalusia nearly a third of computers of the national programme (*Escuela 2.0*) was distributed. However, Catalonia trained 17,120 teachers and equipped 3,519 classrooms. Regarding Andalusia, it trained double the number of teachers than Catalonia, and equipped three times as many classrooms. As we will see later, teacher training was a point in the programme positively valued in Catalonia.

It is also interesting to note that in all other 15 autonomous regions, the distribution of computers had a limit: 50,000 devices. In Castilla-La Mancha, for example, the number of digital classrooms (3,611) is not much lower than in Catalonia, but the number of trained teachers is very different: 3,600 against the 17,120 Catalan trained teachers.

We can perform another comparison related to specific aspects. The comparison is made using the objectives of the programmes as bases, explained in official documents. (Table 2)

We can say that, although the two autonomous regions analysed follow the guidelines of the Ministry of Education of Spain, eventually they develop some quite different 1x1 programmes.

While Andalusia bet on having free software -it had been developed before-, Catalonia preferred to use Windows as the operating system, taking advantage of the agreement signed between the Ministry and Microsoft. Catalonia also distinguished itself from other plans because it opted to work with a distinct age group of students, and divided the total value of the computers between the Catalan government (Generalitat de Catalunya) and families, arguing that it was a way to share the equipment responsibility with students and families.

TABLE 2: ONE-TO-ONE PROGRAMMES – COMPARISON

ONE-TO-ONE PROGRAMMES	*ESCUELA 2.0* / SCHOOL 2.0 (SPAIN)	*ESCUELA TIC 2.0* / ICT SCHOOL 2.0 (ANDALUSIA)	*EDUCAT1X1* - (CATALONIA)
School level	5th and 6th grade primary school and 1st and 2nd grade secondary school	5th and 6th grade primary school and 1st and 2nd grade secondary school	1st and 2nd grade secondary school
Hardware	Computer ultraportable Low-power processor Memory of at least 1 GB, Low weight High battery capacity	Ultraportable – size 10,1" Resolution:1,024x600 Weight:1,5Kg. 6 hour battery life Processor Intel ® Atom™ Speed:1.66GHz	Toshiba NB200-10U; 160 GB, Resolution: 1,024 x 600; Size: 25.7cm (10.1") Battery maximum life: 9h15min (Later: Acer Aspire One 250-0Dw; HP Mini 5101; Visa MS-N011)
Costs to students	Defined by autonomous regions	Free	150,00 euros
Operative system and software	Defined by autonomous regions At least, one operating system running with open source software Agreement with Microsoft	Guadalinex-EDU: free software developed by Department of Education (Government of Andalusia) Open Office	Windows XP or Windows 7 Linkat (free) Office 2007 or 2010 Open Office
Books	Complementary use	Complementary use of paper books and digital contents	Paper book replaced by digital book
Connectivity	Schools: broadband and WIFI connection Home Connection: agreements with telecom companies	Schools: WIFI in the classrooms Home Connection: Internet connection trough the Andalusia Corporative net	Schools: ADSL, WIFI, individualized access and control, online direct Internet connection with 3Mbps
Educative approach	It is not explicit in the plan	Constructivism, Connectivism Learning by doing Active and Collaborative Learning	It is not explicit in the plan

Source: Authors with information from several official documents (Pérez Sanz, 2011b; IMAE, 2009; Junta de Andalucía, n,d).

Except for the 1x1 programme in Andalusia, which explicitly defined its theoretical approach, the other projects did not make any explicit reference to the theoretical foundations on which they based their educational plans.

5. DISCUSSION

Interviews and several surveys of teachers, principals, and students who participated in 1x1 initiatives in Spain offer relevant data to evaluate these plans in different aspects: the impact on teaching-learning, training teachers, availability and quality of technological resources, quality of digital contents, etc.

Using the conceptual scope of media literacy, as previously presented, we can see which aspects were emphasized for programmes in relation to their main objectives and actions.

5.1. Teachers and students opinions

The research project called "The policies of a 'computer per child' in Spain. Visions and practices of teachers of the School 2.0 Programme. A comparative analysis between regions" (Moreira, 2012) sought to investigate what were the beliefs of the teachers, about the *Escuela 2.0* / School 2.0 Plan, in all the autonomous regions that were applying.

The study was conducted with teachers of 5th and 6th grade of the primary School and 1st and 2nd grade of secondary School, getting responses from 5,161 subjects, who gave their opinions on educational policies existing in the Spanish context in the 2010-2011 academic year.

These 5,161 teachers who responded to the survey were divided into 46.9% males and 53.1% of women aged between 35 and 54 years old (Moreira *et al.*, 2013, p. 78). In general, teachers responded that they had little information about the educational model project and resources of ICT policy in their autonomous regions, which seems to show that an adequate dissemination of policies had not been developed in these aspects of School 2.0 Programme. However, the teachers considered satisfactory the information they had on the objectives of the project, teacher training and teaching materials created.

Regarding the impact of the programme in the educational and social context, most respondents felt that *Escuela 2.0* (or any similar project of their autonomous regions) will cause a significant impact, in medium term, on education (Moreira *et al.*, 2013).

Teachers in general, and especially in Catalonia, claimed that they had adequate training to use ICT in their daily practice. However, the main aspect to be highlighted is that, at least in the first year of implementation, the *one-to-one* plans had not generated, in the opinion of teachers, substantive or radical changes in teaching methodology.

The most frequent activities that were developed by teachers were searching for information, working with word processors and online exercises. In that first year of implementation of the *Escuela 2.0* / School 2.0, and its corresponding regional programmes, teachers considered that, practically, there was not a contribution to the improvement of expression and communication, or even collaborative work (Moreira *et al.*, 2013).

Besides, being the object of several studies and questionnaires, the *Escuela 2.0* / School 2.0 project has also been the subject of much controversy and heavy criticism. It was accused of having been planned and approved "in closed door meetings between the Ministry of Education and multinationals, financial groups and publishers: Microsoft, Intel, HP, Iecisa (Informática El Corte Inglés), JP Sà Couto (Portuguese OEM Microsoft), Telefónica, Vodafone, Banesto, Santillana (PRISA)" (García, 2010, p. 67).

The Catalan Plan also was strongly criticized by ASEITEC (Association of Computer and Communication Technologies Firms in Catalonia), who said that the plan would not last more than 4 years, due to the low quality of computers (Hernández, 2011, p. 12).

According to the study made by Education and Technology Association called Espiral (Rodríguez, 2011), theoretically, *eduCAT 1x1* presented a great number of advantages. However, many questions have arisen since the beginning of the project. This study interviewed 1,489 teachers, merging those who had already been participating in the programme and those who had not been were not involved. Teachers, most of whom were 41-50 years old, worked in public schools.

Thus, 54% of surveyed teachers believed that *eduCAT 1x1* project should extend to other schools, although 75.6% of respondents felt that "the plan was a good idea, but poorly implemented". Furthermore, 90% said that it was necessary to revise the project, even if they were against its cancellation (77%).

The main problems related to this plan were problems with connectivity (80%), low quality of contents produced by publishers (81.1%) and fast implementation (85%). Public school principals of Catalonia unanimously expressed their discontent with unreliability of infrastructure and problems that caused on the organisation of classes during the first year of implementation of this *one-to-one* programme (Consell Superior d'Avaluació del Sistema Educatiu. Generalitat de Catalunya, 2010).

Another complaint was the low participation of teachers in critical processes related to the plan, especially regarding the election of instructional materials (García, 2010). This criticism was especially strong in Catalonia, and its *eduCAT 1x1*, because schools that had started the plan had a mandatory condition: replacing the textbook with a "digital book".

According to the Association Espiral Study (Rodríguez, 2011), teachers believed it would be possible and convenient that students access information and build knowledge from various formats and resources. They believed, too, that schools should have autonomy to choose the digital (or paper) materials to use, and if they wanted to use them.

In Catalonia, school principals had a positive assessment (ibid.) on the types of computers received, although some respondents emphasized the small size of laptops. Three-quarters of schools principals surveyed agreed with the guidance lines of *eduCAT 1x1* project, which determined that the computers belonged to the students, since they should be responsible for their work tool.

In Andalusia, apparently, the previous solid use of ICT in education made the problems minimal: "A majority sector says that the ICT project has generated many desired transformations at the level of organisation and curriculum" (Pérez, Hernando-Gómez & Gómez, 2011, p. 204).

Thus, interviews with Andalusian teachers indicated that the most important aspects valued by them were not the distribution of computers but the establishment of "active methodology and in line with technologies" (Pérez *et al.*, 2011, p. 206). In this topic, other research had

already shown that major innovations, thanks to introducing the ICT in classrooms, were related to working on projects: "The method of working on projects generally involves interdisciplinary and global development of teaching units with applied approach, which requires a positive attitude towards collaboration by teachers" (Gómez & Morueta, 2008, p. 72). Specifically, 67.3% of teachers thought that Andalusia had improved the participation of students with the use of ICT, a self-employment of students and group dynamics.

5.2. One-to-one and media literacy framework

Regarding the *one-to-one* projects studied, and the field of knowledge associated with media literacy, and with the aim of establishing early relationships between these two areas, we consider the assessment framework proposed by Celot & Tornero (2009), which shows the different levels of use of media / technology by citizens in order to determine its value and evaluation:

- Environmental Factors, which provide access to different media, considering their:

  — Availability of technology (mobile phones, radio, newspapers, Internet, television and film).

  —Industrial, educational and civil contexts and regulatory mechanisms and policies.

- Individual Capabilities, which help in the development of communication and are related to:

  — Use of media.

  — Critical judgement of media content accessed.

  — Social skills, trying to establish the ultimate goal of the media, namely the communication in the pursuit of social relations, content creation and participation.

In order to establish the relationship between this media literacy assessment framework, and the *one-to-one* plan in Spain, we used the explicit goals in each School 2.0 Programmes (Sanz, 2011a). The objectives described in official documents of the 1x1 programmes (Spain, Andalusia and Catalonia) were classified according to the predominant aspect in each one (see Figure 1).

TABLE 3: FRAMEWORK FOR MEDIA LITERACY AND OBJECTIVES OF ONE-TO-ONE SPANISH PROGRAMMES

DIM.	SCOPE AND SKILLS		*ESCUELA 2.0* (SPAIN)	*ESCUELA TIC 2.0* (ANDALUSIA)	*EDUCAT 1X1* (CATALONIA)
INDIVIDUAL SKILLS	PERSONAL COMPETENCES	SKILLS OR ABILITITES TO USE MEDIA OR TECHNOLOGY	Involve students and families in the acquisition, custody and use of the resources (laptops)	*Improving educational practices to achieve greater development of students skills*	*Converting the personal computer in work tool for student*
			Teacher training in technological aspects	*Ensuring that ICT are becoming the commonly used teaching tools in the classrooms*	*Providing a free textbook to Catalan students, based on the use of 1x1*
		COGNITIVE ABILITIES / CRITICAL UNDERSTANDING (Knowledge about media, user behaviour)		*Improving educational practices to achieve greater development of students skills*	*Providing the basis for the education of students, in a "life in a connected world"*
	SOCIAL COMPETENCES	COMMUNICATIVE AND PARTICIPATIVE ABILITIES	Teacher training in social aspects	*Deepening quality of education and equal opportunities*	
			Involving students and families in the acquisition, custody and use of the resources (laptops)		
ENVIRONMENTAL FACTORS	MEDIA AVAILABILITY		Digital classrooms	Transforming classrooms wih interactive whiteboards, wireless	Converting the personal computer in work tool for students
			Laptops for students		
			Internet connectivity in classrooms	Teachers and students with a personal computer	Providing a free textbook to Catalan students, based on the use of 1x1
			Generalizing and facilitating accessing to digital educational resources		
	MEDIA LITERACY CONTEXT (Media education, regulation, etc.)		*It is not explicit in the plan*	*Deepening quality of education and the equal opportunities*	*Providing the basis for the education of students, in a "life in a connected world"*

Source: Authors

However, there are some actions that can be related to more than one scope: the case of the families involved in acquiring, custody and use of laptops, for example (one of the goals of the overall *Escuela 2.0* project). So, in this case, we can check that this action, using the terms "acquiring" and "use", is related to individual competences, but it is also related to social skills because it takes into account the verb "involve".

Similarly, when we talk regarding "facilitating access to digital educational materials for teachers and students", it can be said that there is a goal of developing a social competence, even though we know that this action is not directly related to "communicative and participative abilities" area.

In Andalusia, the mentioned objectives are related to individual skills and social abilities, taking into account that the action uses the "improving the educational practices" sentence. We can say that this goal can also be related to cognitive abilities, since there is not an exclusive mention of access or use.

Regarding the aim of "deepening quality of education and equal opportunities", we can suggest that it is associated to the development of social competences because, theoretically, generic opportunities could become communicative skills.

Like in Andalusia, which proposes ambitious goals, such as improving the quality of education and equal opportunities, Catalonia has broader goals, setting the goal to provide skills to live in the 21th century. With this objective, we can say that Andalusia and Catalonia are working with individual cognitive abilities and social skills, although these aspects can be found implicitly in this item.

The most curious situation is the ultimate objective of *eduCAT 1x1* project, which seems to have some political contents, because it defends the idea of a modern and connected Catalonia with a very nice position between all the countries of world.

What we can see is that, on one hand, all these designs work strongly with the use of technology, developing individual skills related to the use of technological devices, and on the other hand, putting their greatest emphasis on access to technology, *i.e.*, the availability of resources. Therefore, cognitive skills and critical thinking are mentioned little in the aims of these programmes.

The following graph (Figure 2) is generated automatically by the software GoVisual Diagram Editor - Community Edition (oreas GmbH, n.d.), thanks to an algorithm called “Cluster Orthogonal”.

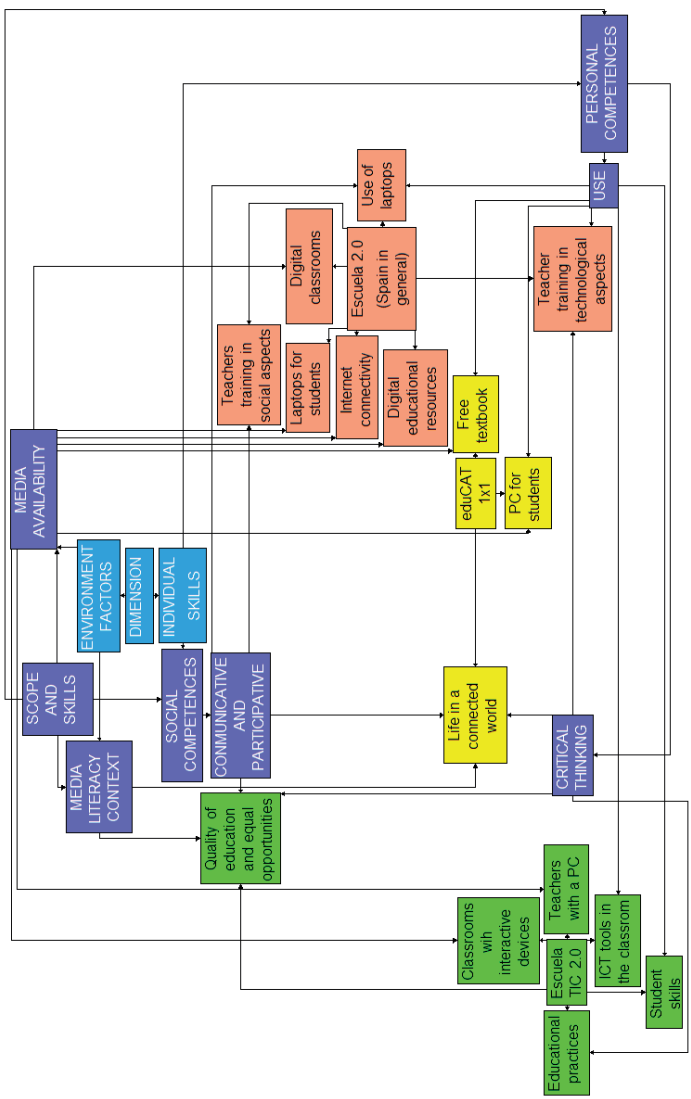


FIGURE 2: VISUALISATION WITH A CLUSTER ORTHOGONAL ALGORITHM

Spain (orange), Andalusia (green), Catalonia (yellow) and EC Media Literacy Assessment (blue and purple)”

Source: Authors

The situation of the different concepts related to the previous table, helps to visualize the relationship between the theoretical model of Media Literacy Assessment (blue and purple), and 1x1 projects in Spain (orange), Andalusia (green) and Catalonia (yellow). Moreover, we can see in an neutral and objective way -because the graph is generated using an automatic algorithm- the degree of closeness between all the concepts.

Thus, it is observed that the Catalan approach is near the general proposals of the Ministry. On the other hand, we can check that there is a different style in Andalusia. It is important to note that this analysis is based on the stated objectives in the programmes, and that it does not include details of the activities carried out in the specific area of the classrooms.

5.3. ICT programmes and the current economic situation

The change of the national government in late 2011, and the strong need to reduce public spending due to the economic recession led to the suspension of the Spanish *Escuela 2.0* / School 2.0 programme in 2012 (Moreira *et al.*, 2013). In announcing this action, the Ministry of Education expressed its intention to replace the *Escuela 2.0* programme with another ICT plan in education.

As a result of the suspension of the ministerial project, *Escuela TIC 2.0*, in Andalusia, the manner of distribution of computers to all students was also suspended. However, the ICT programme continued with the focus of providing to schools the necessary computers. The free software developed by the regional Department of Education continues being updated and its 2013 version is now available.

In Catalonia, on 9 June 2011 the new Department of Education, communicated the decision to eliminate the *eduCAT 1x1* and replace it with a new plan called *eduCAT 2.0* (Cano *et al*. 2012, p. 91). In this new version, Catalonia keeps its 1x1 model with students from the previous Plan and continues providing devices to the schools, but it does not continue its support to new students.

In this sense, we can ask: "Is the economic recession the great villain of the suspension of the 1x1 programmes in Spain?" In Catalonia, what we see is that many controversial issues emerged during the two years of the implementation of the *eduCAT 1x1*, and the Department of

Education said that it would suspend the programme for review, regardless of the economic climate.

5.4. One-to-one: recession or not?

With or without a economic recession, we can also discuss the nature of this type of project, which is apparently based solely on the access to and use of ICT technologies. *One-to-one* projects have been criticized because it is said that the only fact of exposing young people to technology does not mean that they learn without any initial guidance and infrastructures to ensure the viability of the project during the period of their training (Andrés, 2011).

Nonetheless there are some experts in ICT in education who say that the technological immersion would be enough. Xavier Kirchner, one of the leaders of *eduCAT 1x1* project, thinks that digital immersion can change, *per se*, people and education: "Technology goes beyond enabling us to do what we were already doing better without it, we can also do things you did not do. As a result of that, we change how we see the world and ourselves and as a result, this situation changes us internally" (Kirchner, n.d).

It is interesting to note that even after the widespread distribution of digital resources, traditional teaching materials, such as text books and traditional blackboards, remain the most commonly-used resources in the classrooms of the *Escuela 2.0* / School 2.0, despite the abundance of digital technology (Moreira, 2011, p. 99).

Other opinions, however, consider that often there has been a mere replacement of teaching tools: "What does exist are replacements: books replaced by web pages, paper report cards with student information systems, chalkboards with interactive whiteboards, and filing cabinets with electronic databases. None of these equivalents addresses the core activity of teaching and learning" (Weston & Bain, 2010, p. 10).

Under the *eduCAT 1x1* project, this kind of question appeared very clearly. According to the evaluations analysed, it was a failure that the project was not associated with any specific methodological change.

Of course, the abundant availability of technology in the 1x1 initiatives can be fertile ground for the creation of new-paradigm schools,

but almost all who have analysed the 1x1 programmes secure that, in addition to access, competences and motivation are necessary conditions for using the ICT devices by teachers in the classroom. In any case, many school principals and teachers surveyed about 1x1 projects agreed that the presence of laptops motivates even the most reluctant students, which helps raise attendance and lower dropout rates in schools (Andrés, 2011, p. 254).

However, any technological innovation has not brought by itself any educational efficiency improvements (González, 2011, p. 119). An institution that adopts 1x1 projects, many of which were inspired by the OLPC initiative, can forget that Negroponte and his foundation have a view of learning known as constructionist learning –the theory with which individual learners / children construct their own mental models to understand the world around them. The OLPC hypothesis is that children can learn most effectively with a personal learning device (OLPC laptop) with them at all times. Implicitly, this approach to learning is learner-centric and a facilitative approach to learning, rather than a more traditional instructional approach.

So we can say that the big challenge is to debate the underlying teaching approaches and programmes proposed for implementation of technology in education. A *one-to-one* policy should incorporate and explain what are its educational philosophy and principles, the theory of teaching and learning that it wants to promote and encourage in the educational practices and, consequently, lead to the necessary debate to challenge why and how it is taught in schools today, and towards what we want to develop.

6. CONCLUSIONS

When we discuss the use of ICT in schools, or any type of device between communication and education, we just leave the purely technological questions and go to the perpetual debate on pedagogical issues. The analysis of Spanish *one-to-one* programmes suggests that the increased use of technology in schools has a fundamental importance in the twenty-first century, and both students and teachers have to be trained to meet the demands of the new skills required in our

Knowledge Society. Nevertheless, the various features observed in the studied cases suggest that the distribution of one computer per student does not change, by itself, the educational processes.

The purely content-based teaching approach –what Paulo Freire calls "banking education", which is based on the idea of transmitting knowledge to the empty containers of the students, and without any skill related to critical thinking- can prevail in the classrooms, even if it is digital. The use of ICT, in this case, will not be enough to ensure real progress in the task of building knowledge, which should be enriched by the collaborative and collective work, to be enhanced by access and critical use of digital resources and technologies.

As we see in Table 3, where we observed the *one-to-one* plans from the point of view of media literacy, the majority of goals planned by the Spanish *one-to-one* programmes were related to individual and personal skills, mostly related to the use of technology, or other environmental aspects, such as access to ICT technologies. In this sense, it would be very interesting to assess other 1x1 projects developed in other countries with this media literacy approach.

Another important point to be highlighted, which was mentioned by some teachers in the analysed literature, is the need to work with a multi-literacy approach, like Jenkins *et al.* (2009) said: "New media literacies include the traditional literacy that evolved with print culture as well as the newer forms of literacy within mass and digital media".

So, beyond the educational proposals and approaches, the implementation of ICT in education also has to take into account digital and media literacy. All subjects directly or indirectly involved in teaching-learning processes should be prepared for the effective, critical and productive use of ICT technologies and all type of media. With this goal, we can say that it is not enough to emphasize the aspects of access and use, but it is necessary also to foresee, for any programme and policy related to the use of ICT and media in education, and with or without an economic recession, aspects related to critical thinking, evaluation and communication skills, since only the fulfilment of the complete aspects of media literacy can guarantee the full exercise of citizenship and empowerment of citizens through technology, one of the ultimate goals of any educational system.

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5. Digital technology in public education: one laptop per child programme in Peru

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ABSTRACT

The study focuses on the perception by children, parents, teachers and principals of educational institutions of the three rural regions of Peru about the implementation of the One laptop per child programme. It identifies basic economic, social and cultural deficiencies within the population as an obstacle to benefit from the technological resource and points out the State's inadequate administrative management. In conclusion, more democratic practices are needed with an emphasis on the pedagogical aspect in order to improve rural education in Peru.

Keywords: ***digital technology, rural education, educational policies, One laptop per child Programme***

1. INTRODUCTION

Education in Peru may be defined as an enormous debt to the people. From every point of view, the Peruvian educational system survives under the ineffectiveness and managerial shortcomings of the State. This contrasts with the relevance given to education in the political discourse and the striking governmental decisions that once and again stir up expectations among authorities, teachers, parents, students and society in general.

One of the most relevant shortcomings which motivated the interest of this work is the educational inequality resulting from demagogy. As such, the government faces the challenge to give all Peruvians, in particular, the poorest, the right to quality education.

Poverty, social exclusion, and the lack of personal and collective development perspectives occur precisely in places where the worst educational conditions are found. (NEC, 2007)

It is today publicly known and an essential part of the political discourse, that the democratization of education is the fundamental principle that may lead to equal opportunities for all Peruvians including access to knowledge, better employment opportunities, higher living standards and the personal accomplishment that all young people deserve.

Based on this recognition, the past government administrations have prioritized different specific actions, although in a not very clear manner.

Making a brief review of the previous administrations' contributions, we may say that since the year 2000 geographical coverage is no longer a problem in Peru as there are schools almost everywhere. Currently, the greatest problem is the quality of the service offered among the poor populations, and the lack of material and human resources needed to improve teaching contents and methodologies.

During the 2001-2006 period, a commission made up of experts prepared the National Educational Project, a document on educational policy containing the principles, objectives, strategies and activities needed to be carried out in order to radically solve the educational shortcomings of our country. The year 2021 was established as the deadline for its completion.

Nevertheless at the same time, the last two Peruvian administrations undertook actions to establish digital technology for public education; both cases ended with negative results.

The most recent was the OLPC Programme, which has aroused great attention and expectations among analysts, research centers, NGOs and institutes from the civil society that are interested and participate in the development of education in Peru. In the first place it is not a problem typically addressed by the State nor does it concern itself in meeting educational demands from the least privileged and historically disregarded sectors of the country (rural schools, single teacher schools, multi-grade schools). In the second place, it represents a qualitative leap of implications not considered before in helping social sectors previously excluded from the benefits of modernity. It is for this same reason that we are interested in analyzing the suitability of the programme, as it consists on a technology that is not part of the student's environment. Also, the student would be encouraged to handle instruments that might uproot him from his family and social context and that might even estrange him from reality, from his needs and from his immediate problems.

From the official point of view, the OLPC Programme is proposed as an instrument for the empowerment of rural families; essentially, a starting point from which that segment of the population could overcome the exclusion to which it has been confined to and placing it as a passive subject of "progress" that other more privileged segments enjoy. The computer in the hands of children is, hence, conceived not only as a learning drive and equalization with urban sectors, but also as an agent of progress for the community.

The purpose of this research is to address political, social and communicational implications resulting from this programme from the perspective of the stakeholders involved conceived as beneficiaries -the families (children and parents) and the educational institutions (principals and teachers) that have received the XO of the OLPC Programme in its initial stage (2008).

The questions that initially caught our interest may be summarized in the following: How is technological integration expressed in social practices? What symbolic values do users grant to modern technologies? What has been their influence on the building of citizenship,

networks and social development? What has been the role of the new forms of communication in the socialization and representation processes of children and young people?

1.1. General objective

Analyze and evaluate social and cultural transformations brought about in national public schools as from the introduction of digital technology. The purpose is to construe, from the subjectivity of the individuals involved (children, teachers, authorities and parents) the inter-personal and social transformations given to learning and socialization forms fostered by the use of communication technologies.

1.2. Specific objectives

- Establish the stakeholders' perceptions with regard to transformations attributable to the OLPC programme in social, cultural and communicational aspects, and analyze what development expectations are installed in the population based on this new form of education.
- Analyze how the beneficiary population (children and families) adapt to the technological environments of the community and their impact on their symbolic practices, their interaction, participation and social organization.
- Evaluate the personal and collective expectations and projections as a result of their command of these tools.
- Establish the emotional, cultural and political transformations generated by information and communication technologies in the selected communities.

2. THEORETICAL AND REFERENCE FRAMEWORK

According to an evaluation performed by UNICEF in 2011, policies seeking to improve education in Peru evidence some positive results, particularly in primary level coverage.

> At a national level, 93% of children between 6 and 11 years old attend primary school. However, 4% are not attending, which represents approximately 145,000 children"... "With regard to lagging behind in school, in Peru, 23% of children between 6 and 11 years old are enrolled one grade below what they should, a percentage that almost doubles among children who learned to speak Quechua (43%) or Amazon native tongues (45%) in their early years. Forty-two per cent (42%) of children between 6 and 11 years old living in extreme poverty have some type of school lag. (UNICEF, n.d.).

2.1. Technology and the digital divide

Technological progress has given rise to perspectives of different kinds and signs, and it opens an unprecedented yet promising scenario in meeting man's needs. Above all, it does so in the creation, accumulation and widespread distribution of knowledge and is, therefore, the undisputable right of all to be a part in this process. International agencies focused on culture, such as UNESCO, and in our case, the Peruvian Government, agree that the States have the obligation to formulate policies for the construction of the so-called Knowledge Society. Moreover, it is recognized that all human beings have the right to access the benefits of technological development.

Inequality in access to information technologies is considered a distinctive feature of disparity situations. This "digital divide" heavily underscores social differences as it directly affects the possibilities to interconnect with knowledge sources, a situation that turns into a disadvantage in personal and collective development possibilities. This imbalance in access to products arising from material and technological progress are typical of underdeveloped societies and has accompanied us throughout our history; however, at present, the consequences of this relegation become more relevant due to the following:

- 1. The current importance of the need to connect with the national and global environment -an essential condition to accomplish better living standards. Current technologies offer access to the broadest information ever known. Information today is a basic element in the exercise of citizen rights, solving problems, working out employment or production alternatives, contacts and access to different services.

- 2. The opportunity that this virtual sphere offers to participation with different kinds of interventions, such as artistic, informative, commercial, opinion-related. In other words, in the virtual world, all voices can express with absolute freedom and may eventually be heard anywhere in the world. It is, therefore, not fair to exclude certain segments of the population from this possibility.
- 3. Digital technology is becoming increasingly accessible, requiring less and less sophisticated skills, restricted to certain persons with special talents. Its use, therefore, should not be limited to an elite. The use of technological instruments is increasingly easier, which should lead to its prompt generalization, though this would not imply the immediate acquisition of digital skills.
- 4. The dimensions of information that digital technologies offer in their extraordinary capacity for transmission, recording and filing of data, music, images, even in real time, bring about opportunities and cognitive skills radically differentiating those who have them from those who do not.

In Peru, the availability of communication and technological resources has been growing due to the intensive commercial activity and to a degree of economic progress in the middle strata of the population that makes it possible for them to buy them.

According to the National Institute of Statistics and Data Processing (INEI), during the first quarter of 2011, cellular telephone communication reached 83.3% in Metropolitan Lima and 81.3% in the rest of Urban Populations (populations with more than 2,000 inhabitants) while in the Rural Areas it reached 46.2%. While distances persist, cellular telephone communication has become a kind of "democratization" of communications as its use continues to spread. From our own experience, we were able to verify in the field that many of the homes visited had a cellular telephone; however, not all of them had a television set, only one or the other had a computer and none had an internet connection. This is probably due to many factors, basically concerning the penetration of mobile phone companies across the country, the reduction of costs, the easy use and the undeniable existing need of communication in towns that have no adequate road connections let alone air transportation.

2.2. Rural schools and computer literacy

In rural areas of Peru, school is barely the breaking point between complete reading and writing illiteracy and knowledge (usually elementary). Nevertheless, teaching and learning to read and write are not limited to the command of a technique, the recognition of certain symbols, enabling a person to decode and encode. Literacy creates new cultural practices, generates a prescription for their use and reconfigures social hierarchies in certain social and cultural environments.

In the words of linguist Virginia Zavala (2002), the term literacy comprises reading and writing not only as a specific technique, but as its insertion in the social practices of a certain community. The learning of new techniques essentially has an impact on relevant, symbolic activities of the community, on the expression and assumption or reconceptualization of values, feelings and beliefs and on the management of time and of space. In contrast, the beneficiaries' perspective is that learning to read and write is conceived as an instrument to "defend from a hostile and unfair world". (Zavala, 2002, p. 21).

In the social imaginary of the population, education symbolizes progress, particularly in rural sectors that see no other opportunities to overcome material living conditions that are often below the basic survival rates. It is a historically rooted association, and it is expressed in the expectations of the population with regard to school, which is conceived as a means for the children to gain access to higher living standards than those of their parents. It is around school that they focus their hopes and illusions of a future they are unable to offer.

What actions must the State undertake to guarantee a timely and adequate insertion of excluded zones to the knowledge society and the use of digital culture benefits? Is the OLPC Programme the most adequate strategy?

For decades school instruction has focused on reading and writing as the only or the best form of literacy. However, today, a new form of teaching based on technology is being promoted through which the approach to literacy teaching is innovated. The OLPC's computer opens more creative possibilities to express learning or experiences encountered in school; it allows one to elaborate drawings, graphics, record

sound, capture images and edit them, etc. From this perspective, we may establish that computer application learning is a mechanism for the introduction of a new literacy teaching system in school, which, in turn, would trigger a series of transformations in the beneficiaries as to how they interact and in the community as a whole.

Is it under this concept that the need to establish technology in the classroom is set out? Is it implicit that the student must understand and participate in the world that surrounds him, which today would boast high technological density in day-to-day activities? In that case, technology in the classroom would enable children to perform within a context where this technology is already present, but such is not the case of rural zones covered in the first stage of the OLPC Programme.

If what is claimed here is that the purpose is to provide equal opportunities to those who have so far lacked dignified resources for learning and quality education, it is necessary to bear in mind that these technologies are not yet present in the social environment of rural children. Correspondingly, that they are probably being considered intrinsically optimal instruments for learning, and their introduction in the life of these children would have a beneficial impact regardless of the circumstances or forms of insertion.

In a recent National Conference for Educators organized by Universidad Peruana de Ciencias Aplicadas, Julio Fontan, a guest speaker from Colombia, stated: "The goal is not that students use technology, as they are already using it and will continue to do so, but that children develop their potential..." (*El Comercio* newspaper, August 8, 2011). As may be observed, experts on this subject assume that technologies are already a part of the child's life, and that the role of the school is to open students to the contents, tools and uses that may stimulate their full potential, prevent distortions, so that they may acquire skills for a creative use. However, as we previously pointed out, this is not the situation in the areas visited where most of the children did not know or had never seen a computer, and their only contact with technology is television and the cellphone of their parents.

2.3. Digital culture

> "When the technological mediation of communication stops being merely instrumental to express itself, densify and become structural, it inexorably changes the place of culture in society." (Walzer, 2005, p. 21)

As a recent phenomenon, it is important to evaluate the impact that establishing the use of digital technology has in the family dynamics in an excluded population. Also of importance, is the role that the child assumes as a holder of skills completely different than those of his parents, basically devoted to farm work, which may induce him to disruptive practices and behaviors in the family dynamics.

The portability of the XO confronts us with another aspect of irreversible implications that must be examined: the unblocking of the school institution as the sole place where acquisition and appropriation of knowledge take place. As the child gradually acquires autonomy in the use of the computer and uses it as a learning inducer that he can handle with relative autonomy, the teacher's image is changed and maybe devaluated, as well as that of the father and the mother as carriers of knowledge.

Meanwhile, Derrick de Kerckhove observes that the omnipresence of digital technologies and their intensive use are having an impact on human beings, in the mental operations they make:

> All technologies that encode, classify and carry language also modify it, as they modify the emitter, the receiver and the users of language. Language keeps a close relation with our mind and all technologies that affect language also affect the strategies we use to organize the time, space and ourselves. Therefore, psycho-technologies restructure our minds. (de Kerckhove, n.d.)

This represents another innovation of this study, which is to identify the impact of introducing an innovative educational resource to which many authors, promoters and detractors attribute completely unprecedented and radical transformation powers in the ways in which an individual understands (and reformulates) his relationship with the environment.

When analyzing digital culture, it is viewed as a means or result of the adaptation of technologies to society, highlighting the way in which productive and distributive information and communication processes

have been made easier, towards a future that inexorably defines a higher stage in the evolution of mankind. Nevertheless, we should consider the short-lived promises, the frustrated expectations, and the projects that are attempted but do not reach consolidation or result in superficial appropriations. Notwithstanding, all of these have the capacity to destabilize what was previously valid.

> The culture of inter-activity in the digital era may be defined as ways of life and behaviors absorbed and conveyed in everyday life, marked by digital technologies by means of communication and information and interfering in the people's imaginary. This mediation and interference correspond today to the characteristics of a new communicational logic [...] (perspective of the hypertext network, of the digital, the random, the multiplicity, the multidirectionality, the hypermedia). (Silva, 2005, p. 68)

2.4. The OLPC program: its application in Peru

In 2006, Peru adopted the OLPC Program as a direct initiative of the Government towards improving education in the early school years as an immediate, effective and low-cost option to incorporate all children, particularly those from the least privileged areas, to the benefits of the information society.

"In the OLPC program, Negroponte, Papert and others sought to develop and distribute a low-cost "children's machine" that would empower youth to learn without, or in spite of, their schools and teachers." (Warshauer & Ames, 2010, p. 34). This statement refers to one of the most controversial principles of this programme: it is presented as an opportunity for youth to learn without, or in spite of their schools and teachers. And we have observed that it has been established in our country under these assumptions, given that, as we have verified, the Ministry of Education has not conducted a thorough previous work with teachers and educational institutions, but has carried out the OLPC Programme precisely without them, assigning them maintenance tasks for the laptops and basic training for their use by children.

The Programme is conceived in itself as carrier of sufficient contents and tools to activate children's learning, from a rather fundamentalist perspective of constructivism.

Thus, learning is understood as a cognitive, knowledge-building activity which belongs to the articulation process of external stimuli and individual potential. And technology is attributed with the power to offer a child the motivation, the fundamentals, and the right procedures to develop a self-learning process independent of teacher intervention.

It does not consider the reformulation of the curricular structure nor the work methodologies or the redefinition of the teachers' role as requirements for its application.

> The program One Laptop Per Child responds to the demand for quality education and equality through the integration of information and communication technologies (ICT's) in the educational process based on national identity, in particular, in zones with the highest poverty rates, high illiteracy rates, social exclusion, population dispersion and low school population concentration rates, to contribute to educational equality in rural areas. The program seeks to improve the quality of education, to which end the teachers' role will be modernized and strengthened. (www.perueduca.edu.pe/olpc/OLPC_Home.html)

The programme implementation started in the second grade (grade age 8 years). The institutions benefited in this first stage were rural, single-teacher, multiple-grade schools located in extreme poverty zones. It is important to bear in mind that many of these rural schools serve a bilingual population; however this aspect was not taken into account, and the OLPC Programme introduced by the Educational Technologies Office (DIGETE) was not established based on a teaching and operative articulation with the Bilingual Intercultural Education Office.

Despite the qualities and versatility attributed to the computer, reality contradicts expectations dramatically. One of the most menacing problems involves the zones where it has been distributed in; they have been unable to overcome the lack of electric power. Official spokespersons say it and several documents of the Ministry of Education (Minedu) insist that electric power is not indispensable and mention solar panels as an alternative. However, in Peru, the technology for transformation of solar energy into electric energy is not widespread.

In pedagogical aspects, the promotion of the XO is based on the game-like nature of technology, the opportunity offered to the child to

intervene, manipulate and create. In turn, this would define the optimal conditions on which learning takes place in the early school years, from a coherent perspective with the new educational approaches: "... through activities proposed in the XO laptop, we will be promoting the active participation of students, that is, learning by doing." (www.perueduca.edu.pe/olpc/OLPC_Home.html)

The XO computer is intended as a resource capable of "adapting to different learning styles and of offering different activities for a wide array of pedagogical activities. Furthermore, it stimulates the social construction of knowledge, as it generates and strengthens relations between students, which enables and stimulate collaborative learning, increases motivation, lifts self-esteem and develops more effective social skills... The impact of technology is considered in the expansion of students' perspectives with respect to their context and the world, strengthening their self-esteem and their personal projection to the future." (www.perueduca.edu.pe/olpc/OLPC_Home.html)

Another of the characteristics of the XO is that it has free software, a quality that allows the incorporation of new applications, in line with the particular needs and skills of the user. This should be an opportunity for teachers to create their own teaching resources. Nevertheless, the training received by the teachers was exclusively limited to operative aspects on how to handle the laptop.

With regard to the perception of the students' parents participating in the programme, they are mentioned as indirect beneficiaries responsible for accompanying the child in the development of new skills as they get acquainted with the benefits of technology. But their task is actually reduced to taking care of the computer, to which effect they are required to sign a letter agreeing to be responsible for its optimal maintenance. The importance of family is minimized, probably based on the reality of the rural context, but in no way justifies its exclusion: parents do not know what their children are learning. In its double interpretation, this phrase is true. On the one hand, parents are unaware of what their children are being taught at school because they are busy with other activities and do not follow up on their children. And, on the other hand, it often happens that parents have lower levels of education than their children or the contents of what the school

offers are alien to the environment where the child is being raised, hence, unknown to the parents.

2.5. Changes in the application of the OLPC Programme

In November 2009, the Ministry of Education formally initiated what has been called the second stage, incorporating multiple-class and multiple-teacher schools and establishing Information Technology Resources Center (ITRC) proposed as an alternative to the original proposal of a computer per child. These centers consist in spaces equipped with computers, multimedia resources, and audiovisual resources and a robotics kit in numbers in proportion with the student population of each educational center. This ITRC surely brings to mind the computer laboratories where computer studies were taught many years ago, a comparison rejected by Minedu sources, as they say: it is not about teaching computer studies, but about joint experimenting, creating and innovating of teachers and students.

Subsequently, in June 2010, public schools of the capital city were incorporated, with the purchase of 29,414 computers that would be assigned to 455,366 students of 889 primary schools of Lima. Furthermore, the delivery of 881 network servers, 886 multimedia projectors with screen and 8,884 automation and robotics modules was announced.

At the same time, a general call was made to the Regional Presidents and Directors of Education to invest part of their budget in the purchase of the laptops. Suggestions were made to invite local companies and organizations to assist in the transformation of education with information technology. No reply from Regional Presidents has been reported with regard to this suggestion. A policy that could seem decentralizing but which brings to light the incapability of the central government to manage an educational policy that emerged under the dazzling light of technology. Furthermore, it was based on the mass purchase of computers, minimizing the contribution of teachers to education, even when incorporating digital technology. According to official spokespersons, 840,000 laptops were purchased between 2007 and 2011.

We must point out that after the change of government administration in July 2011, the OLPC Programme has been completely reformulated.

3. METHODOLOGY AND POPULATION

The search for information to conduct the study focused on six areas of the country. They are not presented as a representative sample, as they were selected based on criteria such as logistic feasibility, accessibility, favorable disposition and previous agreement with the responsible authority in each school.

In order to elucidate the objectives proposed, we programmed visits and designed questionnaire guides as research tools for school principals, parents, teachers and students.

The selection of the schools obeyed to the following criteria: a) That the OLPC Programme had started in 2008 (two years before our visit) to evaluate a process already incorporated; b) that the children benefiting from it were in fourth grade, an indispensable condition so that they would be able to reply to a questionnaire and c) that they had been beneficiaries of the programme in its first stage.

Our research was made in rural schools and communities of three regions of Peru: Lima (Huarochiri: Antioquia and San Bartolome) Cajamarca (Colpon and Baños del Inca) and Ucayali (Yarinacocha).

Schools that had entered the OLPC Programme in its original form were identified, as this was the form applied in 2008, with second grade primary school students. Therefore, these are children who are currently in the fourth grade of single-teacher, multiple grade schools in rural populations, classified as living in extreme poverty conditions.

In the **Region of Lima**, close to the capital, two communities were visited in the highlands: Antioquia and San Bartolome. In the former there is no Internet access and newspapers from the capital arrive only on weekends. In San Bartolome, Internet services are offered in the town occasionally, through a private business.

In Antioquia we visited the school Andres Avelino Caceres, which has primary and secondary levels, with eleven students doing the fourth grade of the primary level. With regard to the San Bartolome school, it is coeducational, it has 16 students in the fourth grade and two grade work in each classroom. Internet access is through a router which is usually inoperative.

The **Region of Cajamarca** is part of the Peruvian northern Andes. The village of Colpon is three hours away from the capital. There is no public transportation to the community, and it has no Internet service. There are no telephone land lines, only one for the community, but cellphones do operate. Furthermore, there is no cable television or newspapers. The Colpon school has electric power. It has only primary grades and in the fourth grade there are nine students enrolled. It used to have satellite internet, but it was cut in July 2010.

The other community in the study was the village of Baños del Inca, barely 20 minutes away from the province capital, so public transportation is constant. Some homes have telephone land lines and there are several television stations. Moreover, they receive all national and regional newspapers. The school La Esperanza has only primary level. It has no electric power or Internet, which is surprising as due to its proximity to a city it is not considered a rural community, yet it has not basic services. There are ten students in the fourth grade.

The **Region of Ucayali** is in the rainforest. There, 30 minutes away from the city of Pucallpa, is the village of Campo Verde. Public transportation is consistent throughout the day but lacks Internet connectivity and telephone land lines; hence, the use of cellphones is widespread. There is television signal, both national and regional, as well as cable television. The school has only primary level and there are 12 students in the fourth grade. It used to have satellite Internet, but it was suspended in 2009.

As for the bilingual school of Yarinacocha, it is located in the village of Tushmo, 20 minutes from the city of Pucallpa. It is quite accessible as transportation is constant. With regard to communications, there are no Internet cafes, cellphones are scarce, very few homes have television and newspapers do not arrive there. The school offers primary level bilingual education with twelve students attending the fourth grade on a very irregular basis.

A total of 15 teachers were interviewed in the above-mentioned schools, as well as five principals, 65 children and 33 parents.

In addition, interviews were held with officials from the Ministry of Education and with researchers who performed external evaluations.

4. ANALYSIS AND INTERPRETATION OF RESULTS

One of the focal points in our study was the conditions on which they accessed the OLPC programme. In this respect, we found a wide array of situations. In some cases, the schools had requested desk PCs for the computer laboratories while in other cases some schools were randomly assigned laptops without any previous coordination with the Minedu authorities, and they were surprised when they were assigned laptops without knowing why. Some principals believe there was a draw. For example, there was no written request from any of the schools principals to access the OLPC Programme. Additionally, situations have been reported where the number of laptops received did not match the number of students.

Although it does not appear as a condition in the OLPC Programme proposal, in the perception of all the segments interviewed, one of the most serious drawbacks includes the lack of Internet connection and hardware and software problems. These included: the mouse-pad right click button does not work, battery charges break down too fast, the keyboard is weak, the machine does not always read the USB nor properly saves downloaded files, the battery lasts between thirty minutes and two hours, unresponsive mouse-pad, and the audio system stopped working. As for the software, the programmes have not been updated, and the children get bored always repeating the same application.

Most of the **teachers** who were assigned to manage this resource did not know how to use a computer, let alone adapt it into the curriculum nor use it in their classes. The training they received was insufficient to use the potential offered by the XO. Most teachers only received a one-week training course limited to basic operation and maintenance aspects. Training did not include how to incorporate them into educational matters or the improvement of teaching methods. Of note, the laptops motivated some teachers to learn on their own (with principal approval and utilizing their own resources); however, in other cases, the obligation to use the XO produced an unexpected requirement to which they have adapted, slowly and with great effort, more due to the pressure than for their own conviction.

Nevertheless, far from questioning the way in which they were made to face the use of the laptop, teachers seem to understand that one of

the predominant requirements of the labor and professional world that awaits the students is the use of computers and therefore, they have made an effort to use it for the benefit of their children and for their own.

Most of the **children** had no computer use knowledge until the program arrived at their school. However, and even when they were interviewed they had stopped taking it home several months ago and some of them had even stopped using it in school, they mentioned a wide range of applications that they had learned and greatly enjoyed (especially those who had some access to Internet): "explore" or "search" words, images, stories, games. Many activities were connected to their school work: puzzles, maps, geometric figures, creating stories, consulting dictionaries, searching in Wikipedia, taking pictures of community activities, family or animals; searching historical data. However, what they liked most was to play, listen to music, draw or write, but in no case they abandoned their usual routines: washing, sweeping, taking care of animals, helping with house chores, taking care of their siblings, cooking, helping in the farm and playing volleyball, football or watching television in their free time.

Parents - usually uninvolved with the education their children receive, due to work or cultural reasons, with the introduction of the laptop paid still less attention because it completely strange to them. Even if the children were interested in sharing what they learned with their parents, they always refused. They even opposed their children taking the laptops home, as they were afraid they would have to pay if they broke down. However, they do appreciate that their children can get acquainted with an instrument that they relate with better opportunities for the future, the possibility to migrate, follow higher studies away from their community.

5. CONCLUSIONS

1. The OLPC Programme is a clear example of fascination or technophilia as technology itself is considered to have the capacity to dazzle and thus stimulate the alleged innate conditions of children to adapt to it. One must bear in mind that the technological impact of the information society is not yet a phenomenon that is part of economic, social

and cultural practices in a significant part of the Peruvian territory. And if technology is undeniably an opportunity for progress, the more reason for the State to guarantee that computer literacy in school goes hand in hand with accessibility to electricity and internet connection services and to technological resources to configure altogether the environment where the children will interact.

2. This experience has evidenced the undervaluation of the teacher by educational authorities. With minimum training, exclusively related to the laptop operation and maintenance, with no support (in most cases) during the process, a working tool, unknown to them, was imposed and installed without taking into account the institutional education plans. This forced them to improvise to adapt their course, the curriculum and their teaching methods to the characteristics of this new instrument, involving at the same time the school population in their charge.

3. From the State's side, it was assumed, as a starting point, that the teacher would see him/herself motivated (compelled) to learn (or self-learn) in order not to fall behind, facing the vitality that technology would trigger in the students. But based on expressions from the highest authority at the time, attempts were made to evidence that children would not need the teacher to acquire the knowledge offered by the virtual world and that they would be able to achieve higher learning levels without him/her. That is to say, teachers' deficiencies would be corrected by the children themselves and the laptop potential.

4. The OLPC Programme apparently tried to shorten the path from a fragile education as to infrastructure, teaching resources, teaching methods and development of teachers, towards quality education, in line with the demands of globalization, providing the children directly with the instrument to access knowledge.

5. The family institution has been completely undermined as the parents have been ignored in the application of the Programme. They were included as responsible for the maintenance of the machine, but since they were not informed about the characteristics of this new form of learning to which their children were being incorporated, they were denied the possibility to participate and benefit from the process. There were no communication strategies, no discussions or advice regarding this new form of teaching being established.

6. The execution of the OLPC Programme in our country represents an authoritarian measure where the Government not only disregarded essential material aspects for an optimal implementation, but, most importantly, failed to provide the mechanisms (democratic and coordinated) to configure a critical mass that would become a driving force in the great leap of rural communities towards the society of knowledge.

Recommendations

1. Peru is a country that must practice democracy at all levels and in all spheres. Also in the way educational policy is conducted. As a result of the reflection that this research work has generated among us, we suggest that decisions concerning educational innovation be discussed and shared with the people involved, in particular, with principals and teachers, who, in general, are aware of the need to introduce technologies into the educational process, but with respect to which they admit they need to learn. The State must satisfy these demands rather than impose responsibilities that create confusion and frustration.

2. Despite the deficiencies in implementing the OLPC Programme, it was verified that in children of poor populations of the country, working with the laptop had awakened skills and motivation for learning and knowledge. For this reason, we argue that it is essential to redefine the Programme and to adapt it to the reality of each place, satisfying the requirements regarding infrastructure, basic electricity, Internet connection services and an efficient training of teachers and families. We consider that the introduction of technology, even in the rural communities of our country, is a process that will soon materialize. In this respect, the best is that they are gradually inserted in an educational context. In the cities of Peru this process takes place mostly in Internet cafes, businesses that operate without proper controls, with the distortions and risks that this implies.

3. It is fundamental that in addition to the school, other institutions of society become more involved in education. Specifically, we suggest that entities such as Municipalities, Churches, Universities and companies within the framework of their social responsibility, should implement communication services for the community, much like the current

Internet cafes, but with a different approach, not just for profit (although the possibility that they may generate income is not necessarily ruled out), with a system that at the same time it serves children and adolescents, it attracts adults, senior citizens, parents, offering them assistance, academic guidance, technological training, thus contributing to computer literacy in line with user needs.

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6. The appropriation experience of XO computers in families and communities benefiting from Plan CEIBAL in Uruguay[1]

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ABSTRACT

The objective of this research[2] was to reconstruct the appropriation experiences of XOs[3] in poor families benefiting from *Plan CEIBAL* by inquiring into the practices and exploring the meanings bestowed to these experiences in the context of the families' living conditions. Some of its

1 This research was made with the patronage of CENTRO CEIBAL and IADB-FOMIN (Multilateral Investment Fund). http://www.ceibal.org.uy/index.php?option=com_content&view=article&id=442:resolucion-de-directorio-sobre-proyectos-de-investigacion-acerca-del-plan-ceibal&catid=63:noticias-slider-home

2 The complete final report is available at: http://ceibal.org.uy/docs/investigacion/Evaluacion-cualitativa-de-las-experiencias-de-apropiaci%C3%B3n-de-las-computadoras-INFORME-FINAL.pdf

3 The laptop distributed by *Plan CEIBAL* is known as the XO or ceibalita ("little Ceibal"). In this text, both names will be used indistinctively.

most important results are: 1) Incorporation of the XO in the households acquired a symbolic value of social inclusion more than a digital inclusion value; 2) unlike children, parents have many difficulties to appropriate the XO, and they tend to autoexclude themselves for fear of breaking the computers or failing while handling them; 3) parents have the certainty that computers are necessary to improve their children's education, and essential in the future to obtain more qualified jobs; but few between them are aware of the ways in which these technologies can at present improve their ordinary lives, or of the progress opportunities they offer for the adults, because they have little practical evidences of links between the acquisition of computer skills and the transformation of their living conditions. A key conclusion of this research is that although the XO, at present, does not have a significant role in the poorest families' community life and imaginaries, it is starting to be seen, and to act, firstly, as a practical mediator between the "inside" and the "outside" of the community by facilitating communications and information access, and, secondly, as a symbolic mediator between a present of scarcity and a future of opportunities.

***Keywords:** OLPC Model; Uruguay; Appropriations; Poor families.*

1. BACKGROUND

In the last few years, it has become apparent a growing concern in Latin American countries regarding inequalities in access to equipment and connectivity of large population sectors in the region, and also a noticeable interest in improving the education systems and the educative performance of the students. The implementation of digital inclusion policies and programmes since the late eighties and early nineties corresponds with a regional effort to join in the global trend, in which the ICTs are conceived as key tools for development, with the potential to improve education systems in three levels: quality, efficiency and equity. (Sunkel & Trucco, 2010)

According to the Inter-American Development Bank (IADB) (Severin & Capota, 2011), Latin America is the region where most of the One to One Computing programs have been deployed. Numerous countries in the region have implemented the model, among them Argentina,

Bolivia, Brazil, Chile, Colombia, Ecuador, El Salvador, Haiti, Honduras, Jamaica, Nicaragua, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela, and, more recently, Mexico. By 2001, nearly two million laptops had been distributed (ibid.), and, according to IADB's projections, the number will grow to 43,050,739 by 2015.

1.1. The Plan CEIBAL: Digital inclusion initiative

In November 2006, Nicholas Negroponte paid Uruguay a visit in which the guidelines of what would become *Plan CEIBAL*[4] by presidential decree published in April 2007 were defined. The project, which is part of the Equity Program for Digital Information Access (known by its initials in Spanish as PEAID), intends to generate conditions of equity in the access to new technologies as a way to transcend the digital divide, understood not only as an accessibility problem, but as a set of conditions that effectively restrict the use and appropriation of these technologies (CEIBAL, 2010) . The Plan has as its main goals:

a) Providing all public primary schools' children and teachers with universal and free of charge laptops as a means to reduce the country's digital divide.

b) Promoting social justice by creating conditions of equality in information and access to communication possibilities.

c) Favoring the generation of new learning environments and of a propitious context that enables Uruguayan children to respond to the challenges of a society based upon information and knowledge.

d) Placing at teachers and students disposal new digital tools in pursuit of expanding their learning processes, augmenting their knowledge and building awareness in the importance of continuous learning.

Plan CEIBAL is the first One to One model to achieve full coverage in the public primary education system, and is one of the biggest worldwide (Severin & Capota, 2011). Its main purpose is to provide all students and teachers in Uruguayan public schools with XO laptops (the

4 "Conectividad Educativa de Informática Básica para el Aprendizaje en Línea".

model built by OLPC) and internet connectivity. This process started with a pilot phase in May 2007 in Villa Cardal, was later broadened to the rest of the Florida department in the same year, and, in 2008, reached all of Uruguay's departments except for Montevideo and its Metropolitan area, which were covered by October 2009[5].

2. PRESENTATION OF THE RESEARCH

This article reviews some key aspects of the results obtained in the qualitative evaluation of the XO appropriation experiences in low-income community environments and families. The evaluation was conducted from a socio-anthropological perspective that reconstructed the practices and inquired into the meanings bestowed by families to these experiences. For this, we assumed that in order to study the ways of using, appropriating and socializing the XO, it is not only necessary to monitor access conditions, computing skills acquisition and competences development for their creative usage at home and in the community, but also to explore imaginaries and cultural rationalities which often contradict the scientific-technological rationality that official programmes of digital development explicitly or implicitly suggest.

In the region, most of the qualitative evaluations regarding family and community impact of digital inclusion *One to One* programmes –including the ones studying *Plan CEIBAL*- have privileged the description of activities and enquired into the perception and opinion that children, teachers and parents have about the laptop (CEIBAL, 2010; Pittaluga & Rivoir, 2010). These studies, which generally reveal great acceptance and favorable opinions towards the computer, do not always allow us to understand the true difficulties that low-income families face to incorporate, from a practical and symbolical point of view, the XO in their homes.

5 Currently, 92% of schools have internet connectivity. In 2011, 60% of homes had access to a PC, 42% in the poorer households. Digital divide was reduced between 16 and 20% thanks to CEIBAL action. Connectivity covers 44% of all the country, which is the highest percentage in the region. 65% of low-low level and 64% of low level use it between one and two hours at home. The quintile that uses the XO the most is the middle-high (81%). En 2011, 82% of the children surfed through the Internet weekly. There are no substantial differences between kids from different socioeconomic level in time spent with the laptop. (CEIBAL 2012)

These hardships are not only related to greater or lesser opportunities to use it, neither to their access to appropriate training: sometimes, even speaking about the computers supposes a difficulty. Therefore, our research focused in reconstructing the adult's perception of the XO, letting them talk with their own symbolic and biographic resources (and eventually setting aside the interview's original questions), like their childhood experiences without computers.

It is in this sense that we must point out, as an important consideration for interpreting the results of this research, that the acknowledgement of the practical and symbolical difficulties to incorporate and *domesticate* the computer at home should not be seen as contradictory with the high regard in which the families keep the XO. Both evidences should be interpreted as two faces of the same coin: on one hand, computers represent an inclusion effort in a technological world, one that seems fundamental as a way to improve the youth's work opportunities and upward social mobility chances; but, on the other, particularly among the poorer adults, they represent a situation of exclusion or lack of practical and symbolic tools to handle them, tools that the computer's presence at home cannot provide by itself.

We understand the appropriation process of the ICTs not only as the incorporation and competence mastery that can be developed in the net, but as "the set of socio-cultural processes that intervene in the new technologies use, socialization and signification in diverse socio-cultural groups" (Winocur, 2007b, pp. 109-117). Additionally, we postulate that a new technology's appropriation is carried out from a specific *habitus* and involves a symbolic capital related to it. In that setting, it is also central "the previous experiences with other technologies, as well as what is considered socially relevant in terms of the reference group's reproduction and social upward mobility". (Winocur, 2007a)

In the perspective of this study, the domestic, family and community spheres, their articulation, intersection and divergence processes and their relationship with school become keys to understand the XO appropriation. Home and community establish a practical, affective and symbolic mediation in the appropriation processes: "They constitute a fabric of domestic routines and media connections, of family bonds and virtual networks, of closures and openings online and offline, of conflicts

and alliances for 'new' and 'old media' control, of encounters and failed meetings in the virtual space and the real space, of projection towards the public and withdrawal towards the intimate, and of tension between individual projects and family traditions". (Winocur, 2010, p. 17)

Finally, in the perspective laid out for this evaluation, we assumed that: 1) Plan CEIBAL's implementation, as is the case with any policy or programme, is a social practice like any other, subject to changes, modifications, reinterpretations and meaning negotiations; and 2) their results should not be evaluated only by establishing the relative fulfillment of objectives and goals present in their design, but from a reconstruction of what actually happened in the encounter (or disencounter) between diverse social actors (teachers, parents, community leaders, digital literacy tutors, media, *Plan CEIBAL* promoters, professionals, student volunteers, etc.), with equally diverse expectations and representations of the XO and its possibilities.

2.1. Methodological strategy

A significant sample[6] was built with 125 families[7] benefiting from *Plan CEIBAL* that belong to less favored social sectors[8], living in the capital and diverse rural, semi rural and urban localities of the country. These families were chosen because they constitute critical cases in which *Plan CEIBAL* has the most impact expectations in terms of social, cultural and cognitive transformations.

6 In a significant simple, which differs with a statically representative sample, cases are chosen according to the degree of theoretical relevance that they have for the research, and their capacity to illustrate daily of exceptional situations in the studied population. In order to establish our sample's significance we considered, firstly, working with the less favored families benefiting from *Plan CEIBAL*, located in diverse social and geographical contexts and realities, and, secondly, the concepts and analysis perspectives proposed in the project.

7 The procedure followed to locate families was based on key informers in the reference zones. Different contacts were used, according to their knowledge of local realities (NGO members, religious communities, town halls, etc.) Additionally, 6 focus groups were carried out to recover the perspective of the selected communities' leaders and representatives, which could contribute a different vision, more reflexive on the XO's possibilities and limitations for community development.

8 Even if the families distribution in the categories low-low and middle-low were firstly taken from the classification used by CEIBAL (2009, p. 27), they were later adjusted to include other criteria pertinent to our evaluation.

To reconstruct the families' experience with the XO a qualitative interview[9] with seven thematic blocks and more than 70 questions was created. They reflected the following objectives:

- To analyze the social representations bestowed by the families' imaginary to the XO laptop's origin, operation, possibilities, advantages and disadvantages.
- To establish how these representations influence the XO's incorporation to the homes, the parent's relationship with school, the social inclusion strategies, the resolution of community problems and the families' visibility in the public sphere.
- To explore the domestic and community dynamics related to XO socialization, use and appropriation.

Localities, neighborhood and settlements were chosen to reflect a diversity of vital situations (objective and subjective), considering the differences between them in terms of their access to services, technological, cultural and symbolic resources, the distances relevance, the senses of belonging/local identities, and the community activity experiences.

3. THE XO'S ARRIVAL: IMAGINARIES AND REPRESENTATIONS

3.1. A social inclusion imaginary more than a digital inclusion one

The XO arrival to the homes was accompanied by a favorable imaginary towards the CEIBAL, intensely promoted by the media that associated the Uruguayan nation's progress and an increase in social development opportunities with ceibalita's equalitarian distribution and the children and teenagers' acquisition of skills to handle the laptop. In that media context, that underlined equality in access to the technology and inclusion of the less favored, the XO acquired a symbolic value of social inclusion more than a digital inclusion one. The concretion of

9 The socio-anthropological nature of the evaluation supposes that knowledge production is an open and dynamic process, subject to permanent redefinitions and estrangement by both the researcher and the informants. It was because of this that both the approach strategy and the interview guidelines suffered adjustments according to the field work and the relationship with the informants.

material access dissolves at least this dimension upon which the exclusion stands.

The symbolic value of equity and of the social inclusion possibilities is nurtured by representations already rooted in the families about technology and education. Access to technology is a symbol of progress, of "being in", is the way to upward social mobility. The ceibalita's positive representation and its acceptance at home are configured from the confluence of three legitimacies: the media discourse, the presidential figure and the school's institutional authority.

The symbolic mediation of the media provided the first resources to represent the XO, among them movie images and news that gave a symbolic catalog about these technologies' power and dangers. At the same time, it gave visibility and amplified an action that was coming from the President of the Republic and that was perceived as "something that the State did" for the poor:

> And everything started there, when the Tabaré Vázquez' government published in the press that every child was going to have its computer (Marianela, kindergarten aid, 47 years old, secondary school, Camino Carrasco, Montevideo)

The "T.V." says it, the President announces it, and "everything started there". In spite of the manifestation of this inaugural idea, testimonies reveal that the ceibalita also obtains its signification in a deep rooted cultural tradition. The State's role as provider of progress and social equality opportunities is present in the representations of the ceibalita and manifests itself in a continuity line between Varela[10], public education and the Plan CEIBAL. Public school as a place of authority legitimates the arrival of the XO to the homes while, at the same time, reinforces with its own symbolic tradition in Uruguay (white tunic and blue ribbon, equalizers) the idea of equity. In this way, some symbolic processes have the capacity to strengthen the inequalities and barriers, while others can generate the idea that differences dilute or distances become shorter

10 José Pedro Varela (1845-1879) was Public Education Minister during Latorre's dictatorship, and from there he promoted the Ley de Educación Común (Common Education Law). He is considered the great reformer of the national education, because in that moment public, free and compulsory education was established.

(Reygadas, 2008, p. 72), as was the case when all the children received a computer.

> For me, Plan CEIBAL was the most revolutionary thing that has happened in all the history of education (...) from Varela to today. (Francisco, 50 years, construction worker, Tacuarembó, Tacuarembó)

For families living in rural environments and in small localities, the XO acquires an equity value because it allows them to overcome physical distances: the ceibalita allows them to access diverse realities and opens their imagination to other living possibilities. The inclusive transformation is produced by means of an enlargement of the horizon: "see more things... things that have never been seen"[11].

> In the very small villages, the husband works in the establishment, the woman is home, the children as well, but they don't get out of that environment, (...) education ends there (...) and suddenly this ceibalita gets into these kids heads that it is not only about staying in the neighborhood and lazing around in the streets (...) For me it helps that purpose, it is to avoid people from being stuck. (Nelly, 51 years old, rural producer, primary school, Sarandí de Navarro, Río Negro)
>
> We never thought that in the countryside we were going to have a computer (...) because the countryside has always been somewhat neglected. (...) I thought: they will be for the city schools that have more children, but when the teacher told us that they were coming this way (...) I was very happy, because they were going to have something that we didn't when we went to school. (Adriana, 35 years old, housewife, primary school, Valle del Lunarejo, Rivera)

The rural-urban barrier is understood in terms of inclusion-exclusion, and thus resources like the book or the computer are valorized as instruments for surpassing the limit. These technologies are associated, as is the case with education, to the idea of "advance", meaning both progress and mobility: "they should not stay where they are".

The other value associated with equity is information access. Most families perceive that the computer's presence at home democratizes information access effectively and potentially: everyone has at its disposal the same amount of information. Its predecessors, books and

11 E67, Nelly, 51 years old, rural producer, primary school, Sarandí de Navarro, Río Negro.

libraries, huge symbols of knowledge, were always too restricted or out of reach, and not only for economic reasons, but also for symbolic ones in the sense of distinction (Bourdieu, 1984):

> The books were too expensive (...) books were really treasured, because "next year it is your brother's turn and we are buying just for one of you" (...) If one actually made it and studied was thanks to the iron will of the parents, because they had to work double (Susana, 44 years old, employee, technical school, La Cruz del Carrasco, Montevideo)

Facility in information access and the comfort of reaching it from home or school, instead of having to go over several distant places, as well as the money saved in photocopies and internet cafes, are recognized as relevant advantages. Families perceive as well that autonomy to reach information has been won: before, it was the teacher who possessed and gave access to knowledge, while now the means to obtain it diversify.

> I remember that teachers brought the information and gave us a base, and from there we made some research on the subject (...) but always in books. We didn't have another option. (Sandra, 51 years old, unemployed, primary school, Villa Colón, Montevideo)

The symbolic value of knowledge, which is traditionally related to the encyclopedia and to print, has moved to the computer and Internet. As Morley points out "it is those technologies, rather than those of print, which are now felt to be the proper enshrinement of the latest forms of scientific knowledge"[12]. Children's web browsing experience (or the adult's one with their kids, or through their kids) has an immense value related to having at home the biggest dictionary-oracle of the world: "it is like a book but with everything in the inside", says one of our interviewees[13].

12 "...in recent years, it has been computers that have been sold domestically as the key technology of access to knowledge. In the context of powerful public discourses about the importance of computer literacy in saving children from the wrath of the gods of unemployability, the computer has thus displaced the encyclopaedia as the principal domestic symbol of knowledge – regardless, again, of how and for what purposes, other than playing electronic games, it might actually be used". (Morley, 2007, p. 300)

13 E82, María Angélica, 45 years old, rural employee, primary school, Salto.

3.2. Connectivity: the weak flank of equity perception

Providing each kid with a computer and letting him take it home is a strategy sustained in the confirmation that home conditions and characteristics are as relevant for educative results as schools. Providing computers to poor households can be important to promote "an effective divorce between social origins and digital competences" because it favors more contact and training opportunities (Katzman, 2010, p. 34). However, appropriation can be frustrated because of internet access difficulties, or the extensive periods of reparations. Parents understand perfectly that connectivity is essential to deploying the XO possibilities, and a situation in which it disappears or is permanently interrupted can be experienced as a very strong restriction to an already acquired equity and inclusion right, much more than an eventual technical failure or a frozen screen.

> I don't get this interne thing, why we had it and now we don't... kids have their computers stopped because they don't have interne. In the end, they can't do a thing; they have the computer as an ornament. (Monica, 32 years old, unemployed-domestic worker, primary school, Piedras de Afilar, Canelones)

We all experience a certain anxiety regarding the vulnerability of available or stored information in the Internet, but among the poorer families, disconnection has a much more dramatic nature, because it is resignified from the traditional frame of lack: all that wealth that came all of a sudden can disappear in the same way.

4. PRACTICAL AND SYMBOLICAL APPROPRIATION EXPERIENCES

4.1. XO usage and appropriation at home

XO presence at home allowed, in spite of the limitations that we will later point out, certain uses and appropriations that involve the whole family. Mothers use them the most at home (67.9% against only 14.1% of fathers). Some learned to search or to store information, chat, play, or communicate with relatives abroad. Others ask for specific internet

queries or order a soap opera, movie or music to be downloaded for them; and most of them try to supervise what their children are doing. Any of these uses reflects different appropriation levels of the ceibalita, and we could distinguish between the ones motivated for personal interest, and the ones motivated by the necessity to control their kid's activities. Obviously, the greater use and motivation observed in mothers is related to their presence at home, and to the traditional role of being in charge of school and children's issues. Nonetheless, fathers are also attracted by some software, and they generally share interests with their children: videogames, information queries, movie, video and music downloading and virtual tours of the *Mercado Libre*, whose merchandise they look but rarely buy.

> By means of that (the XO) I met my nieces, that had children and I hadn't met them. (...) We even showed them pictures of here (...) of how the neighborhood was changing, how my house was being built. (Héctor, 44 years old, construction worker, second grade in technical school, 15 de Enero Settlement, Toledo Chico, Montevideo).

> I always try to see what they are doing. Sometimes I grab the computer and check. (Raúl, 36 years, temporary worker, high school third grade, Sacramento, Colonia)

> If they let me have the computer for a little while, I go into Mercado Libre or El Gallito Luis[14]. I like to look at the job opportunities. I am not looking for a job but I see the things they offer (...) (in Mercado Libre) I only look at the things being sold, the auctions that happen... because I am not looking to buy, I am only snooping. (Patricia, 30 years old, housewife, 4th grade in primary school, 1° de Mayo Neighborhood, Montevideo)

Finally, to understand the meanings that the XO acquired for the interviewed families, both in the appropriations that actually happened and in the ones that did not, it is important to look at the way it entered the homes. In the media, the official discourses and the school, the XO was always destined for the kid. This explains why families tend to find usages divergent with educative purposes not completely appropriate,

14 Classified advertisements section of the Uruguayan newspaper *El País*.

which contributes to the fear of touching or breaking down the computer, conceived as a school tool destined for the children.

4.2. The "adopt" or "adapt to" the XO dilemma

Families are certain that computers arrived to stay and that they will be essential for the future in any way of life, but, at the same time, notice the little practical abilities that the traditional education system and the cultural capital provide to use them. In the following example, a mother explains clearly this situation. The use of the term "adapt", when in fact she seems to be referring to "adopt" is key. The confusion between the terms expresses the incorporation of technologies true dilemma, in the homes as more generally in life: should we adapt to them or adopt them?

> (...) because the computer is something that exists, and that we cannot deny, the sooner we adapt it, the better, because we are going to look for the best way (Beatriz, 50 years old, unemployed, primary school, Montevideo)

> I won't be able to handle this, I don't have the wits (...) I have to be mentally prepared to learn and I don't have 'nough patience for this stuff (...) My work is in the fields! An' you won't get me outta there. (Darío, 45 years old, rural employee, incomplete primary school, Dolores, Soriano)

We think that the confusion between the terms "adapted" and "adopted" reflects an important dilemma of XO appropriation in the poorest homes. The incorporation of any new technology at home requires an adoption process that starts with the decision to buy it, motivated by a practical or symbolic need. Then, it requires an appropriate place in the house so that it adapts functionally to the needs of the whole family, or of the member for which it was destined; and finally it is used, carrying out an effort economy to make it work. In the ceibalita's case, all of these conditions were modified: they arrived home without anyone asking (which is not contradictory with their high valorization). Unlike the television and the desktop computers, it can be left anywhere, like a conventional toy, but requires cares and obligations that are ultimately verified by the school. To use them it is necessary to permanently move from one place to another looking for Internet connectivity, and they cannot be operated by simply turning them on and

off. Parents have difficulties to order and assimilate the "ceibalita time" with the standard routines of doing homework or arranging school supplies, which ends up altering the rest of domestic routines, like the moments to eat, sleep or rest:

> It was becoming late and I said: "-Iván, come inside, it is cold out there" and he was with the XO out there in the tree (...) he woke up very early. They didn't even sleep (...) when they brought them in. It was 7 in the morning and we could already hear a tune coming from Ivan's bed. The computers were already on, in bed! (Monica, 32 years old, unemployed, primary school, Piedras de Afilar, Canelones)

In the following example, a mother expresses very clearly the consequences of a contradiction: unexpected technological wealth along with extreme poverty:

> Over there, in my neighborhood, there were many families that were bigger than mine and, you know, they weren't happy with the fact that there were too many computers in a single house (...) you know what it means to carry sometimes as much as 7 computers to send the little ones to study (...) and when you come to that, you have to think about electricity consumption as well (Laura, 34 years old, domestic worker, 3rd high school grade, Mercedes, Soriano)

To summarize, the condition to incorporate the XO to the homes requires that their members "adapt" to the usage conditions that are predesigned. On the contrary, the XOs become unusable.

4.3. Learning mediations: pencil and paper vs. keyboard and icons

For parents, learning possibility is traditionally defined by a more or less successful relationship between hand and mind, mediated by the material and symbolic base of the pencil, the notebook, the book and the teacher, which are knowledge and meaning sources and givers, and with the capacity to verify and legitimize the results. But with the computer, and the disappearance of the pencil mediation and the stroke control to express assimilation of concepts and ideas (making

summaries, writing essays, doing sums, copying texts, etc.), they find unclear how knowledge is transferred, and they tend to perceive that it is in fact the computer who is doing additions, summaries, information search and editing, etc:

> The computer is like a mind (...) that stores things that our mind can't store because we forget (José, 49 years old, rural employee, primary school, San Antonio, Salto).

> Before, we learned... we had to keep everything in our mind. But not anymore. Now everything is with computing, computers. (Sandra, 41 years old, primary school, B°P3, Paysandú)

Additionally, before the XO, access to knowledge had a material base and a specific weight. It was measured by the quantity of books that could be carried, dragged, read and understood, and, in that sense, the possibilities of social mobility depended on how knowledge was accumulated as life advanced:

> Geography book, math book, Spanish book, biology book. It was a backpack and you carried, I don't know, 20 kilograms of notebooks and books (Adriana, 32 years old, primary school, temporary worker, Sayago, Montevideo)

On the contrary, even though the ceibalita possesses all the information of the books, this knowledge cannot be touched or organized in a hierarchy: it is unclear what comes first and what second in order to slowly climb the steps of knowledge.

4.4. Ceibalita's fragility: the fear of touching, breaking down or erasing

XO's arrival activates rooted ideas about new technologies. In the presence of the technological artifact, awe is experienced as well as fear. On one hand, an extraordinary action potential is imagined, and, on the other, it is believed that handling it is complicated and that the smallest mistake can break it down. It is a fear that grows from the supposition –and verification- that the old manual skills needed to handle a pencil, work in the field, drive a car, practice a craft (carpenter, builder,

mechanic, classifier, painter, electrician, technician, etc.) and to carry out any domestic task, using electrical appliances, even handle a cell phone, seem completely useless or at least insufficient and thus cannot be transferred to the handling of a computer. The parents of these families assume that their incapacity is caused by their clumsiness, their age, their low education level or their lack of intelligence. And the children confirm with their abilities and swift learning the failure of their parents. This feeling does not necessarily work against the XO, but it does reinforce the idea that it was created for "the poor's children" and not to allow "their poor parents" to acquire the tools that will let them perform in a society where present and future work is definitively marked by computer technologies.

> An adult thinks that he can break it down, that he can cause it to freeze. However, they are more adventurous and they are unafraid of getting into computing and handling it and looking for the stuff they want to know. (...). Not them, they don't think that it could break down; they investigate (Lorena, 32 years old, unemployed, incomplete primary school, Florida)

> You are in the computer and weird stuff starts to pop up and you say: "this... what have I done? I broke something" (...) The kids, they don't care. They just go on! They don't have any qualm. (E53, Evangelina, 37 years old, NGO employee, primary school, Boix y Merino, Montevideo)

4.5. Playing, studying and free time

It is impossible to understand the opinion parents have on the XO as a pedagogical tool without reconstructing the way in which its presence at home is interpreted from previous representations about playing and studying that prescribe that playing and learning are two incompatible activities. Ceibalita's presence at home questions and creates meaning conflicts with all previous ideas: playing is learning, we can play alone or with company, study and playing times can be mixed, it can be indistinctively used by boys and girls, it does not require a table, notebook, pencil, nor books, and it can be used anytime and anyplace, given that the kid can connect to the Internet. The confrontation between the parent's dominant representations about time, space, playing and study, and the ones implicit in the XO design, causes confusion and mixed feelings

because they cannot distinguish which is the time of playing and which of studying. It is also possible to assume certain bewilderment because the XO was authorized and legitimized by the school and its teachers, who previously (and, in many cases, still today) shared a pact of meaning with parents regarding the opposing values of playing and studying.

> I think that the XO was made so that they, in the school, could start to learn how to handle it, but not with games, games, games. (Claudia, 31 years old, housewife, 5th high school grade, Estadio Neighborhood, Pando, Canelones)

> When she says "we are going to use it to play" it is to play buy when they say "we are going to use it to teach" it is to teach. But that depends on the parents, when they have their time for playing, and when their time for learning. If not, between the two things they end up doing nothing. (Evangelina, 37 years old, NGO employee, primary school, Boix y Merino, Montevideo)

There is also a contradiction between the representation of free time related to the XO, and the playing time shared in family, indoors or outdoors. The free time spent with the XO has less social value that free time shared with others.

> They should play something else. Because there are kids that are with the computer playing games instead of going to play to the field (Sandra, 54 years, unemployed, incomplete High School, Santa Rosa, Canelones)
> (...) I prefer them to ride bikes, to be outside in a beautiful day and not with the computer (María, 36 years old, landlady, primary school, Aguas Blancas, Lavalleja)

Ambiguous feelings between the inside with the XO and the outside with the XO can also be interpreted as resultant from an alteration of the traditional limits that clearly distinguished what was private and what was public. Before internet's arrival, home seemed as a safe and predictable place, where the relationships between safe and dangerous, and the one between shared and intimate, were clear. But the Net introduces a virtual street in the house, full of strangers and disturbing images whose dangers, real or imagined, can "be downloaded" into the house, and adults do not know how to neutralize them because they have little understanding of what their children do with the computers.

I monitor them, because he is so little, and he tells me "Mom, see if he can be my friend", and I tell him "you have to look at his face, see if he looks familiar" They have to be only people we know. (E65, Flavia, 36 years old, baby sitter, primary school, Cerro Norte, Montevideo)

5. VARIOUS NON SCHOOL RELATED XO APPROPRIATION EXPERIENCES AT HOME

5.1. Health and sickness

To understand the different aspects of digital inclusion-exclusion from daily experience, we set as a goal to inquire into the representations that families have about their living conditions and about the role that computers have or could have regarding critical needs like health, employment, housing and services.

Health is one of the few spheres in which a valuable, significant and autonomous from school XO usage is pointed out. The possibility of obtaining information about remedies, treatments and diagnosis not only acquires the symbolic value of equality in access, but also empowers families facing doctors and technicians. The dissatisfaction with information received from the doctor and the nonconformity regarding the way the patient is treated, motivate a research for information alternatives. This is related with a weakening in the trust that medical knowledge inspires, and the idea that progress in treatment of diseases is faster than the doctor's possibilities to access that knowledge.

Because they (doctors) say things in a way that you don't understand a thing (Walter, 44 years old, print employee, secondary school, Camino Carrasco, Montevideo)

You said before: -I have to go to the drugstore to ask what this remedy is for. Now you put it there in the Internet and everything pops up; and why the drops, and why that many. (Flavia, 36 years old, baby sitter, primary school, Cerro Norte, Montevideo)

In this case, the value of the information is linked with specific vital circumstances and tends to have a familiar and shared use:

> Last year my mother had a sickness in the aorta (...) my sisters went into the sickness page to see what was that disease mom had (...) my sister read and we were all there (...) we read as well what she was reading in the computer. (María, 29 years old, cleaning lady, 1rst high school year, Maldonado Nuevo, Maldonado)

5.2. XO representations related to work

The most relevant link between computer and work is the one regarding the possession of computer skills and knowledge as a condition to obtain a job or improve its quality. In this sense, technology is perceived as a shortcut facilitating upward social mobility ("being someone"), but also as confirmation of exclusion:

> Nowadays they are used for everything. I always go to the clinic and say to the employees: "look, they were cleaning ladies and they are executives now", because... they are at the counter and now take notes in the computer (María, 29 years old, cleaning lady, 1st high school year, Maldonado Nuevo, Maldonado)

> I am one of the persons that lost opportunities because of not knowing computing. I could not ascend in post and salary because I didn't learn computing in time (Alberto, 50 years old, public employee, first year of technical school, Santa Rosa, Canelones)

María says that without the computer "you are nothing", expression that is present in several testimonies and that manifests the exclusion experience generated by the lack of knowledge: to be excluded implies the dissolution of the being; its invisibility and immobility are crystallized, like in Alberto's case. Additionally, in the relationship between new technologies and work, there is a perception that access to opportunities related to computers is only possible for those that possess additional competences, previous to computer skills: it is necessary to "have studies", to have had access to education in a wider sense that computer handling. In other words, the digital exclusion representation is based in a previous exclusion, one that the computer's arrival does not erase: in fact, it deepens it.

The ceibalita transcended a material access barrier, but the development of other subjective abilities is needed for inclusion to be possible[15]. In some of the interviewed families a certain impossibility to imagine a different way of life or an individual or collective project capable of transforming their living conditions is observed: "if you don't know computing, there will always be jobs that don't require it", "it is not necessary here", "there is work anyway", are some of the expressions that reflect the expectation limits. This coexists with other perceptions in which adaptation to the change is considered essential to avoid being left out, and computers become an instrument capable of widening horizons:

> Here we had only one possibility... working in construction (...) but there was a profession called graphic design (...) and you have a chance to work in that (...) specially drawing, and that is Facundo's thing... (...) he went in and found out ways of... and learned to draw (...) all that he learned through Internet. (Beatriz, 50 years old, unemployed, primary school, Cruz de Carrasco, Montevideo)

While imagining the future, an idea both fatalistic and magical about the transforming power of technology and its omnipresent nature is expressed. Its advance cannot be stopped, it is impossible to escape because it invades every dimension of daily life, and its apparition is enough to transform everything. Given this idea of technology, the computer is not conceived as a tool to modify present living conditions, but more like a hope of upward social mobility and social inclusion for the children: parents tend to manifest they perceive themselves as "being stopped in time" or "left out"[16].

In a context where many differences between their children and those of the more favored are palpable and evident, parents observe that their children do not show any sign of difficulty in learning and appropriating this new technological tool. This verification contributes to

15 *Vide UNDP Report Chile* (2006, 13), in which three subjective capacities are pointed out: subjective power, reflexivity, individualization. "In this context, it is important to ask ourselves which is the divide that really matters. In addition to the digital divide (that ultimately could be solved with "irons"), it must be taken into account that there is another divide in the population, one that is made out of objective resources and of subjective capacities".

16 Richard. 36 years old. Construction worker. Second year of high school. Las Piedras, Canelones.

the idea that technological access maintains educative disadvantages for the parents but makes them disappear in the case of their children.

In this sense, **for the parents, the ceibalita is understood more as a mediator than as a key to digital inclusion; its role is not so much to promote a digital literacy that transfers from the kid to the parent, or that is made possible because the technology is available at home, as to mediate between the present and the future through the kids.** The mere contact with the technology is imagined as propitiatory of magical transformations. Especially the Internet is bestowed with this meaning:

> Because there are things that maybe they don't know and they go into the Interne, in pages that let them learn (...) sometimes I listen to them, one of them doesn't know, and they tell him to go to this or that page. And I say: they are learning by themselves. (Mari, 40 years old, housewife, primary, Achar, Tacuarembó)

5.3. Perceptions of the computer's possibilities regarding neighborhood or community needs

Digital inclusion policies and programmes are full of expectations about the potential impacts of the ICTs incorporation to less favored sectors daily life. It is argued that they can propitiate the development of productive and social entrepreneurship of all kinds, that they will improve the communities' living conditions and develop e-government interactions. Nonetheless, the concretion of these sorts of appropriations has as a previous condition the existence and positive disposition in the subjects' daily life towards community life, shared spaces, communal activities and the solving of problems that affect the community. In the interviews, the idea of a weakening in the bonds with others appears, as well as the perception of deterioration in collective life and shared spaces quality:

> We have three children and for them there is nothing here in the cooperative. We care because, before, there was a football field and they closed it. A small square, and they closed it. There is much trouble, then (...) because they don't have a place to be (...) there is no cooperation. It is unlike before; that you used to knock on your neighbor's door and ask for a cup of sugar.

> Not here. They see you coming and slam the door shut. (Laura, 38 years old, domestic employee, primary school. Paso Carrasco, Canelones).

When accounting collective activities or community problems, our interviewees did not mention spontaneously the computer or the ceibalita. On the contrary, they pointed out that finding solutions to the problems affecting them personally or collectively requires moving to offices or State centers to demand and negotiate. In their perception, personal contact, face to face communication, key local actors and political contacts are the most effective ways to solve problems. Computer is not recognized as a relevant tool for solving collective problems. When we ask about its possible uses in this field, interviewees imagine limited ones, often in substitution or as a complement to traditional modes of problem solving and organization: access, information search and storage, letter writing and preparation of documents. And, in some cases, spontaneous and planned uses, like recording relevant community events with the XO, are mentioned.

> In the May 18th parade or a football match or any event, there is always a kid filming with the ceibalita (...) if you go to a social or popular event in the neighborhood, and even more in grandma's birthday or things like that, they are there with the Ceibalita. (Carlitos, social educator, SOCAT, Las Piedras)

Other ideas about ceibalita's potential collective uses appeared only when reflecting about the matter by request of the interviewer. In this context, an imagination effort is evident in which only some localities can conceive the ceibalita as a resource capable of producing community initiatives capable of improving the neighborhood, cultural activities or productive entrepreneurship. For example, one of our interviewees, Clemencia[17], says "my imagination is like non-existent", and she only manages to formulate the idea of the children meeting in the square. Another of the interviewed mothers could only identify one collective activity: "every two weeks we go out to clean the waste pipes and the ditches", and imagines how to develop a festive meeting in that context,

17 Clemencia, 41 years old, incomplete technical school, unemployed. Colonia Nicolich, Canelones.

incorporating food and games, but the computer was not spontaneously mentioned in any moment[18].

The diverse uses that the interviewees perceive and practice individually with the ceibalita (information access, bureaucratic queries, work opportunities), are not, in most cases, projected to develop community projects, productive entrepreneurship or improvements in the locality's infrastructure and services. Not even the interviewees with a trajectory in commissions or any other participation in collective organization bodies pointed out any relevant role of the computer as a facilitator of their activities.

However, the experience of small communities like Valizas[19] and Grecco[20] suggest some appropriation possibilities under specific conditions. In both cases, the virtues of the computer imagined by the community regarding communication (of events, images and collective needs) to "the outside" implies a kind of appropriation that bonds technology practically and symbolically with representation and progress possibilities of the community. In Grecco, Facebook is used as a useful tool to inform about the town's activities, as, for instance, the famous horse races:

> I put the horse races that I have and when they will be and everyone is notified (...) in the Facebook, then everyone that logs in sees it (...) and they come from everywhere, it depends on the origins of horses (Maximiliano, bar owner, horse race organizer)

In Valizas, access and distribution of information acquires a strategic value for the sustainability and improvement of work sources and environmental care. It becomes especially significant when its inhabitants acknowledge that Internet is a great information source regarding climatic conditions, vital to fishers, which receive updates by radio.

> At home we have a transistor that communicates with some fishers (...) they are always calling and asking you to give then the forecast, they want to know it to decide if they stay a bit longer or they return. So, as we have more

18 Adriana, 32 years old, eventual worker, primary. Sayago, Montevideo.

19 Valizas is a small locality situated in the Rocha Department coast. Its main economic activity is summer tourism, and, according to the 2011 census, it has 330 inhabitants.

20 Grecco is situated in the southeast of Rio Negro department, develops mainly rural activities and, according to the 2011 census, it has 598 neighbors.

> communication and the forecast is more accurate, it is easier to go out. More relaxed at least. (Verónica, trader and wife of a fisher)

The same can be said about the internet communication that has become essential to improve their hot springs visibility and attract more tourists, and also to look for solutions to the dark side of this economic activity: the garbage left behind by the visitors.

Valizas' digital literacy tutors adapted the XO's formative programme so that it included this local necessity, involving local actors to carry out the project and generating new responses from this collective initiative: the creation of a compost bin and a vegetable garden. The XO worked as a catalyst for the undertaking, and also as a support tool that helped to obtain information, which, in turn, propitiated a greater use in the school, what was in fact the fundamental motivation of the promoters.

To summarize, in the cases that a more significant use of the XO were found, this was produced by the confluence of two elements: on one hand, the acknowledgement of needs that brought the neighbors together and that, as has already been pointed out, required the necessity to establish an intense relationship with "the outside"; and, on the other hand, the digital literacy tutors intervention (role that was eventually fulfilled by children and teenagers), that imagined applied uses of the computers to these collective problems. The relationship between digital literacy tutors with strong roots in the community and symbolic and computer resources that enables them to think possible bonds between the XO and the community's needs seems to be key to visualize and develop potential uses for the computer in this field.

6. CONCLUSIONS

For the parents, the connection, from a symbolical and practical point of view, of the advantages that they visualize in the computer (education, information and communication) with the public policy's rationality that serves as context of the XO and frame of all its development possibilities, depends on their capability to imagine options for its use.

The XO's arrival to the homes established a significant symbolic connection between the parent's past – without computers –, the present

that requires its incorporation in family life, and the future of greater work and social inclusion opportunities for the children. This helps to bestow a positive meaning to the generational divide between the digital abilities developed by the children *vs* the difficulties experienced by parents. These divide could, in other senses, be seen as a menace to the family's authority principle or might even cause the exclusion of the new affective, playing and cognitive alternatives that organize the children's life with digital technologies.

The certainty that the XO is the kid's propriety operates as an obstacle for the development of parent's appropriations, but the idea of being the owner's of their own XO introduces a different value and allows them to imagine non educative, work or playing uses, without fear of breaking down something that belongs to the child[21]. That's why we consider that the ownership of a XO, especially in the mothers' case, would significantly facilitate the appropriation processes by those who have already developed some relevant abilities. It would also help to break the idea that it is a technology destined to kids, as well as the feeling of incapacity and handicap they have when comparing to their children, which leads them to autoexclude from the learning possibility. And, lastly, it would strengthen learning by means of a renewal in the alliance between home and school, which is actually in crisis because the parents do not know how to monitor the XO homework that the teacher gives the students. In fact, an important motivation to get over the fears that the ceibalita inspires is the need to learn basic tools to better understand, accompany and control what their children do.

Even if at present the XO has no significant place in community life and in most families' imaginary –in the sense of facilitating a transformation in living conditions (work, housing, health), it is starting to be seen, and in fact to act, as a *mediator* between the family and community's "inside" and "outside". Its value as a mediator is currently much more relevant than the value of its possible uses and potentialities to generate family or community productive entrepreneurship, or improve the community's internal organization. This was clearly visible in the kind of information that parents look for by themselves or with the aid

21 This idea appeared when parents were asked what they would do if they had their own XO.

of their children (bureaucracy, job offers, directions, distant places, medicines); in the communication with relatives living in other departments or abroad; and, in some exceptional cases, like the hot springs in Valizas, in the social networks use to promote tourism and environmental care.

The multiple training places and strategies by themselves, as they are conceived at present, are not enough to achieve the adult's digital inclusion: being parents of children that learn swiftly does not really help adults to do it the same way. The most important challenge for digital inclusion programmes is to understand the parents' fears and difficulties to incorporate the XO to their homes from a practical and symbolical point of view. These are not only related to having more or less chances to use it, or access to training. The true obstacles are, on one hand, the confrontation between the previous experiences with forms of learning and accessing knowledge, and the ones that are designed and implicit in the XO. And, on the other, the social representations that they have about their capacities and limitations –conceived from a position of social exclusion or auto exclusion- and the ambition of digital inclusion policies and programmes, conceived from a scientific-technological rationality that establishes the development of digital skills as a condition to achieve general development goals. In this sense, the effort should not only be focused in multiplying training centers or modifying learning strategies, but also in reinforcing all the possible mediations between the families' symbolic universe and the XO's technological universe, even those that do not necessarily require direct handling of the ceibalita.

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7. OLPC in the state of Goiás – Brazil: between pedagogical objectives and teaching practices

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ABSTRACT

The Brazilian government released the Programme One Computer Per Student (PROUCA) which has been implemented in Brazil since 2007. The purpose of this programme is to optimize the processes of learning and teaching. It was inspired by *One Laptop per Child* (OLPC) and presented to the Brazilian government by Nicholas Negroponte and Mary Lou Jepsen. This article aims at analyzing the relationship between the pedagogical objectives of the project and the teaching practices of teachers from a public school in Goiás. The research took a qualitative approach studying the case of a public school in Goiás that takes part in the programme. This way, some official Brazilian documents were analyzed in order to know the pedagogical purposes of the PROUCA, as well as interviews with teachers and board of directors from the afore mentioned school. The school, in 2010, received 730 laptops, from the PROUCA, for its 522 students. The school was benefited because it was admitted in the full-time school programme (elementary and junior high school) in 2012. The board of directors stated that the

elementary students use the laptops for research more often than high school students. The students aren't allowed to take the laptops home and the teacher must schedule and plan its use. According to the teachers' statements, we infer that even though they do not fully understand the pedagogical objectives of PROUCA, they struggle to improve their practices through the use laptops.

Keywords: *laptop; PROUCA; 1:1 modality; digital inclusion due to school*

1. INTRODUCTION

Modern society is under the influence of technology in most areas by the use of technological tools that impose speed, productivity and instantaneous communication. These technological tools have been adopted more often (media speech and government proposals) as a mean of creating technological education, that is, digital inclusion in our country (Macedo & Foltran, 2007). According to the Brazilian government, the digital inclusion might be a way to allow social inclusion once it enables the citizen to use computers and the internet to obtain and share information, having access to job offers and enrolling in technical courses and workshops (Brazil, 2011).

Silva, Jambeiro and Brandão (2005, p. 30) state that

> the starting point for the concept of digital inclusion is the access to information, that is available in the digital media, whereas the end line is, the understanding of that information and the transformation of it in a new knowledge, that is, the improvement in people's lives as a desirable consequence.

However, the digital inclusion concept can be widen when it comes to the critical use of computing, considering that the use of digital resources changes the understanding of the methods of production and the way information is shared. Therefore, integrating the available resources in the world wide web to the process of making, socializing information and knowledge in order to improve people's lives must be the purpose of digital inclusion. Hence, it means much more than mere availability and access to technological resources (Pretto & Pinto, 2006; Warschauer, 2006).

According to Warschauer (2006), it is not possible to detach the digital inclusion from a bigger concept of social inclusion, since the first

supports itself in an educational perspective that invests in the formation of abilities and competences capable of providing autonomy during the course of one's life.

On the other hand, state policies for digital inclusion in school came into "technicalities (pretending to be modern, progressist and social inclusive) neutralizes the problem of public education" (Oliveira, 2012).

The Brazilian government has, nowadays, 22 programmes that aim at the digital inclusion of Brazilians, guaranteeing them a larger presence in the job market and a better quality of life.

The digital inclusion in the school environment has gradually received more financial investments due to the creation of specific programmes for public schools. That happens because digital inclusion is introduced as a space where its advancements are not merely a necessity, but a primary factor of guaranteeing the improvement of the learning and teaching processes (Macedo & Foltran, 2007).

In 2003, the Brazilian government's agenda placed the digital inclusion in the realms of the main rights, citizenship exercise and social development, emphasizing the transforming character of the new technologies (Medeiros, 2010). Since 2003, the Brazilian government, through the National Policy of Computing (PNI), based its actions in a triple axis: income, education and TIC (Information Technology and Communication), associating the digital inclusion to the social inclusion, considering that the access to TIC favored the increase of income and access to education (Carvalho, 2010).

Among the federal programmes of digital inclusion in the school environment, the One Computer per Student Programme was discussed in 2005 taking into consideration the *One Laptop per Child (OLPC)* programme's proposal in which a laptop was given to children for individual use.

In that sense, the Ministry of Education and the President's office emphasize that the PROUCA has the objective of promoting digital inclusion by distributing one portable computer (laptop) for each student and teacher of the primary education of public schools, and its purpose is to digitally include the city by allowing them to learn it in the school.

2. THE INSERTION OF THE 1:1 MODALITY IN BRAZIL THROUGH THE PROUCA

The modality of one computer per student, also called 1:1, was presented to the Brazilian government in January of 2005 through the One Laptop per Child (OLPC) at the World Economic Forum in Davos (Switzerland). In that same year, representatives of the OLPC came to Brazil in order to talk to the Brazilian President and detail the proposals of the programme's insertion. According to one of its own advocates, the OLPC aims at

> offering educational opportunities to the poorest children in the world, giving to each one of them a lowcost powerful laptop, besides being low energy consumption, it is connected to the internet as well as tools made for the collaboration and learning (OLPC, 2012).

In face of the OLPC's proposals, the former Brazilian President Luiz Inácio Lula da Silva created, in 2005, the PROUCA's workgroup (GTUCA) to evaluate the proposals from the technical and pedagogical point of view. Within a year, the group met considered that was necessary to make experiments in Brazilian schools. After that period, in the beginning of 2007, GTUCA formalized and presented the PROUCA's Base project after learning about the 1:1 modality in another Latin American country: Uruguay.

Established in the law number 12.249, June 10, 2010, PROUCA is an initiative from the Presidency of the Republic of Brazil along, the Ministry of Education with the objective of "acquiring new portable computers with pedagogical content for the primary education in the public schools' spectrum" (Brazil, 2010). The laptop computers have distinct hardware configuration, according to their manufacturer specifications, which are Classmate/Intel, Mobilis/ENCORE and XO/OLPC.

This programme integrates plans, programmes and educational projects of educational technology and digital inclusion associated with the actions of the Plan of Educational Development (PDE) and the National Programme of Educational Technology (ProInfo)[1] (Brazil,

1 ProInfo was created in 1997 and in 2007 it was renamed, but kept its initials. The former National Programme of Educational Technology spread the increase of the focus on the use of educational technology in education, inserting the use of free software and creating the "High bandwidth connection in schools" Programme.

2007). According to official government documents (Brasil, 2013), it is an educational programme that focus on technology, digital inclusion and strengthening of the commercial productive chain in Brazil.

Initially, five model-schools were chosen to join the pilot project. They were: Dom Alano Marie Du Noday State's Public School (Palmas-TO); Ernane Silva Bruno Community's Public School (São Paulo-SP); Integrated Center of Public Education Rosa Guedes (Rio de Janeiro-RJ); Luciana de Abreu's Primary Education State's Public School (Porto Alegre-RS) and Vila Planalto's Center of Primary Education (Brasília-DF).

Figure 1: Map of Brazil indicating the universities that comprise the GTUCA, indicating the states for which they are responsible. Presentation of the location of model schools in the country.
Source: http://www.uca.gov.br/institucional/experimentosFase1.jsp.

The GTUCA evaluated the experiments and consolidated the education, evaluation and monitoring plans. Besides this WG (workgroup), the Council of Superior Studies and Technological Evaluation (CAEAT), from the Brazilian House of Representatives, took responsibility for following up and taking part in the implementation of the PROUCA in the five model-schools, besides producing an evaluation study that could promote some discussions, about the thematic in the Brazilian's Executive and Legislative.

For the proposed evaluation, the afore mentioned study based itself in the conjecture that "the use of this type of technology presents a series of innovative aspects" (Câmara dos Deputados, 2008, p. 16) that would provide the development of a digital culture by the means of:

a. Technological immersion;
b. The dissemination of new abilities and communicational competences;
c. Widening of the periods and learning moments, which provide autonomy to teachers and students; and
d. Supporting the collective, cooperative, intercultural and of authorship and co-authorship of teachers and students types of work (idem, pp, 2008, p. 16-17).

Therefore, the study outlines a digital inclusion project inside the school environment that aims at "opposing to the traditional educational model, widening the relevance and contextualization of the educational process", which would allow the convergence of "the obliquity of the social equality and competitive economy" (idem, p. 17, 2008, p. 17). For that reason, these aspects, considered as pedagogical guides of PROUCA, will be taken as reference for the analyzes of the relationship between the pedagogical objectives of the project and the teaching practices of the teachers from a network of public schools in Goiás.

According to official documents, in 2010, each University, responsible for the education of teachers and follow-up of the schools that received the pilot project, should have presented three evaluation reports about the creation and implementation of the programme in the school: the school context, infrastructure and school's management.

In addition, a school's case studies and the link of the school's blog should be presented.

In general terms, the reports describe the actions that took place in the schools with fully and accurately describing the actions and data analysis. They didn't regard the objectives of this evaluation because the programme was constituted by federal law when the reports had been made and the expansion process had been advertised for more than 300 schools.

3, METHODOLOGY

This text analyzes the relations between the pedagogical objectives of the project and teachers' educational practices of a public school in Goiás that took part in PROUCA.

The research used a qualitative approach of a case study that selected a participating school. It was conducted in two stages that follows: documental character and other one of empirical character, where the teachers and the board of principals were interviewed. The following documents were analyzed:

— PROUCA: a computer per student: benefited schools (2013);

— PROUCA: manual (2010);

— PROUCA: report of the previous pilot schools;

— A computer per student: the Brazilian experience. Brasília: Chain of Congressman, Coordination of Publications, 2008.

— OLPC: One laptop per child – Brazil.

The official documents were read and some parts – objectives, technical and operational characteristics to implement the Programme – were extracted. Apart from that, they were analyzed so that the pedagogical aspects of PROUCA in Goiás and in Brazil could be identified.

The empirical research took place in Teacher Vandy de Castro Carneiro State School. The researchers went to the school twice. In both opportunities, the interviews were made and the information was collected and registered in notes/diary.

4. RESULTS AND DISCUSSION

In Goiás, PROUCA has been implemented since 2010 in nine schools distributed in eight cities.

4.1. The PROUCA in Goiás: preliminary data

According to PROUCA website, "the States' and Cities' Boards of Education and the National Union of the Cities' Schools Principles (UNDIME) were in charge of choosing the 300 schools took part in PROUCAS' Pilot Project".

The Programme select the schools taking the following 5 national requisits (PROUCA, 2013):

1. Number of teachers and students (around 500 teachers and students);
2. school's structure (it should have, mandatorily, electricity to charge the laptops and lockers to store the equipment);
3. school's location (preferably, the pre-chosen schools should be near Centers of Educational Technology – NTE – or similar, Public Colleges or Universities or Federal Technical Schools. At least one of the schools must be in the State's capital and another one in the rural area);
4. the signature of the participation acceptance's term (the State's or City's Board of Education of each one of the chosen schools should participate of the project by sending an official request to the Ministry of Education – MEC);
5. the teachers' group acceptance (for each chosen school, the State's or City's Board of Education should send to MEC an official letter of acceptance with the school's director signature approving the school's participation in the programme).

Concerning the teachers' training, the GTUCA developed a material entitled "Brazil Training: project, actions' plans and courses" that presents the directions for every training course: objectives, classes' duration, contents, pedagogical principles, necessary conditions,

implementing strategies and operating the training proposals for training the work in the 1:1 modality. The two-year period was considered the minimum length of time for training the teachers so that they could work pedagogically with the digital resources of this initiative.

In Goiás, neither the definition of the criteria for the schools' selection, adequate these schools, nor the process of training teachers are found in official documents for implementing PROUCA in the State.

The laptops were distributed to two schools in the State's capital (Goiânia) and to other seven cities (Figure 1). In Goiânia, the Jaime Câmara Community School and Teacher Vandy de Castro Carneiro State School are being provided with laptops. Therefore, the PROUCA provides to 217 teachers and 3945 students in Goiás (PROUCA, 2013), according to Table 1.

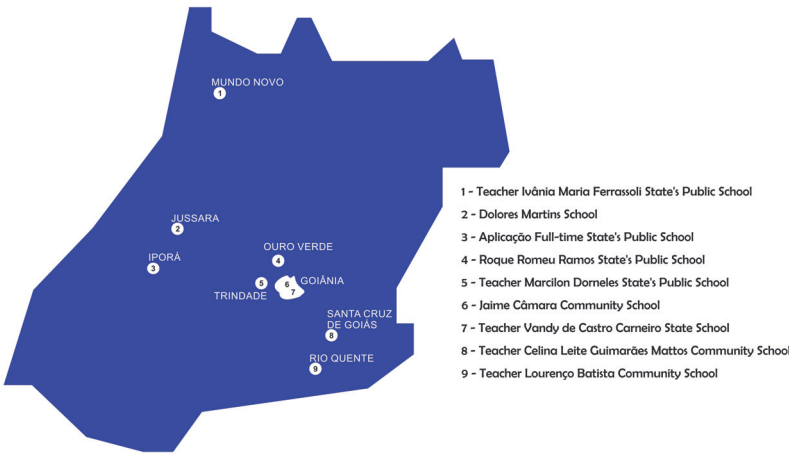

Figure 2: Schools awarded with PROUCA in the state of Goiás, Brazil.
Source: the authors.

In August of 2010, the Jaime Câmara Community School, in Goiânia, received 596 laptops for its 622 students and 56 teachers. In 2010, Vandy de Castro State's Public School received 737 laptops for its current 522 students.

The Teacher Marcilon Dorneles State's Public School, located in Trindade, received 371 laptops for approximately 290 students from the sixth to the ninth grades of the morning or afternoon shift.

The Roque Romeu Ramos State's Public School, located in Ouro Verde, had at the time of PROUCA's laptops delivery in 2010, 480 junior high school and high school students, 29 teachers, 20 of those teachers were prepared by NTE to use the computers' lab and 25 administrative workers. The school received 593 laptops and wireless connection, which was installed by PUC-SP's crew.

TABLE 1: information about PROUCA's school in Goiás

CITY	INHABITANTS	SCHOOL	IDEB (2011)	STUDENTS	TEACHERS	TRAINING
Goiânia	1.302.001 hab. (IBGE, 2010)	Teacher Vandy de Castro Carneiro State School	4,3	677	25	Partial
Goiânia	1.302.001 hab. (IBGE, 2010)	Jaime Câmara Community School	4,5	540	28	Full
Iporá	31.273 hab. (IBGE, 2010)	Aplicação Full-time State's Public School	5,6	362	22	Partial
Jussara	19 086 hab. (IBGE, 2010)	Dolores Martins School	5,0	475	25	*
Mundo Novo	6.438 hab. (IBGE, 2010)	Teacher Ivânia Maria Ferrassoli State's Public School	3,7	277	13	No information
Ouro Verde de Goiás	4.034 hab. (IBGE, 2010)	Roque Romeu Ramos State's Public School	4,3	540	25	Partial
Rio Quente	2.959 hab. (IBGE, 2007)	Teacher Lourenço Batista Community School	4,6	558	43	No information
Santa Cruz de Goiás	3.142 hab. (IBGE, 2010)	Teacher Celina Leite Guimarães Mattos Community School	4,3	185	14	*
Trindade	104.506 hab. (IBGE, 2010)	Teacher Marcilon Dorneles State's Public School	4,2	331	22	Partial

It was considered a partial or complete training in accordance with the number of hours designated for training as "Brazil Formation: design, planning of actions / courses."

* Do not have information on the amount of hours of training.

Source: Toschi (2012), adapted by the authors.

In the Aplicação Full-time State's Public School, located in Iporá, the teachers were trained by the NTE's group located in the Iporá and they studied for 180 hours in the e-learning and classroom methods by the ProInfo's environment.

Concerning the Teacher Lourenço Batista Community School (Rio Quente – IDEB's[2] 4.6) and the Ivânia Maria Ferrassoli State's Public School (Novo Mundo – IDEB's 3.7) there are neither available information in the internet nor academic articles. The research group didn't visit the schools.

The Dolores Martins (City of Jussara – IDEB 5.0) and Celina Leite (City of Santa Cruz de Goiás – IDEB's 4.3) Schools, despite having blogs about the subject, simply comment about having trained their teachers, and do not show data about the process or about the way the laptops were used by their teachers and students.

So far, it is noticeable that the Brazilian schools do not comply the criteria defined, schools' selection criteria, the schools' conformity to the criteria and the teachers' effective training proposal, in the national level, to the implementation of the 1:1 modality. However, a shocking discovery is the lack of data about the diverse aspects that involve the afore mentioned project.

According to this preliminary survey the Vandy de Castro State's Public School was chosen to the case study's school, with the purpose of understanding the relationship between the project and the teachers' practice. This school was chosen because:

- It was object of the preliminary data collection in the table of a previously and finished research[3];
- It presents availability to be part of this research by the management's and teachers' group;
- It is one of the chosen schools to participate in the Full-time school regimen[4] in 2012.

2 IDEB: Brazilian index of the primary education development (http://inep.gov.br/web/portal-ideb)

3 Research entitled One Computer per Student Programme (PROUCA) – Pedagogical Questions" made by the Rede Goiana de Pesquisa em Políticas Públicas e Inclusão Digital (REPPID) advised by the research Teacher of the Universidade Estadual de Goiás, Mirza Seabra Toschi.

4 The "Full-time school" is a Brazilian government proposal through the Ministry of Education (MEC) to increase the students' daily class hours to seven hours. The schools were chosen for having the most

4.2. The 1:1 modality in the Vandy de Castro State's Public School

Following the proposal, we are going to show some data about the implantation of the PROUCA in the Teacher Vandy de Castro Carneiro State School and an analyses of the manner in which some of the pedagogical objectives of the Programme are being developed in the school.

The data were collected from the interviews with teachers and directors in two stages. The first stage, in the second semester of 2012, had the objective of making the first contact with the school, gathering information about the school area, the delivery, installation and use of the equipment.

The school's principal stated that this "is the best project being developed in the school, despite its problems". In addition, she emphasizes that the adoption of the full-time shift, full time teachers, and the assistance of two teachers' assistants[5] added to the PROUCA resulted in the improvement of the school's IDEB.

The principal pointed that the high rate of teachers' turnover in the school, as well as their lack of knowledge in using the laptops, as one of the PROUCA's major problems. In addition, she emphasized that the teachers' training occurred, mostly in the distance-learning model and the Center of Educational Technology (NTE) was merely the link to the forming group of the Federal University of Goiás. Moreover, she reiterates that she believes that there was some resistance of the teachers in the implementation of the Programme; however, it did not hinder that it happened.

The school's principal stated that the primary education students used the laptops more often than the high school students because the contents are more adequate to their age group, and that the laptops are mainly used for researches.

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part of the students assisted by the Bolsa Família Programme, besides of having low Brazilian index of the primary education development (IDEB), below 3.5 points. There were also chosen schools with the IDEB's higher than 3.5 points and lower than 4.6 in the first school years and schools with IDEB's between 3.9 and 4.6 in the last years of the primary education. Available at: <http://www.brasil.gov.br/noticias/arquivos/2013/03/12/adesao-de-escolas-a-educacao-em-tempo-integral-vai-ate-o-proximo-dia-31>

5 Students from the Federal University of Goiás who were benefited with a scholarship for their research and they were responsible for taking care of the laptops (storing, tagging, battery charging, scheduling appointments for the laptops' use, etc) and helping teachers use the laptops in their lessons planning.

However, their use only occurs in the classrooms because they cannot be taken home. In addition, the internet access is slow and unstable, forcing the teachers' assistants to organize a schedule for the laptops' usage to three classes per day, maximum. While the teachers were being trained to use the laptops, the students had already received their laptops and their classes could be scheduled, then.

The second stage of the research took place in 2013 and was done by members of the Kadjót's[6] - group with teachers that finished their training, partly or fully, in the 1:1 modality.

An interview was conducted with six teachers, 4 women and 2 men. Out of this, 50% é civil servant and the others 50% are temporary workers from the local Comission of Education, half of them work on a 40-hour Schedule while the other take a 60-hour Schedule. Two teachers graduated in Pedagogy, two in Languages, one in Physical Education and one in History. One teacher has a 1 to 5-year experience, one has a 6 to 10-year experience, two have 11 to 15 years, and one has worked for 20 to 25 years.

At the time of the second interview, even though the teachers had already been working exclusively in the school, given the adoption of the full-time model in the school and to the other programmes accepted by the school, they stated that they almost never used the laptops with their students in 2012. The teachers' mostly used argument to explain it, was the poor training in the use of the pedagogical applicative available in the laptops. They emphasized that, even though they were in the school full-time as well as the students, they did not have a continuous, consistent nor organized training in the use of the laptops in the 1:1 modality.

During an informal conversation, the school's principal stated, one more time, that the school had a high rate of teachers' turnover, which was a problem for the continuance of the work and for the formative process already initiated.

6 KADJÓT – Research and study group of the relationships between technology and education. It gathers researchers from a variety of institutions under the Federal Institute of Education, Science and Technology of Goias (IFG)
More information: <https://sites.google.com/site/grupokadjotgoiania/>..

Each teacher received a laptop and was allowed to take it home. According to the teachers' own statements, access to a wireless internet connection was difficult or even impossible outside the school, besides the little knowledge they had about the operational system and the applicative installed in the laptops.

In 2012, the school had two assistant teachers' for PROUCA in the school. They were students from the Federal University of Goiás who got scholarships from the Federal government to help in the PROUCA, took turns in the school's three shifts. Their attributions were to catalog the laptops, help the teachers in planning and scheduling the laptops' use in the classrooms, and charging the laptops' batteries for the immediate use in the classrooms. However, because of the cessation of the scholarships' payments, the students did not stay in the school helping the teachers and that brought many complaints from the teachers since, in the teachers' opinion, the assistants were a huge help in the use of the laptops.

When it comes to the laptops' mobility and connectivity, the teachers stated a low satisfaction rate in the use of the laptops: the laptops' batteries only lasted for 2 hours and the school did not have an efficient structure for the laptops' battery charging during the classes. It was complicated even in the storage rooms where the laptops were kept. Moreover, the low quality of the available internet connection forced the teachers to agree in the use of the connection by only two classrooms at a time. Yet, without the guarantee of an appropriate speed connection for the network access.

Summarizing the Vandy de Castro School's PROUCA situation from the following data:

1. Poor technological infrastructure - the school has more laptops students. Nevertheless, the electricity network does not tolerate the charging of all laptops at the same time and their simultaneous internet access is not tolerated, either. The use of the laptops must be scheduled.
2. Problems in training the teachers- it was in the format of two lectures and following up of the interns of the Programme while they were receiving their research's scholarships. The teachers asserted that their training was insufficient and problematic.

Additionally, it is worth to emphasize that few teachers began their programme's training and that none of them finished it.

3. Usage methods – most teachers stated that they used the laptops just for internet research since their knowledge of softwares is very little.

According to the results of the quality in the teaching and learning process, the national evaluation system for junior high school taken in 2011 presents the following results:

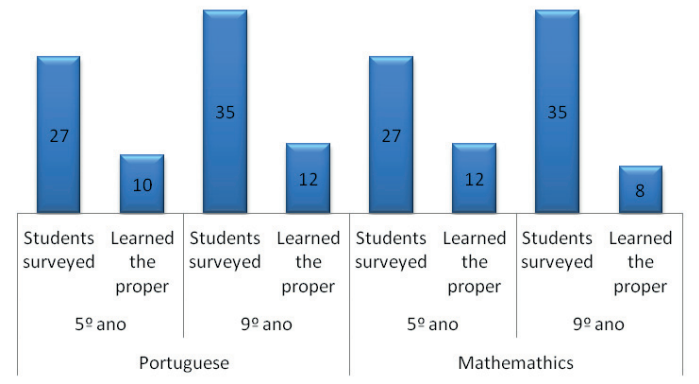

Figure 3: Data presented in Prova Brasil, in 2011, for learning Portuguese and Mathematics.
Source: the authors - informations from MEC (http://portal.mec.gov.br/index.php?option=com_content&id=210&Itemid=324).

The results are practically the same as the ones from the 2009 considering the same grades and school, although there a slightly improvement in the number of students that reached an adequate study according the test method.

We are aware that an effective result in the teaching and learning process can't be promoted within a year, specially, if the school environment and organization had many changes. We can state that the little significant improvement in the student learning can't be credited to 1:1, once it was barely in use during the course.

5. FINAL CONSIDERATIONS – PARTIAL REFLECTIONS ABOUT 1:1 MODALITY IN BRAZIL

The OLPC's project aims at providing a technology innovation that, in a simple and quick way, could help solving a critical social problem: social inequality. The OLPC's promise is a technical utopia supported by the capitalism's contemporaneous transformations and in the development of market of information, which strengthen speeches that associate knowledge to the technological innovations and the fulfilling of common needs.

The discrepancy between the idea and reality of the Brazilian's context of the 1:1 modality, in the way it was implanted, is evident when a technological resource, which has little similarity to those used in the job market, is given to schools, considering the operational system used in the laptops of the PROUCA. In addition, this opportunity of technological immersion was done to an educational system through the access of technology without properly training to the teachers (digital migrants). As consequence, this research reveals the fragile situation, as soon as / once they haven't been given the opportunity to effective educational intervention.

The Câmara dos Deputados' report (2008), as well as studies about the subject, emphasize that the PROUCA's laptops suffer constant technical problems and they do not connect to the internet effectively. We highlight, as well, that the school is not prepared, neither from the infrastructures' nor from the technical and teaching trainings' points of view in the handling of the laptops on their pedagogical role (Carvalho, 2010; Mascarenhas, 2009; Medeiros, 2010).

Based in his researches, Mascarenhas (2009) discusses the need of an articulation of the diverse aspects of digital inclusion. The author refers to a combination of equipment, content, abilities, understanding and social support for development of significant socialpractices.

In that sense, we show the afore mentioned data, not with the intent of judging or stigmatizing the PROUCA in Brazil, but we intend to present elements that allow the evaluation of the practices resulted from how the PROUCA was implanted. We do not know whether there were learning improvements from the use of technology, besides the detection of fragilities in the educational promises of the use of technology in schools.

Moreover, from the teachers' statements, we notice that, even though they do not have a clear understanding of the pedagogical objectives of PROUCA, the teachers do not measure efforts to improve their practices through the use of educational laptops. In addition, the teachers reported that the use of educational laptops could be part of a process of progressive and slow transformations of their daily practices.

To make digital inclusion possible nowadays means much more than enabling the access to technological resources, especially if we consider that this type of inclusion is the first step to social inclusion. Therefore, to integrate students to the digital information network aiming in producing and socializing information and communication for the improvement of the collective's lives must be the purpose of the digital inclusion (Pretto & Pinto, 2006; Warschauer, 2006).

This way, PROUCA is a leading global policy of digital inclusion through education, renewing an utopian technique that privileges the technological and informational access to the detriment of a social policy. Under current Brazilian conditions, giving laptops to the students of public schools seems to be more justifiable for the pursuit of modernity and economic progress than by educational choices consistent.

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8. Typologies of docent knowledge in the "One Computer per Child" programme: training, social training and cognitive reflexivity

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ABSTRACT

The article observes the training (in both its process and its results) and the cognitive practice of teachers. The research was carried out in a public primary school in the state of Rio Grande do Norte, Northeastern Brazil, which adopts the Brazilian Ministry of Education and Culture Programme "One Computer per Child" (PROUCA). In the analysis, we objectively reflect on the appropriation of the digital artifacts in the professional and social environment of the teachers, focusing on senses of interaction and cognition; typologies of (re)constructed knowledge in social practices within the media, produced by and in the transformation of socio-technical relations. It is about a procedural tracking, with ethnographic qualitative basis, in which we utilized focus group tools and individual interviews; analysis of semi-structured questionnaires and intensive observation of the school environments and classrooms where the laptops

were present. We identified, by means of a content analysis and categorization process, the rise of knowledge in the investigated empiricism, knowledge that is related to know-how, presented in the teachers´ experience. New sociabilities in the acquisition of other ways of thinking and acting about the digital artifacts were also inferred. They are (re)created knowledge observed in the body of empirical research, which can be understood as a new pedagogical activism, fundamental to renovation of educational action. The relevance of this paper consists in providing clues to the continuity of social formation actions to interact with the new media and guide pedagogical practices with the use of laptops, in the one-per-student model, in schools. It also makes possible the comprehension of appropriation of the digital culture, media literacy and reflexivity in school practice.

Keywords: PROUCA; technological appropriation; teacher training; cognition.

1. INTRODUCTION

> The great advance of electrical science in the last generation was closely associated, as effect and as cause, with the application of electric agencies to means of communication, transportation, lighting of cities and houses, and more economical production of goods. These are social ends, moreover, and if they are too closely associated with notions of private profit, it is not because of anything in them, but because they have been deflected to private uses: a fact which puts upon the school the responsibility of restoring their connection in the mind of the coming generation, with public scientific and social interests. (John Dewey, 1916)

The ongoing debate about the nature of the technological culture and its benefits or harms in social practices is, without a doubt, one of the most disputed themes in the epistemological fields of media and education. In the analysis and recommendations related to the theme, we have seen, especially in the last decades, various initiatives in public policies by the governments and other agents interested in the interaction between media and cognition. Many initiatives are academic, as it is the case of the studies on media literacy (Jenkins, 2009); others are political interventions by socio-cultural organizations that, invariably, propose the appropriation of the nature of the media as a way to propel social reconfigurations. In other fronts we find the governmental actions of digital inclusion. Together, these segments propose to understand 1) the phenomenon of the actor-screen, 2) use and coverage of the

social digital media, 3) *appropriation* and interaction in virtual learning environments or 4) expansion of the hacker culture; there are other thematic variants, which also awaken developments that give sense to the socio-technical transformations of the present. Our interest is in how the educational environment can interact with the meanings that involve the digital artifacts and how teachers adopt and accompany the new practices and knowledge that follow said developments.

The awakening of the epistemological debate in the areas of media and education arose through empirical impressions. Within the empirical corpus, we chose to reflect on the *appropriation* of the digital artifacts in the professional and social actions of teachers. The problems focused were: senses of interaction; types of (re)constructed knowledge and cognition when media are introduced into the social process, and the constructs that propel the transformation of the socio-cognitive relations.

The main context of the research is the One Computer per Child Programme (PROUCA). This is a Brazilian Federal government programme aimed at:

> promoting digital inclusion in public federal, state, district, or municipal school teaching (or in the schools with no lucrative purposes which meet the needs of people with disabilities), through the acquisition and utilization of information science solutions... (UCA, 2013).

The activities of the *One Computer per Child* Programme were initiated in the year of 2007, by means of tests, in the pilot phase. It was only in the year of 2010 that the activities started in public institutions located in the five regions of Brazil. So far, there are more than 300 benefited schools and around 150.000 laptops distributed to the students in the *One Computer per Child* Programme (PROUCA).

We located the research in a public school in the state of Rio Grande do Norte, Brazil: Maria Cristina State School. The school is located in an outlying neighborhood of the city of Parnamirim, which occupies the 274th place in the IHD (Index of Human Development) of Brazilian municipalities, according to data from the *Atlas of Human Development in the Brazil of 2013*. The school has approximately 300 students of different grade levels in age groups that range from 10 to 17 years old in high school and junior high (Regular Teaching II and High School),

and unleveled students who can be from 17 to 80 years old, in the programme of Education of Youngsters and Adults – EYA (Educação de Jovens e Adultos – EJA). A total of 22 teachers work in the three shifts (morning, afternoon and evening). However, this paper is based a group of 17 teachers, who are more than 30 years old and have some 10 to 20 years of public service as educators. The teachers live in the vicinity of the school and have an average income of two minimum wages (approximately $600 per month).

PROUCA initiated its activities in Maria Cristina School with the use of the laptops in the year of 2010. Teacher training for the pedagogical use of educational laptops, as well as actions in the classroom, began that year, using the computers as didactical support to curricular contents.

The curricular intention of PROUCA determined that *appropriation* would be the main category of analysis. When we re-linked of the different fields of knowledge at the research locus, we decides to use an approach based on *appropriation,* associated with digital literacy, typologies of knowledge, pedagogical activism in the educational, cognitive interactional flows and media convergence. The analytical cut was supported by two propositions.

- Observing the extensive dynamics of interactional flow involving the teachers and the new socio-technical resources in the school environment of the "One Computer per Child" programme (PROUCA). Within that environment, we asked the question, "What identifies the new abilities and what are the required competences for socio-cognitive *appropriation* of this new knowledge in the school environment?
- We know that the interaction is different from media interaction, distinguishing itself from it, by establishing a cognitive process that manifests itself in different movements of perception, reflection, belonging and memory. How are such marks in digital educational environments in the experience of PROUCA presented?

We conducted a "descriptive tracking" (Latour, 2008), process, within a qualitative ethnological basis. The ethnographic exploration led to development of the research field and determination of group to be

investigated. The first observations and approximations to the context of the investigation permitted the decisions that determined the choice of sources and methodological instruments (and, therefore, data) relevant to the research. Later, we were able to enter the phases of reflection, description and explanation of the investigated reality, in order to explain this reality in a holistic, contextualized manner (Lüdke & André, 1986). In this sense, we use the ethnography to understand the social subject in his space within a given collectivity, that is, immersed in a school social culture.

The objective was to develop what Geertz (1973) calls "dense descriptions" (p. 10); that detail the way that the subjects invest in the meaning of their own world and negotiate and compete for other systems of meanings when they produce social interactions through the media. The statistics are also dosed – quantitative data automatically generated by the virtual environment. But, we are aware that facts never speak for themselves, and that statistic relations, even when determined numerically, remains unproven of meaning until it is interpretated (Bourdieu, 1999).

The transcriptions of our conversations furnished details about the application of the PROUCA training plan and its consequences for the teacher. That is, by means of open conversations and online questionnaires, *streams*, photos and videos of the observed environments, we reflected the process of formation (knowledge and training of teachers) and the product of this formation (changes in the cognitive dimensions reflection and transformations in socio-educative practices).

2. DIFFERENCES IN THEORETICAL CONSIDERATION AND THE REALITY OF INTERVIEWED SUBJECTS

It is inferred that the presence of digital interfaces in the public schools of Natal, Rio Grande do Norte – Brazil – repeats itself in the transference of digital technologies, applied in technical description models, reproduced in the work plans of public policies for digital inclusion, of which PROUCA is an example. The public policies of the area do not apply models of technology transfer with emphasis in the assimilation of

process of *appropriation* and symbolical interactions. The descriptive technical models don't take into consideration aspects related to the meaning that will be produced as a result of the experience of teacher-users. "*Appropriation,* as we understand it, envisions a social history of uses and interpretations of the objects, referred to in the social practices and inscribed in the specific practices that lead them". (Coelho & Freire Filho, 2011, p. 144). Therefore, give attention to the conditions and the processes that, very concretely, conduct the operations of senses of belonging, socio-cognitive formations and the subjectivities of the teachers is part of the reflexivity process in our research.

Even some academic researches, reporting techno-interactions (digital literacy) in the educational ambience, present such phenomenon as being part of a tautological demiurge where they represent technique as a goal in itself and do not validate the empowerment of the subject in this process. In this manner, the *appropriation* of the digital interfaces imposes itself unilaterally in the relations of everyday, promoting a mythological axiom. Like the myths of Lévi-Strauss (1953), they contemplate themselves in a disrupted knowledge, which in incompatible even with the mediation of digital cultural convergences which support them.

When teachers adventure into digital literacy, they are also living ideological precepts and identity sense of belonging that impose themselves in the appropriation of the digital culture in the technological means, creating new existences, which produce subjectivities and social mobility. They live a context where trans-media meta-narratives reside, that project the force of the qualified work force and the demands of the present economy as being their own responsibility and unique responsibility for the contemporary subject. Such meta-narratives circulate in media channels and inter-personal communication channel. They fabricate aesthetical, technical, symbolical and social values that put the human capital in the center of the productive forces. The subject carries their own capital – immaterial, fruit of the experiences and the knowledge lived – that projects them as the main substance of the changes in the current social processes (Gorz, 2005).

In this sense, two areas of knowledge – social formation and digital culture – intertwine in the development of cognition to form a new contingent of learners. Their perspectives of work approximate themselves

more to the work of the artists, supported not only in specific technical knowledge, but in lived knowledge and, now, and shared in media interfaces, which also require communication abilities. It is not the technological apparatus, i.e. the computers or the digital interface, that possess the magical protocol of empowering themselves with the communicational and interactive process contained in the new rearrangements of the culture of the cognition (Gorz, 2005), but rather the subject himself.

Currently, we need urgently to think about the process of aggregation of value – interaction, cognition, and *appropriation* – to the technologies of communication and information in Brazil (TICs). As an example, the Federal government has been investing increasingly in the resources in public educational institutions, by means of programmes and/or affirmative action's that give incentive to the socio-digital insertion of the citizens through the adoption of computers, laptops and now, tablets.

They are programmes that involve infrastructure, equipment and training of human resources to utilize the technologies in the various fields of society, as is the case of the One Computer per Child Programme (PROUCA, the context of the present study. PROUCA purchase of six hundred thousand laptops for use in public schools. The programme is currently being implemented in Brazil. A Tablet per Student (ATS), destined initially for high school, proposed of aggregating didactical material and the internet in the pedagogical practice. The ATS programme boasts fiscal incentives from the tablet-producing companies in Brazil and, so far, around R$ 150 million have been invested in the purchase of 600 thousand tablets for Federal, state and municipal high school teachers' use (MEC, 2013). Those initiatives are also examples of political actions fortify the productive and commercial chain of technologies in Brazil, but they are also are reflect the importance of digital culture in the work force of the country.

To show how such technological transfer affects social practices, we can think about the reflexivity as an epistemic practice and method, (Beck, Giddens and Lash, 1995) The empiricism is applied to the object of reflection, beginning with a preliminary hypothesis that the relations of teachers to the technologies go through different modalities of

appropriation capable of attending a bundle of diffuse perspectives, but associated to the acquisition of new knowledge posted in the digital culture. That permits the transformation of pedagogical practices in their professional routines. The result is knowledge that can be translated into greater complexity in the lived experiences; greater technological in everyday life and; in the urgent demands of the productive system undergoing socio-cultural restructuration of the delayed capitalism (Sennet, 2006). These new social practices present themselves as a mode of *appropriation* capable of meeting some of the required changes demanded by new challenges to educational practices, which also requires techno-interactive social practices in contemporary society.

As aforementioned, the preliminary hypotheses follow the premise of social *appropriation* of the digital interfaces in the everyday educational experience. Gramsci´s concept of thinking about knowledge (1981) presents itself in the center of the construct of *appropriation.* He recognizes that cognition manifests itself in the different forms of sociabilities. The teacher who develops digital knowledge has ties and is connected by social relations. In this perspective, knowledge appears as a presupposition of an almost "natural" process, inherent to the human relations. It helps the teacher to think about and elaborate interfaces, including the techniques and instruments.

Thus, knowledge exists in the constituted social environments and materializes itself in the knowledge produced by the teachers. This would be the process of *appropriation* within the Gramscian conception; there is reference in the actual world and *appropriation* results from thinking about and working within the "process of real life." (Gramsci, 1981).

This is the reflexive-process panorama which presents itself in the survey. At the first moment of analytical tension, we make evident the role of the technological *appropriation* in social and professional life of teachers, discussing a process of techno-digital *appropriation* interconnected to the ideological dimension of media use and interpretation in social context. We classify knowledge established in the process of interaction and the consequences of social experience in the training of teachers, i.e. how they, after contact with PROUCA, invest meaning in the world itself, negotiate and compete for other meaning systems when they interact through the media.

This assumption becomes relevant when seeking to draw from the experiences within the model *One Computer per Child*, more specifically the use of educational laptops in the school environment, a conceptual framework that intertwines the experiences lived. New conditions of existence are always produced in techno-interactions by teachers. Thus, we come to the empowerment of social actors involved with PROUCA in the techno-digital appropriations.

Few academic studies in Brazil targeted the development of the programmes using laptops in the one per student model. Scanning the literature for *state of the art*, we observed that the academic papers published since 2008, primarily focus on: the implementation of the programme, i.e., the initial impact and repercussions caused by the insertion of this model of technology use to teachers, students and curriculum, considering specific schools in each region (Silva, 2009; Moreira, 2010; Santos, 2010). There was also a case study with the use of laptops in 1:1 model in the practice of reading and writing for children (Kist, 2008), and the development of guidelines and rules that must be followed by manufacturers of notices to contract the installation of wireless internet in schools that have the PROUCA (Gomes, 2010).

Additionally, there are two studies which focus on teacher training programme designed by One Laptop per Child. One of the studies highlighted the impressions of teachers about their training, revealing that the plan outlined for the training of teachers in school is considered deficient, i.e. becomes insufficient for pedagogical practice with significant use of laptops in the classroom (Marques, 2009). Another deals with the *appropriation* of Web 2.0 by teachers through the programme One Laptop per Child and the pedagogical consequences for the teaching field. (Pontes, 2011).

However, the research presented, especially the last two dealing with the training of teachers, which have a greater affiliation with this study, sometimes depict panoramic implementation of the programme in certain contexts of use of laptops, others expose the consequences the appropriation of digital artifact to the professional environment (classroom) of the teacher.

We realize, therefore, that the information and communication technologies, ICT and new media, therefore, prove to be more plastic to the

educational practices and activities of the education system. However, we noted that an important interaction is happening, which is not limited to computer use in the classroom, but penetrates all educational activities. To understand the interactive process, it is necessary to discuss the role of teachers, the direct activity, in this case, how thing are done at school. This direct relationship is associated with *appropriation* of digital media. This process is different from what happened with the technical support that came to school with the expansion of the mass media. Previously, these media could not produce cognitive knowledge to penetrate the educational institution. Indeed, they reproduced immediate effects on emissions from a system of meanings ideologically.

In this perspective, we infer that the professional and social practices of the teachers investigated are being transformed, but it can only be understood critically and gradually in everyday experience, by monitoring new information learned from participation in the programme One Laptop per Child. Thus, we find changes in attitudes and in the way of understanding the experiences with the use of Information Technologies and Communication in the discourses of teachers. However, it is worth pointing out that knowledge is not internalized and seized homogeneously for all teachers. Each has his own way of understanding the world and work embodied and expressed different meanings about the programme. Considering the theoretical and methodological construct exposed, we will systematize in the following sections the context of empirical research, the subjects involved and the basic concepts of research.

3. IN LOCUS TEACHER TRAINING: ONE COMPUTER PER CHILD

The One Computer per Child Programme arises from the Programme "One Laptop per Children" by the United States of America (USA). In the year of 2007 and recontextualized for Brazil, it was named One Computer per Child. According to some of the documents of the Board of Contents Production and Training in Distance Education (DE), the proposed One Computer per Child programme points out such premises as mobility / portability, integration of media, wireless connectivity and immersion in digital culture, in the 1:1 the model (one computer for each student) (UCA, 2013).

In Brazil it starts with the goal of empowering teachers in benefited public schools. The PROUCA training plan involves public schools participating in this new phase of the project, universities, the State and Municipal Education Secretaries and the Centers for Educational Technology of states and municipalities in Brazil. It was supposed to be blended, dividing into content modules, which they call compulsory and complementary. It encompasses theoretical, technological and practical aspects. According to a document on PROUCA training, it is important to emphasize that, whatever the set of modules selected by the schools, these three aspects are always intertwined in the development of training (Andrade, 2009).

Altogether the PROUCA training plan has four content modules, which are: technological appropriation, Web 2.0, project design, programme management for school principals and a specific module only for teachers.

In the case of public school Maria Cristina, located in Parnamirim, Rio Grande do Norte, Brazil, the contents of all four modules were transmitted in teacher education. The training was also initiated in 2007, extending to the year 2012, a total of 20 meetings among teachers and administrators of the institution and the PROUCA trainer team.

Highlighting module *appropriation* interests us is as a way to identify how teachers internalize the knowledge derived from this module and translate it into meanings / socio-technical interactions from a block of technical knowledge which leads the subject to provide the tools and (re)create knowledge to act in society, in their professional and personal context.

The module of *technological appropriation* was developed in five meetings, engaging content consistent handling of features present in the laptop, related to Linux operating system, the office suite KOffice present on the PROUCA laptop, browsers and search tools and educational tools, digital resources that are specifically designed for teaching purposes (UCA, 2013).

The choice of Linux was made due to a scarcity of technological infrastructure. The precarious reality undermined the progress of project objectives, generating challenges to the know-how of teachers, as well as the appropriation of socio-technical use of technology.

Moreover, according to our data, the short time for training, study, lesson planning and poor quality of internet at school, generated discomfort in the programme's progress, influencing the decision-making process and the technological appropriation by teachers. These difficulties are points that disfavor the didactic use of the resource and are more significant than the uncertainty generated in the introduction of new pedagogical and technical knowledge required to use the technology.

There were rare the moments of collective discussion, of reflection on the content covered, as well as musings on practices developed in the classroom with the use of laptops. Thus, we conclude that the goal of PROUCA in the school investigated was to meet the goals outlined in the programme without allowing the reflection on the actions of the teachers. The technical implementation of the project has created a gap between the pedagogical practice of teaching and the organizational context in which it occurred, when they should be articulated for the execution of a reflective teaching practice (Pimenta, 2009).

However, even in the harsh environment for self-reflection by the faculty, we kept the concept of *appropriation* in the analysis of our data, as an element that leads to the construction of senses of belonging, transformation of the subject in social path from the entanglement of teaching practice with digital culture. It was within the premise of technological *appropriation* in the educational context that we took the typologies of knowledge, reflexivity and the changing socio-technical relations of teachers.

Warschauer (2006) reminds us of the meaningful appropriation of ICTs. This covers much more than just providing computers or other technological resources connected to the internet. By contrast, there is a complex set of elements that should be considered as the physical, digital, human and social relationships that arise as a result of the appropriation of digital artifacts. Thus, by significantly appropriating new technologies, "the content, language, literacy, education and community and institutional structures must be taken into account" (p. 21).

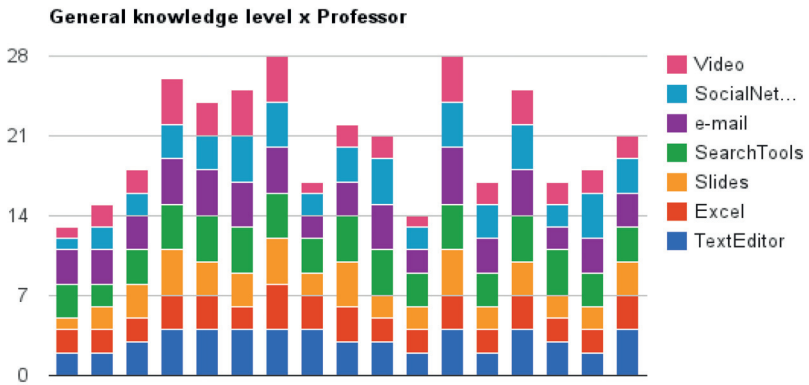
In spite of the content-based in teacher training, especially in the execution of the technological appropriation module, those involved showed cognitive gains of new knowledge and attitude change in their social environment, specifically in the use of digital artifacts in school. Even though teachers have been characterized as migrants and illiterates (Prensky,

2001), that have had a few moments of sharing experiences, of reflections and critical thinking, the formative experience of teachers may be relevant to know-how, relating their experiences everyday digital culture.

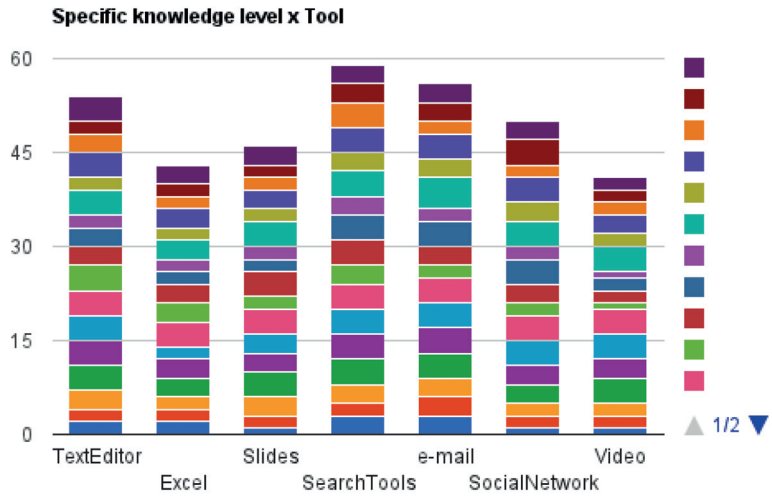
The above statements regarding the technological appropriation and the acquired knowledge were also based on the analysis of the questionnaire used on teachers, a few days after the start of training activities at school. Said questionnaire was aimed at understanding how teachers were inserted in the digital universe, what resources they were already using inside and outside of the school environment, even before giving continuity to the other modules of training.

We built a 'picture' of the analyzed group of teachers, in this case a sample of 17 teachers. This 'picture' revealed how teachers were interacting in the social environment, in view of the scope of digital culture, so that, at the end of the PROUCA training process, we could trace certain changes and acquisition of knowledge, transformations that engaged them, ideally, by means of inferences, in the field of social technical interactions.

The issues raised were related to the experience of these teachers to the universe of informatics. We sketched the result based on two graphs: the first lists the general levels of knowledge about tools per teacher; the second refers to the level of knowledge versus tools. The following graphs are systematized below:



Graph 04: Field of teachers' general knowledge about information technology tools.
Source: Prepared by the author.



Graph 05: Level of specific knowledge, that is, of each teacher on the tools indicated on the questionnaire.
Source: Prepared by the author.

To be able to judge the graphs, we determined that knowledge of each tool is rated at five levels: 1-No knowledge, 2-A little knowledge, 3-Median knowledge, 4-Knows well and 5-Specialist.

As they are 7 types of tools, the maximum would be 35 points and the minimum 7 points. The overall average was 20.53, which generates an average of 2.93 for each tool, meaning that on average, the interviewed teachers have a lower median knowledge (we considered that the median would be average 3, as classified above: 3 = median). If we consider the tools individually, we note that the average tools: text editor, internet search and email, shows that teachers, on average, have higher median knowledge with them, reaching respectively 3.18, 3.47; 3.29 average. Interestingly, the teachers were more knowledgeable about tools such as Internet searches and email than text editors, which is a tool that predates the emergence of the internet. Immediately followed the editors comes the use of social networking with 2.94 average overall.

With this, we can verify, not only based on the analysis of the questionnaire, but also on the speeches by individual interviews and focus groups conducted, that part of the teachers investigated, have knowledge of digital artifacts decoupling the use of pedagogical environment, i.e., teachers

have knowledge (or experience) about the digital resources without linking them to an educational intent. Proof of this is the almost pervasive use of social networks, especially Facebook, by teachers.

Thus, we conclude that when experiencing PROUCA training, teachers had the opportunity to relearn how to use digital resources, combining them into a didactic goal, directed to educational goals and intents.

We understand, therefore, that relearning the use of digital resources in a pedagogical way requires new decisions by the teachers. It means making new choices, relocating pedagogical practices, judging and evaluating what is best, taking risks and also making use of new knowledge or information as important elements in this process (Perrenoud, 2001). In this sense, they must know how to argue, confront problem situations, develop proposals, understand the workings of laptops, and finally, participate as literate beings and people digitally inserted into a complex educational context. Thus, it requires great effort and knowledge on the part of the teachers.

PROUCA, accordingly, may initiate a possible redefinition of teacher identity. For that to occur, the understanding of the content taught in PROUCA training as well as learning new skills, the confrontation between theory and practice and the systematic analysis of the practices and the construction of new theories become key elements for a change of professional structure. (Pimenta, 2009).

Exemplifying the above, here are some lines of teachers who have gone through PROUCA training and make use of laptops in their teaching. They reveal, in referring to the consequences of technological appropriation, a spirit of change in teaching practices and the emergence of a new professional identity through the understanding of the use of digital devices.

> The programme came and the "uquinhas" (kind abbreviation for one laptop per child) came to the school, but the teachers, including myself, did not have the training. I especially did not have practice of handling the laptop well, but I have a computer at home. So for me, at first I wondered, "How will I handle it?" And I was the oldest teacher. Those in my age group did not have daily contact with technology; but there with my students I tried to do as much as possible. I sought to relate the laptop games with what I was working on in mathematics. If I was working subtraction I used subtraction

games. I also used the laptop for word processing. (Teacher Flor, 56 years, 20 years of practical experience)

Paul guided me through teacher training. Every time I had doubts he was there to teach me the system, so I had support to learn a little more. Today I search the internet in some classes using the laptop and try to combine it in my discipline. I dictated texts for students to copy with the laptop, teaching them to use punctuation and paragraph. I allied laptop use to my discipline, which is reading and writing. The contents of the training were the basis for using the technology. (Teacher Rosa, 36 years, 10 years of practical experience)

In those discourses, we can see an attitude of self-assessment and critical reflection of teachers when they reported cognitive gains and changes in the form of planning and delivering lessons. Knowledge or skills are presented in a particular social composition. In the case of teachers, articulation with the social environment is provided by the experience in a programme involving digital artifacts, which is incorporated by teachers as a habitus (Bourdieu, 1994). Thus, by internalizing a new set of schemes for classification of the world, the teacher upgrades himself, permitting socio-technical interaction and appropriations in digital artifacts in his social ambiences, or techno-interactions in the technological environment.

4. SOCIO-COGNITIVE KNOWLEDE TYPOLOGIES, REFLEXIVITY AND TRANSFORMATIONS IN SOCIO-TECHNICAL RELATIONS

Among the various theoretical perspectives about knowledge, we chose the set of relations of the individual to the social world and with himself. In this sense, knowledge is (re)constructed through the indivisible interaction between the social and the subject, in the maturing of our cognitive structures, seeking a better adaptation to the world, through constant balance and accommodation (Piaget, 1971).

Thus, in the socio-cognitive interaction, the subject extends knowledge, creates new structures of assimilation and thus, as in other social media, experiences the use of digital artifacts, realizing them and communicating in these environments. It is in the dialogical/interactional

relationship with each other through social practices historically constructed (Vygotsky, 2007), that the social cognitive knowledge is built.

We also believe that knowledge is (re)build through life experience, in daily life experience. We understand that the teaching activity is not in the reproduction of practices or knowledge designed and/or constructed by others, in this case, researchers and academic experts. The teacher's work possesses its own, custom-made knowledge, because it is linked to a specific context, of students, of working conditions, of life and even personality of the very professional. Thus, the professional knowledge that guides the teaching activity is multiple, in the sense that the professional needs to work with a repertoire of knowledge, skills, abilities, methodologies, theories, etc., to respond to certain situations involving teaching and learning. Therefore, teaching knowledge stems of various sources.

Tardif (2000) refers to knowledge as competences, the abilities (or skills) and attitudes, i.e., what is often called the knowledge, know-how and knowing how to be. He argues that knowledge has a social origin, being produced, reflected and shared by a group that shares the same interests. To the author knowledge changes according to the time, evolves through social changes and its acquisition comes with the exchange through dialogue with peers, that is, with professional socialization.

The central idea is that the knowledge of teachers (schemes, rules, habits, procedures and so on.) are not innate, but produced by socialization. They are classified by Tardif (2011) in knowledge of professional training (set of knowledge transmitted by the teacher training institutions), the disciplinary knowledge (social knowledge defined and selected by the university, the integrated teaching practices through training of teachers in various disciplines), the curricular knowledge (discourses, goals, contents and methods from which the school categorizes presents for her social knowledge defined and selected as a model of high culture and training for high culture) and knowledge of experience (knowledge based on the daily work of the teacher and the knowledge of their environment). (ibid.).

Based on the knowledge of experience of Tardif (2011), we identified the knowledge arising from the socio-cognitive relationships established by teachers when experiencing the One Laptop per Child

programme, i.e., the faculty knowledge arising from the appropriation and use of laptops as well as knowledge succeeded from the process of social media usage awakened by PROUCA. In the discourse of the teachers in the focus group and individual interviews, we found examples of how PROUCA training and use of laptops influence in decision-making and acquisition of some of their own competences of appropriation of the technique.

Through content analysis, we seek the meaning of symbolic interactions from the inclusion of teachers in PROUCA and knowledge that underlies these interactions. Note that the assumption of knowledge constructed or reconstructed by teachers is fully nested into the context analyzed. What we want to clarify is that some knowledge we say is new in this research constitutes itself as new to the educational situation investigated, in the specific context of that specific teacher and school structure.

The method of content analysis enabled us to process the information contained in the messages delivered by the subject of our investigation: that is, we developed an analysis of meanings specifically for the empirical field investigated (Bardin, 2011).

The meanings of the contents of the data collected presented the units of analysis. That means, words and sentences from interviews and focus groups guided us in the creation of the units analyzed, thus establishing a categorization process. It is important to note that this categorization has been developed in a non priori form, for they fully emerged from the context of the responses from the subjects of the research (ibid.).

In the process of categorization and the symbolic interactions constructed by teachers, we characterized localized knowledge in the context of use of laptops in the classroom, at the time of PROUCA training. We infer that the experiences of teachers with the programme resulted in the enhancement of cultural capital that the subjects have acquired in their social trajectories within PROUCA. (Bourdieu, 1999).

The categories that we take for typologies of knowledge refer to knowledge: technical, didactical-methodological and professionalization. To meet the objectives of the research themes, were extracted from the data collected, from a “core sense”: the appropriation of technology

from subject group investigated. The types of knowledge mentioned were categorized according to the grouping of words and expressions from the discourses of teachers which resembled each other in terms of meanings. We illustrated these types of knowledge through analytical description of the contents of the messages.

4.1. Knowledge, reflexivity and social transformation

From the development of technological appropriation, teachers developed knowledge inherent to the experience with the PROUCA laptop. Here we explicit knowledge from a categorization process, which has appropriation as central axis.

We point out that the knowledge arising from the instrumentation was deployed in the process of training of teachers who used laptops in class. This was essential knowledge for pedagogical action, even if deficient in educational practices that involve children, partly because some children were already digitally literate and knew more than the teachers. And on other occasions, children were totally alien to computer languages.

The set of discourses proclaiming instrumental learning – both for pedagogical use and for performance of the teacher in their socio-digital midst – we call technical knowledge. Within this category of knowledge we found some recurrences: difficulties in handling the laptop; early technological literacy, first contacts with the resource usage of the laptop and internet use. We illustrate recurrences of the category – instrumental learning – with subjects' discourse below.

> We met the PROUCA laptop and saw how it works. The operating system it is a bit different from the Windows we're used to. We have much to learn yet, like how to use PowerPoint, the matter of the slides. There are still many things to discover in the PROUCA laptop. (Teacher Margaret, 46 years, 20 years of practical experience)

> I learned to prepare a PowerPoint slide, very cool! I get a content and prepare all that stuff on slides. This is knowledge that in our time didn't exist. (Teacher Rosa, 36 years, 10 years of practical experience)
> What I learned a lot was to use Audacity, the voice recorder and scratch. I learned this and I think that it should have been passed on to the school students. (Teacher Cravo, 55 years old, over 25 years of practical experience)

> I learned to use PowerPoint, download videos. Now we know that the UCA does not allow slides projection... I learned to pursue these multiple languages. I learned to get into Word and enter text. I was looking for it and I acquired these skills and abilities to work with students. I learned other languages, other ways of thinking, acting, to plan, to organize. (Teacher Flor, 56 years, 20 years of practical experience)

We understand that typology (knowledge of the technique is essential when teaching makes use of new information and communication technologies in an educational context. It is necessary, above all, that teachers feel comfortable to make use of new teaching aids and feel free to use the laptops knowing the tool, dominating the main technical procedures for each feature, and integrating the technological environment with the learning process (Kenski, 2003).

We conclude that PROUCA training for teachers added information about the functioning of the features present in the laptop. Even with some difficulties, teachers can have their first experiences with the machine in use the one laptop per child model with students.

We also note that knowledge is being built every the laptops are used and that teaching and examining the possibilities and convenience of use of the equipment in the educational process also have physical and infrastructure barriers.

Teaching practices will consolidate through everyday experience. This is a building process that depends on the time of usage. We know that the teacher gradually learns to master their working environment and teaching resources that compose it, the moment he enters it and internalizes it through rules and actions that become an integral part of their practice (Tardif, 2011).

The same can be said of construction of educational and methodological knowledge. This knowledge represents the set of judgments by the subjects that registered changes in their didactical journeys, i.e., new methodologies are combined with the content and learning objectives in the environment of digital devices. Knowledge constructed in the day-to-day practice of the teacher, discovering and optimizing the use of resources of the laptop in the process of teaching and learning.

In this typology we found occurrences related to working with different languages, changes in planning lessons, reconstruction of

pedagogical practice, research on the internet, learning objectives, articulation among teachers. To illustrate we presented the teachers' discourse that infer new methodological practices.

> I have sought to plan better, to have different classes, in order to promote this technology (PROUCA laptops), using this resource's own symbols, images and video. I seek to combine the technology, the tools of the laptop and the contents of the curriculum. (Teacher Flor, 56 years, 20 years of practical experience)

> My lesson planning changed a bit. Today I search the internet to find a few classes that there are in the "Teacher's Portal". I sought some lessons that other cities, other places in Brazil, had about projects with PROUCA. I kept reading and I kept searching and so I learned other languages, other ways of thinking, acting, planning, and organizing. (Teacher Rosa, 36 years, 10 years of practical experience)

We believe the commitment of teachers to experiment and build new ways to perform their work, and so mobilize knowledge, is the path to think about, argue and try new socio-cognitive realities. It is precisely in this exchange between education and information technology and communication, that the teacher, through symbolic interactions between individuals, machines, content and learning, creates and recreates values and beliefs and construct their identity of subject teachers.

Finally, we find references in teachers´ discourses of knowledge built on the basis of professional training. We call this (re)constructed knowledge stemming from the teachers´ awareness of their professionalization. Thus, we found subcategories that we believe to be forms of knowledge that reconstruct themselves in the lives of professors. They are: reflection, curiosity, memory, imagination, resilience, learning new teaching practices and awareness. Look at what some of the teachers participating in the training programme of the One Laptop per Child say:

> I always seek a better interaction with students. Nowadays there's more to being a teacher than just teaching the disciplines – you have to look for other ways to interact with the students and technology is one. (Teacher Flor, 56 years, 20 years of practical experience)

> The laptop is one more tool that we can use in the classroom. It was a tool for social integration that also motivated my quest to learn, to improve as a person and professional. It came as a jumping board to tell us that we need to improve. PROUCA came so we can reflect. (Teacher Rosa, 36 years, 10 years of practical experience)

> PROUCA brought renewal, the search for the new, the different! (Teacher Angelica, 35 years, 10 years of practical experience)

> PROUCA brought changes to improve teaching, facilitating student learning. It has forced us and motivated us to seek more knowledge in technology to be able to use it in our pedagogical practice. PROUCA gave us a tool to work better with students. Although we have a problem with connectivity (internet), we have a great tool to facilitate teaching and learning. (Teacher Cravo, 55 years old, over 25 years of practical experience)

Within the context of the One Laptop per Child programme, teachers reveal themselves as professionals open to new knowledge, concerned about the need to change their know-how. This shows a positive attitude on the part of teachers that demonstrates an understanding of professionalization of teaching through the systematization of new practices.

Although the professionalism of the educator is achieved through expertise specialized and formalized in scientific disciplines, professional knowledge is essentially pragmatic (Tardif, 2000). In other words, the teacher constitutes his professionalization, basically through practice, in the day-to-day exchanges with his students. We can also observe through discourse analysis, that in forming and reforming knowledge through their experience in the classroom with PROUCA laptops, teachers are gradually deconstructing traditional practices, internalized and consolidated by them through time and the work context. PROUCA is characterized, in this case, as an element that introduces new relations of knowledge production, new forms of interaction between students and teachers, therefore, new social relationships.

We added a narrative by Professor Rosa: “PROUCA came so we can reflect, deconstruct our practices, to then build them again, because we need to build new paradigms of teaching, learning and living.” (Teacher Rosa). In Rosa’s speech, as in others previously cited, we observe the “disembodiment followed by reintroduction of social forms for another

modernity" (Giddens, 1991), i.e., the incorporation of other customs, practices and awareness commensurate to another historic moment.

Remember that we define knowledge professionalization as knowledge within the teaching environment. However, even in the educational environment, teachers have discourses that reveal ideologies of identity and belonging that are established in the appropriation of digital culture. Within the context of PROUCA, teachers reaffirm their ties in everyday relationships, a transformation in their midst and in their relationships with society. See what they say:

> I find myself seeking and using the technological means available to us, enjoying it and applying it to everything that exists in our lives. I use all technological means, including the internet which is what we use the most. I use computers and laptops. I feel integrated into the culture of technology. In PROUCA we will seek knowledge to be able to apply in our daily lives. (Teacher Rosa, 36 years, 10 years of practical experience)

> PROUCA has brought progress, challenges, opportunities, confidence, and self-esteem for the school and for me as a person and professional. (Teacher Angelica, 35 years, 10 years of practical experience)

> My social integration improved for sure. Today I am curious to learn about technology, so that I can have the digital insertion that society demands. (Teacher Luz, 46 years, 25 years of practical experience)

> PROUCA made the teacher seek more technology. Because there is great professional complacency. But I broke it. Any professional who attended the PROUCA training sought to study and pursue, because otherwise he would have stood still in time. (Teacher Cravo, 55 years old, over 25 years of practical experience)

> The good things are what we learn everyday when we use the laptops. I compare it to when a child is learning. The learning builds self-esteem. By teaching others, we become happy. That's the way it is! We can not let PROUCA fall by the way. We need to continue using the laptops with these children, because PROUCA has brought development. (Teacher Jasmine, 46, 10 years of practical experience)

The discourses converge to social practices through the media in the ambience of the teacher, demonstrating the inclusion of teachers

in digital culture. Such narratives reveal a new habitus (Bourdieu, 1999) formalized on the dialogic expression of being in social environment. It presents the continuous and reciprocal exchange between the objective world and the subjective world of subjects' individualities. There is, in this context, a dialectical relationship between the teacher and society, an exchange relationship between the individual teacher's habitus and the social structure of a particular field. Therefore, the changes reflected in the speeches of socio-cognitive teachers are products of the context which they are experiencing in this case, the experience of PROUCA.

We also observed among teachers, attitudes of cognitive reflexivity anchored in the concept of the self-reflexivity of Giddens (1991), which explains the changes in contemporary socio-political practices, incorporating the category reflexivity. For Giddens (ibid.), this new self reflexivity in late modernity would be an imminent movement of the process of modernization in the free will of the subject. The process of self-reflection is of an essentially cognitive nature. It is believed that this contemporary subject surpasses both "fate" and the forces of determinism interactive social practices.

Thus, structural changes in education seem to indicate conflicts and dilemmas, but also present opportunities for recovery of positive values. Like those of autonomy, creativity, reflection, solidarity and sharing, especially when those values become associated with perceived practices of everyday life. In this sense, new knowledge, (re) created in the specific context of our research, can be understood as arising from a particular ideological appropriation of technology, resulting in a new pedagogical activism central to the renewal of educational action.

5. FINAL CONSIDERATIONS

By exposing the *One Laptop per Child* programme and its teacher training as a model of educational practice that provides techno-interactions in learning, we emphasized the socio-technical process of appropriation and its consequences, highlighting the knowledge acquired by the teachers with the use of ICT and new socially established relationships. What is new in this study is the daily life of these teachers being

transported to the field of interactions, as a result of new knowledge and sociability seized.

We understand, therefore, that technology alone does not produce change in thinking and attitudes. It is its use and *appropriation*, especially in the ideological dimension, which will make a difference in the lives of teachers.

From this perception, we see the emergence of new knowledge in empirical investigation; this is knowledge-related know-how, i.e., the experience of teachers in their craft. In the observation, we identified a set of knowledge, originated in the process of content analysis and categorization, which we call technical, didactic-methodological and professionalization, which intertwine the experiences of the actors investigated.

Teachers are (re) constructing their knowledge from the experience of teaching, and they are evaluating, re-thinking and (re)articulating their social knowledge and the daily act of teaching. Linked to the process of acquiring knowledge to teach the use of digital tools in education, the signs of new social environment appear at school where teachers establish other ways of acting and use digital artifacts.

Livingstone (2011) argues that the subjects appropriating the technologies will stand not only as consumers but also as citizens, i.e., participants and critics in their habitus (Bourdieu, 1999). Thus, we see that the technologies of information and communication are artifacts that interfere with the dynamics of contemporary society, leading to new ways of producing and communicating. The result is a complex agenda on diversity of information and knowledge to learn.

Finally, we argue that in the current scenario, what we witness is the incorporation of technology in all spheres of life, thus facilitating communication and interaction between people, opening space for human interaction in a collaborative and participatory form. Therefore, it is of fundamental importance that the study and use of technologies by the teacher intensify. It is important that the moments of experimenting with the laptops, learning by usage, go beyond the school. Thus, there will be time for reflection on what has been learned and the practice developed, providing enriched know-how. And furthermore, it enables the subject of learning a real connection with the society of cognition or knowledge, as some authors call the current rewiring of knowledge.

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9. Massive inclusion of digital technologies in schools. Argentinian young adolescents' appropriation of computers and the Internet in popular and middle classes

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ABSTRACT

Since the implementation of the Programa Conectar Igualdad (PCI) [Connecting Equality Program] in 2010 in Argentina, numerous Social Science specialists started to research how massive ICT introduction in schools would radically affect teaching and learning processes, knowledge building and youth behaviour. Nevertheless, there is still not much empirical evidence showing the ways in which these technologies are appropriated. This situation discloses the need of placing research questions locally situated with regard to those potential changes. What existing access methods does PCI encounter? And how does its implementation participate in the design of personal and family heterogeneous trajectories of ICTs appropriation? How do the students themselves perceive the influence of PCI on their own technologic abilities and competence? How do knowledge and aptitudes associated to new digital media articulate with the knowledge manners promoted by the school format and institutionalism? How does the massive introduction of netbooks affect the interaction among different school actors (students-teachers)? What happens in other sociability and socialization spaces, such as the house and cybercafé?

With the aim of contributing to answer these questions, the article presents a comparative approach of the differential computer and Internet appropriation methods by adolescents in secondary school, coming from popular and middle classes.
Firstly, important findings are related to the decrease in the first-level and second-level digital gap.
Secondly, the most marked differences between high middle classes and popular classes take place in relation with ICT Access trajectories in the house.
Finally, with PCI start-up, it can be observed an increase in the weight of school as a place where computer, and to a lesser extent, Internet use and learning take place.

Keywords: *Programa Conectar Igualdad [Connecting Equality Programme] - ICT - Youth - Appropriation - School*

1. INTRODUCTION

The relation between ICT and social inequalities has a long tradition of debates and discussions. In a more generic way, this relationship reminds us of the topic, so expensive for social sciences, of technology and society, and the ways in which both terms interact and constitute. In the last years several goverments from different countries in Latin America have developed digital inclusion programmes for children and adolescents such as "Prouca" in Brasil, "Programa Conectar Igualdad (PCI)" [Connecting Equality Programme] in Argentina and "Plan Ceibal" in Uruguay. PCI[1] is a state programme that incorporates ICT in education, based on a 1-1 model by means of which more than 3 million of netbooks are delivered to students and teachers in public secondary schools around Argentina. The PCI also provides specific software according to the curricula of secondary schools and free Internet service in all public secondary schools. Another public policy related to the PCI, "Argentina Conectada", provides free Internet access in several towns and cities in Argentina.

Since the implementation of the PCI in 2010 in Argentina, numerous Social Science specialists started to research how massive ICT

1 Public policy implemented by the Office of the President, the National Social Security Administration (ANSES), the National Ministry of Education, the Cabinet of Ministers and the Ministry of Federal Planning, Public Investment and Services.

(Information and Communication Technologies) introduction in schools would radically affect teaching and learning processes, knowledge building and youth behaviour and sensitivity.

Nevertheless, there is still not much empirical evidence showing the ways in which these technologies are appropriated regarding the viewpoint of the school actors themselves.

In this paper we present the results of an ongoing investigation[2] which tackles the relation between Information and Communication Technologies (ICT) and social inequalities from ICTs appropriation by young people from middle and popular classes in the context of PCI in Argentina. We could access the symbolic perspective of the actors by means of our field work. Therefore, we found that from the actors' viewpoint, PCI is temporally classified in three different periods: one prior to the arrival of netbooks; a second period immediately subsequent to their arrival, which lasts for approximately one or two months; and a third period arising after the initial frenzy. This article explores the two first moments. And it allows us to formulate hypotheses about what is going to happen in the third moment. It is worth stating that it seeks to explore the uses on the interaction level, postponing the normative side of the judgements on PCI's weight in educational "quality".

This situation discloses the need of placing research questions locally situated with regard to those potential changes. What existing access methods does PCI encounter? And how does its implementation participate in the design of personal and family heterogeneous trajectories of ICTs appropriation? How do the students themselves perceive the influence of PCI on their own technologic abilities and competence? Based on that question, on a higher level of abstraction, how do knowledge and aptitudes associated to new digital media articulate with the knowledge manners promoted by the school format and

2 Research projects PICT 2011 1639 "Jóvenes, desigualdades y TIC. Un estudio cualitativo de las trayectorias familiares de incorporación de la computadora e internet en el marco del Programmea Conectar Igualdad en La Plata y Gran La Plata" (funded by the National Agency for Scientific and Technological Development -ANPCyT-), PIP 0756 "TIC, juventudes y experiencias de tiempo y espacio en el marco del programa conectar igualdad en La Plata y Gran La Plata" (funded by National Scientific and Technical Research Council - CONICET-), PPID "Jóvenes, desigualdades y TIC" (funded by the National University of La Plata -UNLP-) and SIRCA II "Youth, inequalities and ICT. A qualitative study of youth paths to the incorporation of computer and Internet in the frame of the Plan Conectar Igualdad" (funded by IDRC and the Nanyang Technological University of Singapore).

institutionalism? How does the massive introduction of netbooks affect the interaction among different school actors (students-teachers)? What happens in other sEociability and socialization spaces, such as the house and cybercafé?

With the aim of contributing to the answers to these questions, this work presents a comparative approach of the differential computer and Internet appropriation methods by adolescents in secondary school, coming from popular and middle classes in La Plata and Berisso cities

In the following section we outline our conceptual frame and the existing antecedents about our research problem. In section 3 we explain our methodological strategy. In section 4 we locate the reader in an Argentinian context according to ICT access and connectivity conditions. In section 5 we display our research findings seeking to: (a) identify the influence of netbooks in students' access and connectivity conditions, analysing personal and family ICT access and use trajectories; (b) exploring different perceptions of how PCI implementation methods influence the acquisition of technologic abilities and learning strategies in these actors; (c) describing expectations built by students as well as teachers regarding massive ICT incorporation in schools; (d) understanding the senses and meanings, assessment and representations that the studied young actors build around ICTs. Finally, as provisional conclusions, we present some hypotheses and new questions around the articulation of all these dimensions.

2. CONCEPTUAL FRAMEWORK AND ANTECEDENTS

Our research incorporates a constructivist view of technology (Pinch & Bijker, 1984) a socio-anthropologic perspective (Winocur, 2009; Thompson, 1998) and the pragmatic sociology of Latour (1992) to situate the work under what Feenberg (2005) categorises as a "Critical theory of technology". This epistemological approach does not admit a priori definitions of the meaning of technology. Quite the opposite, it posits that its meaning is constructed through the social and historic practices of people with objects. Thus, technology is not value-free but embedded in social relations and contextually situated. In this way,

interpretations vary according to the historical moment, socio-cultural contexts and variables such as class, age, gender, ethnicity, etc., which are varied and multiple, and in consequence do not necessarily coincide with the codes of technology and its devices. Taking into account the relevant aspects of this critical conception of technology, we also consider the social theory of media by J.B. Thompson (1998).

In order to address the relations between youth and ICT as practices and values, we use the term appropriation, understood as the material and symbolic process in which the subject or social group takes the significant content from an artefact and appropriates it, giving it sense and incorporating it to their lives, in the context of their everyday spaces and relationships with others (Winocur, 2009). Therefore, the ways in which such process develops will be heterogeneous and differential, according to the particular way the cultural artefacts are interpreted and reinterpreted with regard to their own objectives and needs (Larghi, 2010). We expect the results of this study to allow us to generate original knowledge and indicators for monitoring and evaluating digital inclusion programmes in Argentina. Because, despite advances in diagnosing and implementing policies to address the digital divide, there is a lack of studies which incorporate the appropriation experience of users. This omission evidences an epistemological limitation expressed in the construction of indicators which do not contemplate actors' perspective for the evaluation of these programmes (Winocur, 2009).

From our perspective, we aim at analysing and understanding technology appropriation processes in a located manner, dealing with a diversity of contexts, socio-cultural universes, and unequal distribution of economic, educational, cultural, social and symbolic capitals. Moreover, in relation with digital competence and skills acquisition, it must be warned that mechanisms to measure such knowledge require a prudent approach in order not to fall into a technologic determinism, i.e. that seeks to inventory skills focusing only on managing an artefact's function or not as if it resided in an intrinsic and eminently technical property of the devices, and it were not defined by the context in which it has been designed and then appropriated.

As for the 1-1 Model impact, different studies have shown a significant reduction in the first level digital gap relative to ICT access (Grompone, 2010; Rivoir, Pittaluga, Landri, Baldizán & Escuder, 2010; Ministerio de Educación de la Nación [National Ministry of Education], 2011 and 2012). Within this framework, it is the families with lower means of support that are more positively affected by the arrival of computers and netbooks at their homes. In turn, there is also an advance in reducing the second level digital gap (related to necessary knowledge and skills to use ICTs).

In relation to ICTs impact on teaching and learning processes, although it is not possible to generalize yet, (Sunkel, 2010; OCDE, 2010; Pedró, 2011), it can be asserted that their introduction in the school environment generates important pedagogical challenges. On this point, we find studies on national and Latin American levels which tackle this topic and stand out due to their empirical evidence. Such is the case of Dussel's research (2011), who states that although at the beginning teachers showed resistance against ICTs, and they were seen as a threat and danger towards students' integrity, this panorama is being rapidly transformed. That transformation relates to changes in educational policies and the increase in teachers' participation in this new culture, demonstrating a higher use of computers, especially to find information and work, with emerging pedagogical uses (Dussel, 2011).

In a recent paper, Claro, Espejo, Jara y Trucco (2011) tackle ICT access and use in Latin America and the Caribbean from data provided by the *Programa Internacional de Evaluación de Alumnos* [Programme for International Student Assessment] (PISA) between 2000 and 2009. The authors conclude that in that period, "Latin American and Caribbean educational systems have played an important role in reducing the digital gap. (...) in a context of unequal increase [of technologies] at homes, they have provided access equality" (Claro et al., 2011, p. 25). In turn, "public policies in the studied countries have proved to be effective in achieving similar uses of technologies by students in their educational centres, without regard to their social and cultural origin. (...) These policies have achieved a minimum floor to alleviate the increasing second digital gap to some extent" (Claro et al., 2011, pp. 32, 37). On the same understanding, studies about PCI (National Ministry

of Education, 2011; 2012) and about Ceibal Plan in Uruguay (Rivoir et al., 2010), have noted that these programmes have had a strong impact on balancing different social sectors, including public and private schools, despite being only in terms of technology access. A study by Rivoir et al., (2010) about Ceibal Plan highlights that computer and Internet access have increased in popular-class homes; that a positive valuation of ICTs is registered there and that children learn to use ICTs with their equals and they usually teach others, among others findings.

Studies about Links Programme in Chile (Hinostroza & Labbé, 2010) state that teachers and students value ICTs positively, although expected ICT competence has not been accomplished yet. Moreover, in subjects where teachers strengthen "ICT permanent learning", encourage and use communication and connectivity, ICT use for academic purposes is higher (ibid., 2010: 182).

As regards ICTs appropriation by young people, in Latin America there exists varied and numerous literature (Winocur, 2009; Morduchowicz, 2008; Margulis, 2000; Urresti, 2008; Larghi et al., 2012, 2010; Finquelievich, 2002; Paz, 2001; Bonder, 2002; among others). Several studies have even stated that this group is the one that has appropriated ICTs better and to a greater extent (Gil, Feliú, Rivero & Gil, 2003; Winocur, 2009; Finquelievich, 2002; Calvo, 2008).

The surveyed bibliography shows that appropriation takes place, preferably, in students' free time, and that a high amount of learning happens through equals (Winocur, 2009; Rivoir et al., 2010; Larghi et al., 2012; among others), with friendship sealed by senses attributed to technology (Paz, 2001). In turn, in the work by Urresti (2008), it can be seen that social-class differences do not only have an impact on technology access and availability at home, but also participate in the kind of use and appropriation by young people.

Finally, with regard to 1-1 models impact in family links, we can say that ICTs arrival at homes promotes reorganizations in their internal dynamics and relationships (Winocur, 2009; Rivoir et al., 2010; among others). Far from replacing face-to-face interactions, netbook appropriation takes place within the framework of existing relationships (Rivoir et al., 2010) where family and school play a central role in programme implementation.

3. METHODOLOGICAL DESIGN

In order to develop the first stage of our research, we did a preliminary field work in different schools from La Plata and Berisso, both cities located in Buenos Aires province. The first step was a study of the complete list of public schools in which PCI had already been implemented. From that list, which allowed us to know the geographic location of schools, and by consulting different informants, we selected two schools that represented different socioeconomic situations.

The first institution chosen was a secondary school in the centre of La Plata, depending from the local University (School A), which has an enrolment of approximately 1600 students who attend the morning shift, from 3rd to 6th year, and the afternoon shift, from 1st to 3rd year. The majority of students are young people from middle and high classes who live in the city centre and the north area of Greater La Plata (Tolosa, City Bell, and Gonnet).

The second selected school depends from the General Office of Culture and Education and is located in Berisso (School B), a city with a strong worker mark, a few kilometres from La Plata city. About four hundred students attend there, between 1st and 6th year, distributed in the morning and afternoon. The majority are young people from popular and impoverished middle classes, who live in Villa Zula, Barrio Obrero, Barrio Santa Teresita, Barrio La Unión, Villa Roca and Villa San Carlos of Berisso.

The aim of this selection was to assess the influence of the students' socioeconomic origin in their experience with personal computers. Field work in School B was made between May and August 2012, and field work in School A was made between August and December 2012. In this first stage, our work was to go to schools and conduct individual structured interviews with the students. We conducted 39 interviews in total, of which 21 are from students in School B and 18 from students in School A. In all the cases they were students from 4th and 5th year in secondary school. Student selection was carried out following criteria from the theoretical samples, seeking to maximise differences among attitudinal profiles, family and socioeconomic situations while we aimed at keeping an equitable proportion of genders. In order to do that, we had the schools' faculty's support (directors, hall supervisors

and teachers). Also, interviews were conducted with some teachers of the schools to enquire into their own expectations and particular view of the influence of netbooks in their interaction with students.

From the interview answers we built a database and analysed the results. The aim of this analysis was to contrast the hypotheses of specialised literature and produce new questions to develop in the following research stages. In this reading, we compared access characteristics, computer skills and school use of ICTs by the students according to their belonging to a popular-sector school/middle-class school –which we used as a proxy variable to determine social class. Given that PCI has already reached more than three million Argentinian youngsters, and that this first stage of research involved only two secondary schools, our findings cannot be generalized to all the PCI beneficiaries.

3.1. Research context

In Argentina, during the last decades, computers and Internet access were distributed in an angled way according to socioeconomic level, proximity to big cities, gender and age, as several studies have shown (SNCC, 2008; Urresti, 2008; Larghi, 2010). Until 2010, a digital gap could be seen in access to these technologies; the users were mainly from high and middle classes, with a higher representation of young males living in big cities. According to the last National Census (INDEC, 2012a), 53% of Argentinian homes did not have any computers and 46% of the population never use the Internet. Nevertheless, the implementation of the Connecting Equality Programme since 2010 started transforming this panorama, adding its action to the very dynamic evolution of private computer supply. The most recent available data[3] indicate that the percentage of homes without any computer decreased to 46.2% in 2011.

However, Internet access at home still shows a significant social gap: 43.8% of urban homes in the country accede Internet while 56,2% do not have any kind of connection. Among the homes with no Internet access, the main reason is economic (56.10%). There also exist important

3 National Survey about Information and Communication Technologies Use and Access (ENTIC), made by INDEC in the first term of 2011 (INDEC 2012b).

second level digital gaps, since if we consider the effective use of appliances and services, 42% of the national urban population do not use the computer and 45,3% do not use Internet. As regard the third level gap - appropriation - we do not have statistics, but qualitative research usually shows that it is easier to overcome.

Given the digital gaps present in Argentina and Latin America, heterogeneous and unequal ICT access schemes have been formed, where popular-class young people tend to present a late first contact with computers and Internet, made in public access spaces such as the school or cybercafés (Urresti, 2008; Larghi et al., 2012), whereas those from middle and high classes socialize with ICT use from an early age, generally at home. Also, ICTs approach trajectories are heterogeneous and different factors participate in them: social, generational, economic, gender and cultural, among others.

4. FINDINGS

4.1. Access and connectivity

Since all the young people in our research have been beneficiaries of PCI, every home has at least one computer. However, we found considerable access differences among social classes. The majority (63%) of young people from popular classes have just one computer in their homes, besides the one given by the PCI, while young people from high classes appropriate ICTs in contexts where the majority has several computers, besides the one awarded by PCI.

Table Nº 1: Amount of computers per house (not given by PCI)

	HIGH MIDDLE CLASSES	POPULAR CLASSES
One computer	11%	63%
Two computers	28%	25%
Three computers	39%	6%
More than three computers	22%	6%

Source: self-elaborated from interviews

With regard to Internet, the specified bibliography shows that low-income sectors have fewer possibilities of having a web connection from their homes, access is usually limited and fewer have broadband Internet (Anderson, 2005; Sorj & Guedes 2005; Cristancho, Guerr & Ortega, 2008). In our research, we found that all the interviewed young people from high middle classes have an Internet connection at home, whereas connectivity decreases to 76% in popular classes. The possibility of having Internet at home appears in the adolescents' narrations from both social classes as a central question when using the computer, since if they do not have a connection the computer seems to *lose sense.*

Personal and family trajectories of computer and Internet access

It is in relation with ICT access trajectories from their own homes that the most significant differences are seen between the adolescents interviewed. Among high-middle-class young people, such access is long-standing, since 94% have had a computer for more than five years and 61% have had Internet at home for more than five years. In turn, most fathers and mothers of the interviewed students in School A used the computer before their children's birth for work reasons and/or out of a personal interest in technology. Consequently, in several narrations by these young people about their first contacts with ICTs, their fathers and mothers appear as the first users of these devices at home, and as valid interlocutors, even models in their first incursions in the digital world.

Table N°2: Time with computer and Internet access at home

HIGH MIDDLE CLASSES			
Time of computer at home		**Time of Internet at home**	
More than 5 years	94%	More than 5 years	61%
Between 2 and 5 years	-	Between 2 and 5 years	33%
Between 1 and 2 years	-	Between 1 and 2 years	6%
Between 6 months and a year	-	Between 6 months and a year	-
6 months or less	6%	6 months or less	-

Source: self-elaborated from interviews.

Another distinctive characteristic of the young people from middle and high classes is the great amount of technological devices which are part of the home environment. This allows every family member to use ICTs in a personal and individual way. Consequently, the arrival of netbooks awarded by PCI has not meant a great change in access conditions of the interviewed young people from high middle classes.

On the other hand, for most young people from popular classes access to a home computer is relatively recent, with a maximum time of five years. A similar situation takes place in relation to Internet access, since a wide proportion has had this service for one or two years (38%), and a great part of the families has hired it more recently.

Table Nº 3: Time in computer and Internet access at home

POPULAR CLASSES			
Time of computer at home		**Time of Internet at home**	
More than 5 years	31%	More than 5 years	6%
Between 2 and 5 years	31%	Between 2 and 5 years	25%
Between 1 and 2 years	19%	Between 1 and 2 years	38%
Between 6 months and a year	-	Between 6 months and a year	13%
6 months or less	19%	6 months or less	19%

Source: self-elaborated from interviews.

The first approaches of these young people to ICTs took place between 9 and 10 years of age in local cybercafés, where they went with friends, elder brothers or cousins; or at a friend or relative's house. These people also gave them their first knowledge about ICTs use. In turn, for some girls, especially those who have been in charge of housework since a young age, and had possibilities of doing playful and/or educational activities outside school, the first visits to the local cybercafé with their elder brothers implied leaving the house, *knowing something new* and going into a new universe that appeared as predominantly masculine (Proenza coomp., 2012).

The ICT access and use trajectories of fathers and mothers from popular classes, in most cases started a few years ago with the arrival of the first computer in their homes. In many families, it was even their

children's desire the main motivation for buying a computer and/or hiring Internet. Moreover, in the interior of several families, there emerge teaching and learning processes in ICTs use where the young people assume the role of their parents' *teachers*, questioning - at least momentarily - the hierarchy between parents and children in terms of knowledge acquisition and transmission.

In the narrations of young people from popular classes interviewed by us it is noticed that, although their fathers and mothers do not know how to use a computer, they equally believe that the knowledge associated with this technology are central in work and study. Regarding that, Winocur (2009) notes that "(...) the computer and Internet have settled in the popular imaginary as a strategic resource to improve their children's school competence and, as a consequence, their social mobility possibilities" (p. 138). It is worth highlighting that, in some families from School B, there are some different trajectories, with some contact points with those of School A, due to ICT experiences that adults possessed previously, or by the appropriation means arising from home access.

Finally, beyond the specific characteristics of ICT access trajectories of young people from popular and high middle classes, in both cases the first uses were based on entertainment. Then, in a second moment, the use of messages to communicate with friends appeared, as well as web search tools to search for information to do homework and topics of their own interest.

School trajectories of computer and Internet access

Before PCI, School A had computer rooms with great equipment and Internet access, where students regularly attended their IT classes. In turn, in the school corridors there were computers with Internet for the students to use during breaks, for educational aims as well as entertainment. Besides, each classroom had a computer with Internet for the teacher to use.

Students in School B had a computer room where they occasionally attended some IT classes, in charge of the subject's teacher. There also were computers with Internet in the Library, the Head teacher's Office, and the Secretary's Office.

In both cases, most interviewees state to have had an isolated contact with those computers, especially focused on specific subjects timetables as "ICT" (87% of the interviewees) and to a lesser extent in off-hours and the use after classes (18% of the interviewees). In School B, the percentage of use prior to PCI is lower (62%) but it is also focused on the subjects of IT and/or ICT (85% of those who used it). In a coherent manner, in both schools, most of those who had a previous school contact with the computer indicate that the frequency was once a week (67% in School A; 47% in School B). However, the differences are that while 25% of School A students expressed to have used it twice or three times a week, in School B 46% stated to have used it once a month at most.

This situation changed noticeably with PCI implementation. In both schools computer use in school time increased. The frequency increased and the kind of use diversified in a great percentage. Firstly, the amount of students who express using the computer in class increased (62% from School A; 90% from School B). From these, 9 out of 10 use it in several subjects. Now, this impact seems to have a far higher weight in School B than in School A: whereas the weekly use frequency in the latter is similar to the use before PCI, in School B it increased markedly: almost 50% of school users use it every day and approximately 30% twice or three times a week, while just 23% now use it once a week or less. Finally, since the netbooks arrived, the options of use in both institutions became wider, growing in the so-called "school" (use of office programmes, Internet search for homework, educational programmes) as well as playful and entertaining (use of social networks, chat, listening to music and watching videos). Undoubtedly, the possibility of acceding Internet in the whole school at any time has played a fundamental role in this diversification, since the activities that register a higher growth are those which require connection. With regard to this, whereas in School A students could accede Wi-Fi Internet with PCI, in the case of School B it took more than six months to install the technological floor, that is why students could accede Wi-Fi after that time.

4.2. Digital competence and skills: the school joins in from a new place

According to specialised literature, young people's IT skills are unequally shared out according to their social and gender belonging. As regards socioeconomic situation impact, researchers state that low income sectors have access difficulties; they are less intensive users of computer and Internet and have fewer digital skills. As Livingstone (2002) states, digital skills are "inherited" according to social class, since adolescents whose parents are intensive users of computers and Internet have more probabilities of being expert users themselves.

In this situation two kinds of questions are fielded: 1) Does PCI influence in the reproduction of this unequal heritage? 2) Does skill acquisition enable new learning strategies?

The answers to these two questions are found in the framework of transformations which also includes the ICT mass use process in formal education, and its counterpart is the emergence of other educational stages that Burbules (2008) calls "ubiquitous learning" or education, which again, strengthens with the inclusion of portable devices, such as netbooks or mobile phones. These extend the possibility of searching for information, surfing innumerable websites, writing, reproducing, reading, etc. beyond school walls. That is, they allow other learning and collaboration methods and distributed learning, and they are increasingly escaping the control of traditional institutions, which start losing the monopoly of learning methods (Quevedo, 2003).

According to Dussel (2011), Argentinian school has traditionally proposed a relationship with knowledge with the intervention of teacher hierarchy, centred in curriculum and book format, with clear limits between school knowledge and skills and the "informal ones", not legitimate. Nowadays, instead, young people at school judge the rules in pedagogical procedures among dispositions and perceptions structured by their relation with the new media. Since "new technologies - and their consumerism logic - seem to function on the basis of personalization, education and personal and emotional commitment, and they do it with a dynamics and speed that collision with the purposes and "times" of teaching-learning at school" (Quevedo & Dussel, 2010, p. 8). Thus, these

authors state that although there is a structural tension between the working methods proposed by the school and everyday life experiences of current young people, originality lies in the fact that the school is defied by new practices associated with technology, which are unprecedentedly appealing and massive (Quevedo & Dussel, 2010, pp. 63-64). Changes in learning strategies, reading methods, incorporating the "hypertext" modality, and learning of reading and writing, comprehension and productions of senses from texts, still says little of the meanings these practices will acquire in context of digital convergences, which associate words-images-sounds in a continuum that produces and organises sense in original and unknown ways (Dussel, 2010, p. 66). Some recent research state that from activating certain digital convergence processes new "self-motivated" languages and learning strategies can be done (Weber & Mitchell 2008); ways of perception and appreciation that enable institutional decentralization, especially, of school knowledge production (Martín-Barbero, 2009; Quevedo & Dussel, 2010).

According to our research, PCI has generated a reconfiguration of spaces where adolescents acquire technologic skills and competences[4]. First, it is observed an increase of school's weight as a place of computer use and learning and, to a lesser extent, Internet by means of netbooks distribution.

Coincidentally with the previous data, in our research a substantial change is observed in places and referents for technologic skills acquisition among young people from popular classes. Whereas the home and relatives become main learning places and referents among students from middle sectors (all the interviewees signal the home as the main learning place of computer and Internet, and 44% state that their relatives are their main reference in this subject). Among those from popular classes, it can be seen a movement from cybercafés to home and school, while teachers gain ground as referents for developing skills with the computer and Internet (for example, while 38% of the interviewees from popular classes state to have learnt to use Internet in a cybercafé, 20% of them state that currently a teacher is their main

4 We repeat the clarification in the introduction: our research explores uses on the interaction level and, particularly in this section, we explore the development of technologic skills without aiming at providing a value judgment about PCI's educational "quality" in the normative area.

referent when they have to continue learning this technology use). It could be hypothesized that, in a certain way, among students from popular classes, teachers replace the lack of parents' reference which is so present among middle sectors.

Beyond this, among the students interviewed by us self-learning (33 %) and friends (29%) continue to be the main mechanisms or referents in learning. This enables a comparison with the process that Weber and Mitchell (2008:43) have described, for the case in the United States, as a decentralisation that allows young people to make their own digital productions by means of experience (as micro-documentaries, photographic staging, etc. thought under the concept of do-it-yourself), not just acquiring technical skills, but also elaborating their own sense of the "aesthetic" and "opinion", outside school precepts.

In general terms, we found that students from School A have more and more diverse skills in relation to computer use, compared with students from School B. If we compare young people according to some socioeconomic sector, we notice that those from high middle classes (School A) make a more intensive and diversified use of computers, with regard to those from popular classes (School B). As regards competences, the main difference is in e-mail use: 94% of students in School A manage this skill, against just 52% of students from School B. There also is a significant difference regarding text processor use (78% of students from School A, 62% of students from School B know how to use it without difficulties) and when making graphic presentations (67 % from School A, 57% from School B).

4.3. PCI and the emergence of other learning strategies

As we have already anticipated, from the actors' viewpoint, PCI is structured in three moments, which we consider as different periods of institutional life at school:

(I) Period prior to PCI arrival at the school. The course in which PCI has been officially announced to the educational community and its implementation begins in certain institutions but not yet in the schools we studied. It is a period in which different expectations

arise, not only among the students, but also among parents, teachers, social workers, directors, etc. in this period, the expectations game is hatched between anxiety and fascination.

(II) The period in which "the arrival of netbooks" at the school takes place. This is the moment of collective enthusiasm and resentment at the same time (among parents, teachers, an also some students) before the imminent effective implementation of PCI.

(III) The effective institutionalisation period at the time PCI is implemented, beyond generalised enthusiasm. This is the period opened after the collective anxieties have been calmed, and the level of enthusiasm for the "novelty" starts decreasing gradually.

At this point it is worth rebuilding how the students experienced the change produced by netbooks introduction in the classroom. At the beginning, when the netbooks had just arrived, the school environment had changed noticeably: all the students were excited, exploring the programmes of the netbook, using it during the breaks to play and chat, using it in many subjects. After a year, the initial emphasis has started diluting, since the incorporation in the classes is selective (just for some subjects) and, above all in School A, third-generation mobile phones have replaced the netbook's communicational functions. The following narration is very eloquent:

> Now the panorama is not very different from the one prior to netbooks' arrival. Maybe it was a specific moment; at the beginning everybody used their netbooks, which was a deep change. Everybody brought it, everyday, so did I. But then, with the passing of months, they did not bring it, it was heavy, they got bored, we started leaving it, besides with mobile phones, in the past you used it because you chatted and that... although you were in the next classroom... (Laura, 17 years old, School A)

For the time being, we will focus on grasping the experience between the before and after PCI implementation in each studied institution. First, it must be said that according to the students' perspective, there has been a considerable change with the netbooks arrival. For them, school has been modified as a place and moment of their lives with the presence of these artefacts. However, there are varied and sometimes

even contradictory perceptions about the nature of these changes, and assessments of their effects. By means of the analysis we identified three problematic points: 1) changes at school in general; 2) changes in classes; 3) changes in learning processes.

Regarding the first axis, for many students the school became a more entertaining and seductive place since the netbooks arrived.

> When the netbooks arrived everybody started to play, everything was noisier, more entertaining. In an off-hour you do not get bored with the computer, in the past you did not know what to do. (Julián, 15 years old, School A)

> Once I had the netbook it is like you do not get bored anymore (...) In the past I was not bored, anyway, because you tried to find something to do, you laughed at something, we went to the yard, we played ball... we walked around. But once you have it, we say: let's play Conter together! Let's listen to music! (Leandro, 16 years old, School B)

With regard to the changes in classes, the view varies according to each interviewee's personal experience. In this point, each of them focuses on whether the presence of netbooks has an influence in class dynamics and its possible encouraging or distracting effects.

In both institutions the use of social networks, chat, mobile phones and games are perceived as an element that could be distracting the student's attention.

> In the past, if you were bored you looked for something to do in the break, play ball, talk to someone, and the netbook kind of took a lot of place from that... and also, in the past, you did not have as many distractions, or with some teacher who is very good, and wants to include the netbook and if you do not have the willingness, it is really hard to control yourself. (Ana, 16 years old, School A)

Finally, as regards possible changes in learning, there is not a forceful assertion. Students from School B perceive that with netbooks classes are more dynamic, and doing their homework is easier thanks to Internet, where information is available in one place and quickly.

> E: Do you feel more like coming?
> L: Yes, I feel like coming more than before.

E: And do you learn more or less?
L: Yes, you learn more because you have everything there, on the Internet.
(Lucio, 17 years old, School B)

E: With the computer now you think you have everything: pencil, eraser, paper. You do not have to buy anything else... and now I like it more, in the past I did not like it so much. Copying... all that stuff, because the teacher dictates a lot, they give you the theory and then you even have to study. In the past I did not like it because you had to write the theory, and then you had to study everything they gave you. Now you can go to the computer and look for a summary of the topic. In the past we had to go up to the library to watch videos, look for a film, connect the DVD, and now you can use the pen-drive and watch the film on the computer... on your own or with your mates.

(Esteban, 16 years old, School B)

Nevertheless, despite the higher fluency and a more entertaining dynamics, the netbooks required the students to have new skills, as we see in the following case:

E: You told me that you do not always bring the computer. When do you bring it? Frequently? Is it because they ask you to?
F: I may bring it three times... I bring it just in case... there are subjects in which you do not use it (...) I like it, it is good. Besides the teacher helps you... you understand things...
E: And is it easier or harder to learn?
F: Maybe it is a bit harder... in the sense that you have to pay attention to the computer and the topic... in the past it was just the topic..."

(Fiorella, 16 years old, School B)

In conclusion, among the most distinguishing enquired perceptions we can note: 1) school is now lived as a space that may become more entertaining with netbooks incorporation, since it enables students to be permanently connected, play online, and visit social networks; 2) classes seem to be quieter because conflict decreases; 3) learning has been modified since computer and Internet access provides more knowledge tools, although it requires other skills and can be a source of distraction.

4.4. Teacher-student experience since the incorporation of netbooks

Roxana Cabello (2006) has made a unique research ("*Yo con la computadora no tengo nada que ver*" [I do not have anything to do with the computer]) about teacher resistance against the inclusion of digital technologies in the classroom. However, there is not much bibliography in the local field that can provide empirical evidence about teaching interaction dynamics with computers in schools.

The interviews show that netbook use in class depends on teachers' strategies of netbook introduction in classroom dynamics. Thus there exist different situations according to the course and subject dealt with. There are teachers who encourage the use of netbooks every day, others sometimes and others never. Besides, students establish a clear differentiation among those who allow them to use it beyond school work (generally listening to music with headphones), those who just want it for certain activities and questions (using just the calculator in Maths, searching for information during the explanation of a specific topic), and those who completely ban their use during the class (the reason is that they are afraid students may not pay attention, although according to students, sometimes it is because some teachers do not know how to use it).

Data from our interviews show that before "netbooks arrived" with PCI implementation, those young people who had a computer in their homes as well as those who did not have their own PC at home (but, as we have seen, they did have access to them, either in cybercafés, in the computer room at school, or by means of their families or friends), all of them already had some technology and Internet representations beyond the physical possession of it. Winocur (2009) states that computers and Internet are part of the popular imaginary, even before having the possibility of acceding them. The author has researched that among Mexican adolescents-users computers and Internet have become wished objects in the young imaginary through narrations that go around in massive media. In our case, from the young viewpoint during this first PCI period, expectations about netbooks mainly centred in: (I) the possibility that young people perceived of being able to intensify playful uses through

these; (II) the higher degree of autonomy they could give them in family negotiations regarding shared uses and times in the home PC; (III) the possibility that netbook inclusion by teachers could reward as more dynamic and "funny" classes. This expresses an imaginary about these technologies characterised by a strong illusion of control and environment manipulation no longer collectively (as it has happened historically in other young imaginaries) but individualised (Winocur 2009, p. 56).

If the expectations about netbooks that these young people developed, as objects which would give them a higher action capacity in their homes, over family and friends, were to some extent achieved; the expectations they projected over the school were negotiated less effectively. Young people's expectations about teacher's inclusion in classes implied that with the arrival of PCI, the school would become a "funnier" world, because they would be able to develop the uses they already knew outside it; that is, including in their classes something from the playful and emotional logics they associated with the netbook world. On the day the netbooks were delivered, these associations were being formed in the schools:

> E: What happened when the netbook arrived?
> R: Well, we thought we were going to be playing on the Facebook or Conter every day. The first months you knew that most [of the young people] were playing in ten classrooms. With the Facebook, [the students] were angry because it was blocked, but they investigated and they looked for it in some other place where the webpage is no longer blocked. Everybody has it now.
>
> (Ramiro, 18 years old, School B)

> E: Do you remember what happened when the netbooks arrived?
> L: Look, the computers came we downloaded them from the truck [from ANSES]. Mine had not arrived, I had to wait for about six months, but I got used to it... I did not feel I needed it, but now I have got really used to it. I arrive at school and log in the Facebook, you leave it open, the games, music, Ares and that is it. And if you are in an off-hour, you play online with the whole school...
>
> (Leandro, 17 years old, School B)

Lucio and Esteban from School B agree that with the netbook in class "it is like you do not get bored anymore". Then, from the young

viewpoint, the netbook is appreciated as an "aid" with regard to school work, in the sense that it is seen as a funny, quick, intelligent object, as opposed to the boring, dense school world. Netbooks are objects renowned as "an aid" to "search for information" about their "own" topics, about "funny" things (the "laugh videos", "looking for famous people", etc.) and classes without them are lived as "boring" classes.

> L: Now with the netbook it is like, you do not get bored anymore. If I want to listen to music I log in the Facebook, if I want to play too. There you have everything you want.
> E: And the dynamics of the classes? How was it in the past?
> L: You had nothing to do. The mobile phone, maybe a message and nothing else. Now with the computer you space out more when doing something, maybe you are looking at what someone else is doing.
>
> (Lucio, 17 years old, School B)

If "in the past" in the school young people could only "send a message with the mobile phone and nothing else" as Lucio says, "now", with the legitimate incorporation of netbooks that PCI means, these possibilities of getting distracted with the dictation dynamics in classes become wider. In turn, it seems that in some cases the sources of different distractions spread and the strength of teachers' interjections becomes tense with the appearance of netbooks and all their playful potential. As Lucio says: "with the computer you space out more when doing something" and that "something" is required at school. As a counterpart, some teachers have tried to solve/face this tension through the incorporation of the computer in new classroom work dynamics.

Thus, for young people, the diversification of possibilities to do other kinds of operations (look, read, listen, cut, paste, connect, link, surf, search, find, play, etc.) and to take other possible courses of action, multiply with "the arrival of netbooks" in the classroom. The uses which mobile phones and other similar devices allowed are amplified and strengthened in the options provided now by the permanent presence of netbooks in the course.. In this sense, with the introduction of netbooks teachers' fight for "students' attention" is intensified. The class dynamics resembles much more that of a hand to hand fight for their students' attention; and that of the teaching profession to a fight sport

instead of a limpid explanation of legitimate knowledge. Although this process has underlain teacher/students interactions for a long time, PCI implementation provides the framework for its emergence, which causes an intensification of the fight for attention that teachers had already had, for example, against mobile phones.

The expression of strategies with which school agents try to face the incorporation of netbooks are multiple but not infinite. The different reception strategies of netbooks by teachers take place on what they experience as a tension they currently go through in their professional practice: tension present in teaching/support.

The interviews with teachers show that their expectations about PCI were varied, whereas young expectations did not vacillate in valuing favourably the arrival of netbooks at the schools. Teachers expressed their doubts in this regard.

As we see, many teachers found it hard to face the fact of assessing an object whose usefulness is hardly known and whose efficiency amazes them while it also disturbs and even frightens them.

Regarding the expectations about how they could face the problems which netbooks may cause in class, teachers thought they could resort to strategies similar to those they had already applied to mobile phones. The mobile phone is the object which in many senses teachers place as the ancestor of tensions that are introduced by netbooks, in their opinion. In formality, mobile phones are banned by school regulations (form the coexistence regulations to certain norms of regional-level directors). Their use is negotiated as one more element in the negotiations included in every teacher/student interaction. Teachers deal with these objects from an illegitimacy place where these objects, external to school formats, enter the classroom. They negotiate mobile phone inclusion from its exteriority condition, which sometimes gives them a higher authority margin in their uses. At this point, a difference from netbooks is that these are objects legitimately included by the educational system. Thus, if mobile phones are objects introduced, as Dussel (2011, p. 18) says, from the base level of the educational system (the students) from the teacher's viewpoint, with PCI implementation netbooks are introduced from the top of the system (National Ministry of Education, Federal State, etc.).

To sum up, from the teacher's viewpoint, netbooks enter the school stage already "loaded" with meanings regarding how they use these devices in their everyday life (Dussel, 2011). In that way, these collective representations about PCI are incorporated into the netbook social life (Appadurai, 1991) and express prior judgements (not in an appreciatory sense, but in the sense they express a judgement elaborated by teachers prior to the effective arrival of netbooks in the classroom) which block the possibility of developing certain kinds of pedagogic uses of netbooks as educational technology[5], and allow to be experimented as adverse or threatening objects introduced "from above" and end up being an obstacle impeding school routine dynamics. The analysis of netbook "uses" in relation with interactions in the school cannot omit these perceptions and representations as analysis material (real abstractions) which forms teacher appreciation schemata and their effects on practical logics.

5. CONCLUSIONS

Firstly, with regard to the decrease in the first-level digital gap (Camacho, 2005) we found that since the arrival of PCI a rupture was produced in the ICT access trajectories by young people from popular classes and their families, because in the majority of cases they could have one computer at home. In turn, in relation with the second-level digital gap (relative to ICT access and informational skills development, respectively) our work shows a significant decrease.

Secondly, as regards access modalities we have shown how the most marked differences between high middle classes and popular classes take place in relation with ICT Access trajectories in the house and the practices and family knowledge related with technology use. In the case of popular classes, the arrival of the first computer at the house and the later hiring of Internet service, have been recent (encouraged by PCI arrival). However, in high-middle-class families, the presence of computers dates back to more than five years, and Internet access from the house was almost immediate with respect to the arrival of the first

5 In order to learn about certain creative uses that other teacher experiences have been able to develop, see Dussel (2011).

computer at the house. Whereas in high middle classes the adolescents learned to use the computer and Internet with their fathers and mothers as technologic referents, in most cases from popular classes, it was the adolescents themselves who played the role of *teachers* instead of their parents.

Thirdly, with PCI start-up, it can be observed an increase in the weight of school as a place where computer, and to a lesser extent, Internet use and learning take place, since the distribution of netbooks. This re-appreciation of the school is developed by means of a double movement. On the one hand, the school is added to the home, and on the other hand, it tends to replace cybercafés as frequent spaces of ICT use. It is worth stressing that although this double movement happens for students from middle classes as well as popular classes, it gains a specific weight in the case of the latter, since among them the importance of cybercafés was much higher than the former. In this sense, among young people from popular classes it can be seen a movement from the cybercafé towards the home and school, whereas teachers gain ground as referents for the development of skills with the computer and Internet. In this situation, PCI implementation seems to have slightly moderated this inequality in skills, above all in the area of office programmes management and skills associated with school tasks, because among young people from popular classes, the proportion of those who seem to have acquired these skills after the arrival of netbooks is much higher.

Finally, as regards the influence of the structure of social inequalities in PCI implementation, our work leads us to state the undeniable centrality of school mediation as a potentially restorative actor. As a consequence, although that highlights the role of school mediation as fundamental in the fight against inequality reproduction, our work also shows that the way of managing tensions introduced with PCI implementation prevents the current school mediation way from transporting popular sectors towards more equalitarian ways of using these new technologies.

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10. Model 1:1, an Argentinian View

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ABSTRACT

After ten years of residence in Spain, 2012 marked the transitory return to my native Argentina. In 2001, Argentina was suffering one of its worst ever economic, institutional, and political strongest crises, so I decided to move to Barcelona, a city in which information and communications technologies (ICT) were in full swing and expansion. Almost in parallel, and thanks to a period of economic prosperity and industrial growth initiated in the year 2003, Argentina was developing diverse policies to restore educational and scientific levels of its past. Two of the above mentioned policies are those that I would like to present:

— The Roots Programme, destined to repatriate Argentine researchers who reside abroad, and through which I could realize a temporary return in the months of October, November and December, 2012 in the province of Cordoba, 800 kilometers, from Buenos Aires, the capital of Argentina.
— The Programme Connect Equality (PCI), where I developed the majority of my activities for duration of my Roots Programme stay.

This chapter presents an analysis on the scope and limitations of the PCI, seen from the perspective afforded by living ten years out of my country, and to return for three months of immersion in an unprecedented educational reality in Argentina, in which I trained, shared experiences, and transferred knowledge to about a thousand people: from researchers to teachers, school directors, designers of e-learning systems, ministers and secretaries among others, from all the educational levels of Argentina.
The focus of this work shows on the one hand, the positive effects observed in the province of Cordoba, in the application of the PCI (increased motivation of students and educational staff, improved updating of the content of the teaching-learning process, reduction of the digital divide, higher levels of social inclusion, among others). While on the other hand and in contrast, we think that the most important flaw of the PCI resides in the absence of elements that guarantee or at least test the use of ICT as an epistemic tool, such as collaborative learning, and as the construction of knowledge.

***Keywords:** Programme Connect Equality (PCI); 1:1 models; constructivist; meaningful learning; collaborative.*

1. INTRODUCTION

During the last decade, increasingly more public and private actors, in both developed or developing countries, have supported 1:1 initiatives in education (one computer per student). These initiatives represent a qualitative leap from prior educative experiences with ICT because each child now has access to a personal device, normally portable, mini laptops or mobile devices.

The model 1 to 1 is a TIC incorporated strategy, to the education considered a pertinent alternative for many countries, but the inclusion of a computer by child in the class will only contribute to his formation if it has the background of a pedagogical model consistent that can define philosophical, pedagogical and didactic indispensable aspects.

2. THE IMPACT OF THE MODEL 1:1

In Latin America, the implementation of educational programmes inspired 1:1 Model, which gives each student a laptop in the classroom, has acquired special significance. Indeed, the arrival of a computer to many households through the students, represents a highly significant

socioeconomic feat, since the countries in which these programmes are being implemented, have seen their connectivity indicators increase remarkably. Therefore, these programmes are not only interventions in education but also part of the broader social spectrum, whose effects produce a change in the lives of our students, and their surroundings.

The first important experiences of ICT implementation in education can be traced to 2003-2004, when governments or ministries of education in all countries became interested in providing computers and increasing ICT equipment in schools and classrooms, without yet considering the option of each student having their own portable device.

It was towards the end of the decade, when 1:1 Initiatives began to strongly emerge, in which each student received their own netbook. With this kind of 1:1 initiatives the aim is not only to improve school resources, but to also allow each student or teacher have their own laptop to connect to the Internet and access educational resources regardless of location and time.

Although there is a tremendous diversity in terms of the motivation, design, implementation and desired impacts for each project of this kind, most of the reasons put forward for implementing 1:1 programmes, are done so in the name of economic, social or educational progress.

Recently, 1:1 models have emerged as a technology-rich educational reform, where teachers and students have ubiquitous access to a laptop with wireless communication (Bebell & O'Dwyer, 2010). The fact that the computer can be used at school and at home allows for the development of different learning activities (Liu & Kao, 2005), internet connection through the school network, access to educational software (Valiente, 2010) communication and collaboration between peers and teachers, and the involvement of parents in their children's learning. Teachers, meanwhile, have at their disposition digital tools to create learning plans, manage educational content and monitor student progress.

But the implementation of 1:1 initiatives requires much more investment than just hardware acquisition, as in a developing nation this represents only a third of the total cost, while training, service and technical support involve more than half (Zucker & Light, 2009).

The context in which these laptops should be used raises a number of challenges.

The introduction of ICT in the classroom does not guarantee on its own an improvement of the teaching nor of the learning processes. As is the case in the educational contexts without these technologies, this achievement depends on a renovation of the pedagogical thinking that will permit a conscious modification of the conception of the educative process by all the characters it involves. This is a premise that holds especially true, in the processes for incorporating 1:1 models.

To reduce the chances of failure, 1:1 models have done everything possible to eliminate the typical malfunction points of a laptop: hard drive, fan and connectors. To do this, we have removed the hard drive (replaced by flash memory), minimized heat generation (and power consumption) and connectors. Indeed, 1:1 initiatives require specific physical conditions for their implementation and, by their nature, require the integration of different types of equipment (servers, local area networks, wireless routers, computers, printers, electrical installations and connections, etc.). The quality and reliability of the infrastructure are crucial to the success of a programme. These initiatives require a demanding service level agreement so that the technologies (hardware, software, connectivity, etc.) are available at all times required by the educational experiences. Each defect leaves a school, a grade level or a group of students outside the complete educational process. If such failures occur repeatedly, the whole experience would fall below the intended performance level.

As previously stated, one of the most common critical of the 1:1 policies and plans developed in different countries, is that they have focused or concerned almost exclusively in the provision of technology to schools disregarding the pedagogical dimension of this model (Weston & Bain, 2010). A 1:1 model policy cannot be characterized or understood solely as the mere provision of computers to students and teachers.

Evidently, the presence and availability of a lot of technology in the classroom is a necessary condition, but insufficient for educational improvement and change. Reducing the 1:1 model to a mass distribution of digital machines would be advocating a position or stance of technological utopianism or technocentrism

According to this perspective, it is necessary to formulate strategies that generate a sense of belonging to the model, and strengthen expertise by establishing strategic alliances with relevant organizations and companies that can support the initiative. Moreover, the implementation and associated processes must be clear, as well as the financial aspects of the maintenance and support, and or the pedagogical assistance in terms of promoting effective ownership of the processes necessary for implementation to be successful.

In the same vein, we note that the incorporation of the model 1:1 cannot be reduced to what happens in the student-computer interaction nor the interaction between teachers and learners in the classroom; the 1-1 model gets back in touch with the teacher's role as a driver of the process and as such gives it a serious exercised and detailed design and planning through which they can lead their students efficiently in achieving educational purposes.

According to projections from the Inter-American Development Bank (IDB), the number of students covered by one computer per child programmes in Latin America will increase from 4.5 million today to 30 million in 2015 (Oppenheimer, 2010). With this level of growth, it is urgent to obtain new research evidence to identify, among other things, what kind of background skills and competencies are necessary for students to benefit from access to ICT in education.

Despite the significance of the investments, it is not yet possible to assess the impacts of these initiatives and draw conclusions. This could be due to a variety of factors, such as short deadlines for implementation, lack of clear goals and commitment to study the impact, as well as the lack of measurement tools. Most evaluations tend to be descriptive of the implementation process and programme design without appropriate measures on how the ICT devices are used in the classrooms, changing practices and their relationship to academic achievement

Most assessments of the Ibero-American experiences with the 1:1 model suggest a positive impact in terms of a reduction of the digital divide, increased available educational resources, decreased absenteeism, increased creativity, improved technological skills of students, and progress in some math, language and communication skills. However, these are initial results of some of the experiences, as other cases are

still completing the equipment delivery stage and in others, they are awaiting the first overall evaluation of the initiative.

Current research on 1:1 initiatives focuses primarily on the implementation process and whether or not it works, without sufficient data to show how students use their devices. More research is needed to provide a deeper understanding of learning practices in 1:1 classrooms (Bebell, 2005; Roschelle, 2003). It is even more difficult to find studies that specifically test links between hypothetical results of 1:1 initiatives and different implementation measures (such as teacher training). Further studies are needed to specifically examine the relationship between use and measurable outcomes.

Time and coordinated work will give us the final word.

3. THE ARGENTINE CONTEXT

Guaranteeing the right to education requires significant public investment. Therefore, the sanctioning of the Education Finance Law (EFL), which established the goal of raising public investment in education, science and technology to 6% of the gross domestic product of Argentina in 2010, was great news. The EFL was enacted in the context of a critical situation for education in Argentina. The 2001 crisis had ravaged society and public finances.

Schools with scarce resources and the lowest paid teachers virtually had to face the social impact of the crisis on their students alone. The effects on learning were fierce: between 2000 and 2006, Argentina was the country with the most negative performance on the OECD evaluations of (PISA is its acronym in English).

Given this scenario, the sanction of the EFL in 2005 was auspicious. Both the national government and all the jurisdictions fulfilled the law, and in 2010 the consolidated spending on education, science and technology was equivalent to 6% of the GDP. Also, as this budget was tied to a GDP which during this period had annual growth rates equivalent to 8.5% and 9% (except in 2009), the increase was greater than expected in times of lower economic growth.

The fiscal context of this increase in resources was the increases in total public spending and tax revenues: consolidated public spending rose from 32% of the GDP in 2005 to 43.2% in 2009 (latest data

available), and the consolidated tax revenue reached 33.5% of GDP in 2010, whereas in 2005 it was 26.9%.

Additional resources were mainly used for the construction of schools, increasing faculty job positions, equipment (recently with the Connect Equality Programme) and improvement projects in technical schools, among other things. Increasing teacher salaries was key as their purchasing power improved 23%. The law not only stipulated budgetary targets but also set educational goals. Some achievements are extremely positive: between 2005 and 2010 the attendance rate of the 3-5 year old population increased from 64.5% to 72.9%, the net enrollment rate of the poorest 25% of the population increased from 67.4% to 78.4%, and results in PISA improved, especially in reading (6.4% improvement between 2006 and 2009).

However, several challenges remain. In budgetary terms, the federal revenue sharing system perpetuates inequalities between provinces. As such, inequity in education financing is immense. The richest fiscal provinces (Tierra del Fuego and Santa Cruz) triple the investment per student of the poorest (Misiones, Salta, Corrientes, Tucumán and Santiago del Estero). In the field of education, comparative international data continue to show weaknesses and inequalities in the learning achievement of students.

Upon completing the EFL's implementation period, the National Education Law Act is enacted, which sets a floor of a consolidated investment in education equivalent to 6% of GDP. However, how much each jurisdictional government must invest is no longer specified, a criteria which as key to fulfilling Education Finance Law.

In this context, it is worth considering whether the investment of 6% of the GDP is sufficient, and if other indicators should be used to guide investment. In addition, which key educational objectives should be prioritized and funded in the coming years should be discussed, as well as the role of each level of government in funding. In this context, it is essential to reduce the provincial gaps in education investment. To meet these challenges it is necessary to open a broad debate with the participation of all social and political sectors.

4. THE PROGRAMME CONECTAR IGUALDAD

The Connect Equality Programme (PCI) is part of an Argentine public policy whose purpose is to promote digital inclusion and improve the quality of education. Launched in 2010 by the Argentine Ministry of Education in order to recover and give greater value to the public school system and to reduce the digital, educational and social gaps in the country.

PCI is designed to be implemented for a population which can be summarized, as per the official figures provided by the INDEC (the official statistical agency of the Argentine state), as follows:

- 26.4% of Argentina's population are aged 0 to 14 years (more than 10 million children).
- Of that total, about 6 million are distributed in the age ranges of the three Basic Education cycles (at a rate of two million per cycle).
- Public education covers 77% of this population, 20% is privately covered, and there is a remaining 3% who do not attend school.
- Argentina currently has more than 800,000 teachers at all levels (increased by 22% during the 1994-2004 period).
- This workforce has at least a 75% (Basic Education Cycle 3) and up to 92% (pre-school level) pedagogical training.

It is within this framework that during the first half of the millennium, state policies were aimed at the integration of ICT in education, such as the PCI.

Among the Programme's main goals are:

- Promote equal opportunities for all young people in the country, by providing a tool to bridge the digital divide.
- Build a universal digital inclusion policy at the federal level.
- Ensure universal access to the best technological resources and information.
- Train responsible subjects, who are able to use knowledge as a tool to understand and constructively transform their social, economic, environmental and cultural surroundings, and situate themselves as active participants in a constantly changing world.

- Develop skills for handling new languages produced by ICT. In this sense, provide students with the greatest employment opportunities possible.
- Improve teaching and learning processes through changing work formats in the classroom and in school through the use of ICT.
- Incorporate and engage families to actively participate in the learning process of students.
- Promote the strengthening of teacher training for the use of ICT in the classroom.

Connect Equality's aim is to provide a computer to all pupils and teachers of secondary education in public schools, special education schools, and teacher training institutes of the whole country, while training teachers in the use of the computers and elaborate educational toolsin order to facilitate the incorporation of these technologies in the processes of education and learning. In this way, the existing digital gap will be reduced by introducing new technologies as well as the methods to apply them in the context of school, creating the possibility of the student and the community to insert themselves in the knowledge of ICT while promoting such values as social integration and inclusion.

To accomplish this, the initiative has planned the distribution of more than 3,500,000 netbooks to students and teachers of secondary and special education schools, as well as the installation of mobile digital classrooms with netbooks for the last years of the Superior Teacher Training Institutes of the whole country. Students have full ownership of these netbooks, a guarantee of two years and free internet connectivity to Internet up to the ending of their studies.

In addition to the delivery of 3,500,000 netbooks to all students and teachers in public secondary and special education schools, teacher training institutes in the country, the PCI provides a strong training and support programme for teachers and trainers to introduce ICT in education through the Innovation Schools plan. Innovation Schools consists of a team of specialists in different knowledge areas, with experience in teaching disciplinary content, the use of new technologies, and specific relationships between one another. The work areas are: Natural Sciences, Social Sciences, Mathematics, Language, Education Management, Special Education, Environmental Education and Digital

Skills. Between 2011 and 2012, the project reached over 6,500 teachers in 200 public secondary schools and training institutes in nine provinces. As of 2013, the work focuses on the transfer of the device to the upper levels, in order to help build and strengthen provincial teams undertake training activities, and can sustain over time similar plans with higher availability, coverage and knowledge of the terrain.

In proposing to reach the secondary level population, one assumes a more adult use of the tool. The laptops distributed to the youth are not, in most cases, the first contact they have with a computing device. This difference implies a different use, more linked to the notion of a "multi-purpose tool" which extends beyond the school system. The loaned property, which is owned upon completion of high school, reinforces the possibility that young people take ownership of the computer for use beyond school.

The programme has a team of more than 1,200 federal professionals with presence in the 24 jurisdictions that coordinate the implementation of the education strategy and develop various awareness-raising and training for school principals, teachers, students and their families, with the aim of bringing them closer to the netbooks and the information society. In all the educational establishments which join the programme a technical staff is recruited to manage the computers and the school network. Established as a State policy, the programme is implemented by a partnership articulated among four organisms with national jurisdiction, each with specific competencies:

National Ministry of Education

- Definition, implementation and evaluation of the education strategy
- School selection
- Definition of parameters for the tender of equipment
- Coordination of programme implementation
- Agree the Programme's education policy with the jurisdictional Ministries of Education within the Federal Education Council

Social Security Administration (ANSES)

- Acquisition, financing and distribution of the equipment

- Installation of the foundation for the technology and the equipment associated with the installation of the school network

Ministry of Federal Planning, Public Investment and Services

- Connectivity to schools and homes
- Digital TV access in schools and homes

Cabinet of Ministers

- Physical and logical security policy for networks and computers

Jurisdictions

- Agreement on the educational strategy within the Federal Education Council
- Implementation of the education strategy in coordination with the National Ministry Education
- Recruitment and Financing of the Network Administration
- Operation of school buildings electricity
- Institutional physical and human resources support for the installation and maintenance of equipment

The Ministry of Education, through the Portal Educ.ar, produces educational resources for the PCI, which are incorporated into each netbook. This is an ongoing and permanent task and allows for adding new tools and activities in the schools. Among the most important specifics:

- 35,700 educational resources
- 81,200 digital content, multimedia resources and didactic educational
- 70 programmes (simulators and video games)
- 21 titles that make up 6 sets of materials for the incorporation of new technologies in education

The resources are structured according to the beneficiaries: teachers, students, families, special education, rural schools, hospitals and home schools, and bilingual and intercultural education.

Also, more than 100 self-paced online courses and other moderated and carried out by Educ.ar (http://www.educ.ar) have been developed. These courses cover topics ranging from basic digital literacy

to the application of disciplines under the 1:1 model. At the National Teacher Training Institute (INFD) virtual courses are also aimed at the training system (http://www.me.gov.ar/infod/campus.html). Moreover, there is a training approach for special education, aimed at supervisors, directors and faculty of the schools of this modality. A summary of the training is as follows:

National Initiatives

Presentation and awareness activities

Training Device for Coordination Teams

Training Device for Discipline Training Teams s

Training device for supervisors

Training actions by the National Teacher Training Institute (face-to-face and virtual)

Training device for the Special Education

Online Teacher Training

Jurisdictional Initiatives

Activities dedicated to the e Special Education Modality

Activities dedicated to Superior level teachers

Presentation and awareness of the Programme in the jurisdictions

Disciplines and ICT Training

Digital initiation and immersion of teachers

Implementation workshops for ICT and 1:1 model for principals and teachers

Proposals and workshops for families

Proposals and workshops for students

Among the materials organized by these desks are digital booklets on ICT skills, a literature collection, a library of historical documents and old maps, a collection of videos for classroom work in the 1:1 format, interviews, proposals curricular activities, teaching sequences, animated and interactive computer graphics, a collection of Argentine art and culture, a collection of audiobooks for language learning and activities with the Audacity programme, a collection of geography-based Google Maps

applications, games like Sudoku and mathematics challenge, among many others(http://coleccion1a1.educ.ar/). Also included are the contents of "Today" (Youth Programmeming) of the Encuentro TV channel aimed at young people and families. The summary of the materials is as follows:

National Initiatives

1:1 Classroom Strategies

Series for teaching within the 1:1 model

Series for special education with netbooks

Families: The home computer

Educational management for the 1:1 model

Instrumental series for the 1:1model

Normative Series

Families

Other actions include:

— Creation of a post–graduate certificate in Education and New Technologies to train teachers in the use of ICT, and aims to help teachers in the use of the netbooks delivered by the PCI.

— Development of Connect Festivals, in which more than 150 teachers and 800 pupils take part in workshops and activities on art, education and new technologies of the educ.ar portal and the PCI.

— Development of digital contents to be used for didactic purposes, for example the 1 to 1 Collection: new Educ.ar DVDs with animated info graphics, videos (some of them in 3D), interactive materials on Argentine art, maps, historical documents, didactic sequences, games, programmes and virtual libraries to work with the principal disciplines of Secondary education.

— Permanent training of the teachers and directors of the schools.

4.1. Evaluation, monitoring and research of the PCI

The PCI created the Evaluation and Monitoring area designed to identify and measure the curricular, institutional, interpersonal and social

impact of the programme's implementation. Among the main actions carried out are: monitoring the delivery of the netbooks to the school community, research regarding how teachers, students and their families link with new technological tools and content, documentation and evaluation of the processes of change in middle schools and teacher training institutes across the country, and the registration of the technical and pedagogical difficulties, as well as the main advances and challenges to solve in the upcoming phases. Simultaneously, agreements were signed with eleven national universities to produce research that account for the impact of the PCI. These universities are: University of Avellaneda, Central University of the Province of Buenos Aires, Jauretche University, University of Chaco Austral, Rosario University, University of Cuyo, University of Lomas de Zamora, Rio Negro University, University of Southern Patagonia San Juan Bosco, University of Jujuy and University of Rio Cuarto.

According to the official report "New voices, new scenarios: Evaluation studies on the Connect Equality Programme" (2011) commissioned by the Office of the President, the implementation of the Programme is implying a profound transformation, and in studies recently presented it is seen as the foundation of a new school: in this sense, the word "revolution" appears again and again in the accounts used to describe the programme. As a universal programme, it marks a qualitative difference in terms of equality and raises the awareness of the right to secondary education, knowledge and the use of technologies.

The evaluation of the executive branch of the Argentine Nation, the PCI has made possible the access to technologies to school populations for which according to their degree of Unsatisfied Basic Needs (NBI) they would have never accessed on their own. Moreover, the fact that the netbooks are property of the students, an increase of enthusiasm and motivation to study are evident. As for negative aspects of the implementation of the programme, the government emphasizes the lack of ICT competencies among teachers, technical problems arising from the utilization of the netbooks, and lack of adequate connectivity, among others.

In spite of different official documents of the government, for example the one published by the Ministry of Education of Argentina, "Information and Communications Technologies in the school: outlines,

keys and opportunities for their educational integration" (2007), postulating the most fundamental principles of constructivist learning and the collaborative classroom model, I did not find clearly definied tools that explain how ICT can be effectively usedunder the above mentioned principles. It is worth nothing that this absence of elements that guarantee and / or at least test the use of ICT as an epistemic tool, for collaborative learning, and for the construction of knowledge, ends up being one of the principal demands of the teachers and the principals of schools in the province of Córdoba.

4.2. The effective use of ICT in the classroom: the case of the Province of Córdoba

The province of Cordoba is one of the most important in Argentina. With 165,321 km² of land, it is the fifth largest province of the country, occupying 5.94% of the total area. According to the 2010 national census Cordoba has a population of 3,308,876 inhabitants, making it the second most populous province of Argentina. Nearly 40.18% of the population is agglomerated in the provincial capital, with 1,329,604 inhabitants, making it the country's second largest city after Buenos Aires.

Currently, the governor of the province of Córdoba, José Manuel De la Sota, is an active part of the opposition to the government of the country led by Cristina Fernandez De Kirchner. This situation often brings about conflicts of interest and a juxtaposition of the tasks undertaken. As an example, we mention the co-existence of the PCI with the following undertakings of the provincial government:

I) Back to School 14-17 Programme: The inclusion Programme for completing secondary education and job training for youth aged 14 to 17, enables adolescents who have dropped out of school or have not started, to complete their studies through an educational service, which because of its flexible design, allows each student to build their own educational path. The programme is conducted in 31 schools - 20 in the Capital and the rest in other cities-, which currently provide secondary education.

II) Provincial Programme More and Better Schools: among its objectives are the improvement and expansion of educational services by

through school infrastructure and support to education in contexts of poverty. The Programme aims to strengthen the pedagogical and institutional management of a group of common and extended day schools through the fair distribution of material and symbolic resources, including the following:

- Provision of textbooks to 187 primary and secondary schools and to 15 teacher training institutes (IFDs).
- Provision of educational materials to the above mentioned educational institutions at all three levels.
- Teacher training aimed at improving the educational management of the participating schools.
- Joint projects between primary and secondary schools and teacher training institutes, aimed at improving education and reducing school dropout.

III) Provincial Programme of Students Scholarships: incentive to complete secondary education.

5. CASE STUDY

The following proposal for academic research is based on the criteria of systematicity, empirical methods and critical thought.

As I stated in the beginning of this work, my stay in the province of Cordoba, thanks to *Roots Programme,* was an opportunity to analyze certain aspects related to the effectiveness of the PCI, and the results are detailed below:

a) The overall objective of this study was to understand the pedagogical, institutional, and instrumental dimensions of PCI's implementation in the Province of Córdoba, and analyze its potential and critical aspects at education institutional level and in the life of the subjects involved.

More specifically, the following objectives were proposed:

a.1) Describe the type of connectivity available in the centers where the programme is carried out

a.2) Describe the amount of equipment (netbooks) delivered to the centers where the programme is carried out

a.3) Analyze some of the actions developed by the PCI, in terms of training and teacher education and the use of ICT as a tool for construction and collaboration of knowledge by the faculty.

b) Methodological framework: the research approach was quanti-qualitative. To carry out this medium-scale research project, and to reach the established objectives that had been set during October and December 2012, we put into practice field work that allowed us to gather a statistical samples taken from over 800 individuals, all of them inhabitants of different cities in the province of Córdoba.

The different criteria that orientated our work are the following:

- Use of verifiable procedures that can be extrapolated to other situations.
- Empirical transposition of theoretical concepts used, through specific classifications and orders.
- Analytical sistemacity in the management and interrelation of the empirical data and the theory used.
- Systematic utilization and incorporation of data and previous studies on the subject in question, as background knowledge.
- The search of predictability in the interaction of the present objects and actions with similar ones in the future.
- Research, evaluation and analysis with a critical perspective.

The research team consisted of four people: a director and three technicians- assistants, who were responsible for carrying out the interviews. Their profiles were consistent with the topics addressed: graduates in Education Sciences and researchers in social sciences.

Following Tayie (2005), the steps that guided the development of the work, are listed as follows:

- Selection of the research problem
- Review of the literature and existing theory on the selected problem
- Determination of the methodology
- Data Collection
- Analysis and interpretation of data
- Presentation of the results of the study

Based on this procedure, the study aims to achieve the following basic criteria of validity and acceptance:

I) Verifiable and extrapolatable procedure to similar situations

II) Base practice with the intention of linking abstract concepts with the empirical world

III) Analytical systematicity in the management of data and theories

c) Review of the existing literature on the selected problem

The literature review on the topic that we decided to investigate, allowed us to confirm that the realization of this examination would be one of the first projects aimed at observing and analyzing the effects of applying 1:1 systems in Argentina, in general, and in the Córdoba Province, in particular. We know of the existence of surveys and observations of teaching practices in different subjects and general scholarly practices, conducted in schools in various provinces at different times during the implementation of the Conectar Igualdad Programme. These early investigations, carried out from the second half of 2011 onward and focused on surveying the operation of 1:1 models in schools and classrooms, we highlight those performed by the "Monitoring and Evaluation" area of the Conectar Igualdad Programme, initially commissioned by the National Ministry of Education. Added to this initiative, are the studies conducted by the Education portal of the Argentine State (Educ.ar). The last document we want to mention was developed in June 2013, when UNICEF released the report "ICT policies in education systems of Latin America. The Case of Argentina."

d) Instruments: structured semi-structured individual interviews, conducted both in person and via internet.

During the months of October, November and December of 2012, a team of four researchers, headed by the author, applied these instruments in various educational institutions and government agencies in the province of Cordoba. We are talking about more than 800 structured and semi-structured interviews, which accounted for the following dimensions of analysis:

e) Dimensions of analysis: based on the Monitoring and Evaluation report developed by the Ministry of Education of Argentina (2011), we

pointed out three vital elements when implementing a 1:1 programme, such as the PCI:

- Facilities
- Connectivity
- Teacher Education and Training based upon constructivist and collaborative learning

f) Sample: We have worked with a sample representative of the Teaching Training Institutes of the Province of Cordoba. The total sample includes **837** directors, government officials and teachers of different rank and at different levels of the education system across the province.

The participating institutions were: Ministry of Science and Technology and the Ministry of Education of the Province of Córdoba, the School of Educational Sciences of the Faculty of Philosophy and Humanities at the National University of Cordoba., the Center for Advanced Studies of the National University of Cordoba, the Laboratory of Science Education and Technology, Faculty of Exact, Physical and Natural Sciences, Teaching and Higher Training Schools of the cities of Cordoba Capital, Cosquín, Bellville, Villa Maria, Corral de Bustos, Mina Clavero, and San Francisco, all of the province of Córdoba.

In summary:
Total institutions involved: 15
Interviews with government officials: 7
Interviews with directors: 33
Interviews with teachers: 797

VARIABLES	INDICATORS	INSTRUMENTS	ACTORS
Teaching practice	Type of use and activities: constructivist and collaborative	Structured and Semi-structured Interviews	Teachers Directors Public Officials
Equipment	Quantity of equipment available in the centers	Structured and Semi-structured Interviews	Teachers Directors Public Officials
Connectivity	Level of connectivity of the centers	Structured and Semi-structured Interviews	Teachers Directors Public Officials

g) Data analysis

The data collected allowed us to identify priorities, needs, and concerns of the different members of various school communities regarding the inclusion of ICT in education, in particular on the implementation of the Conectar Igualdad Programme.

As a first significant observation, we found that most of the cases surveyed have a special concern for knowledge and everyday use of the tools in the classroom in order to provide assistance in carrying out their teaching activities. This leads us to think that, in most cases, there is an instrumental approach on these types of programmes which aim to promote the use of ICT in the education system.

As a result of this, we understand that undertaking an instrumental approach regarding the use of ICT, leads to a sense of dissatisfaction and insufficiency regarding the availability of resources for teachers. Indeed, the cumulative view of technology creates a sense of dissatisfaction, as it tends to move at a rapid pace and is generally dominated by marketing criteria rather than educational purposes.

Thirdly, the Internet connectivity seems often to be more a hindrance rather than a benefit. In many cities, especially the small and rural ones of the Province of Córdoba, the issue of connectivity has not been resolved. This is a reality that reveals itself by listening to the demands of the teachers whose claims can be synthesized in the following the following examples:

> "... What purpose do the computers serve if we do not have an internet connection?... " Olga R (Teacher from the city of Ischillín, Córdoba).

> "... It is very difficult to work when you do not even have electricity)."

Alternatively, we note that in most of the cases consulted, it was expressed that ICT was done in a collaborative and constructivist manner ("... I always work collaboratively, so I want to achieve the promotion of teamwork...; Ricardo M, Cosquín city, Cordoba), but also in most cases, a lack of well-defined tools did not demonstrate that they actually worked this way ("... I realize that we work collaboratively because all the kids and us teachers all set in a circle draw on the floor..., Ricardo M. Cosquín city, Córdoba). This leads us to the assumption that despite the

desire to work collaboratively, the teachers have neither the consciousness nor the concrete tools to ensure this type of practice.

6. CONCLUSIONS

According to what was observed of the participants during the training meetings one can conclude that:

- 76% stated not having enough knowledge to work with ICT in a constructivist manner
- 60% stated not having enough knowledge to work with ICT in a collaborative manner
- 39% stated having connectivity problems
- 15% stated not having received the netbooks by the PCI
- 22% expressed not approving of the PCI

For these reasons, we are able to confirm that most of the respondents (78%) were generally satisfied with the implementation of the programme. We also found out that a significant number do not have enough power and quality connection, and actual equipment (netbooks) on the premises, but the most significant deficit lies in the knowledge and skills of the actors. Most of them (76%) reported not having enough knowledge to work with ICT in a constructivist manner, and 60% do not have sufficient collaborative tools to work with ICT. In this sense, two levels of actual knowledge is presented by the actors: explicit and implicit knowledge.

We define implicit theories in according with Mortimer (1998), who claims that learners act through them but not consciously, and are often incoherent and inconsistent, and sometimes incompatible. While away from the scientific, are highly predictive, that is, useful for everyday use, but not explanatory anticipate events but do not understand them in its real dimension; (Marchesi & Martin, 2000). In this sense, most respondents referred explicitly working from constructivist and collaborative. But implicit in this is reversed sharply, as they were very few who could give an account of their work with ICT under these two positions.

As is pointed out by Delval (1997), representations of concepts are shaped a certain way, are implicit, and can be made explicit only partially in some cases. As indispensable guide for action, involving external

behavioral expectations, and although personal, are usually shared. The author notes that, while explicit theories are a more elaborate type of representation aimed at eliminating contradictions, does not always happen the same with implicit representations. With the aim of highlighting distinctive aspects of implicit theories, Glaser (2001) defined as more vague, inconsistent and vague, being subject to the action. According to the points made by Vosniadou (1994) and Vosniadou and Brewer (1992), implicit theories are embodied deeply, and therefore hold great emotional component, making it very difficult change actions. For these reasons, although we believe it is essential equipment, connectivity and basic resources to implement a plan like the one presented a study, we believe no less important to reinforce the training plans in general, and those who call into question aspects linked to constructivist and meaningful learning with the support of ICT.

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11. CHILDREN'S PRACTICES OF ICT AND SOCIAL INEQUALITIES: ON THE USES OF THE MAGALHÃES COMPUTER IN TWO SCHOOL COMMUNITIES

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ABSTRACT

This paper addresses the Portuguese government measure that introduced a laptop - the Magalhães computer – in primary education as an attempt to extend the social base of the use of ICT. It tries to give an account of family adhesion to this computer, of some of its uses by children in different contexts, and of the question of inequality in opportunities and uses of ICT.

It was based on two studies conducted in schools from two towns in different Portuguese regions. Their methodological design took a longitudinal stance and included a quantitative strand through a survey with teachers, parents and children, as well as a qualitative strand through interviews with teachers and parents and the ethnography of a class in each setting.

Data revealed: a) a strong adhesion to the Magalhães; b) its regular use by children (mainly at home, secondly, at school, and, thirdly, in other contexts), predominantly under their own initiative; c) the existence of a greater proportion of other computers at home by families with higher academic qualification; d) a more frequent and widespread use of the Magalhães at home by children of parents with higher academic qualification; e) a significantly uneven family support, which is stronger in socially advantaged groups; and f) less imposing rules on the use of the Magalhães at home by families with lower academic qualification.

Data suggest a double trend: a) a widespread acquisition of the Magalhães; and b) a selective use of the computer by the different social groups, accompanied by family mediation that is also selective. This means that, although the first political goal of the programme has apparently been fulfilled, it still lacks the next step, which addresses the effects of the socially differentiated uses of ICT at school and at home.

***Keywords:** Children practices; ICT; Social Inequalities; Education; Home-School Relations*

1. INTRODUCTION

In 2008/2009 the Portuguese government introduced the Magalhães (Magellan) computer (MC)[1] in the 1st cycle of basic education (CBE)[2]. It was a political measure that has raised the question of extending the social base of the use of information and communication technology (ICT), not only in schools but also in other contexts, such as in the family. This paper tries to give an account of family adhesion to this computer,

1 Named after Fernão de Magalhães (Ferdinand Magellan), the Portuguese navigator who was a pioneer for having discovered the passage from the Atlantic to the Pacific Ocean in the 16th century.

2 Our school system comprises three Cycles of Basic Education (CBE) and the Secondary School (10th through 12th grades) as compulsory education. The 1st CBE corresponds to the 1st through 4th grades (primary school); the 2nd CBE corresponds to the 5th and 6th grades; and the 3rd CBE corresponds to the 7th through 9th grades.

of some of its uses and their respective contexts, as well as to equate the question of inequality in opportunities and uses of ICT, based on two similar empirical studies conducted in schools from two towns in different Portuguese regions.

2. ICT, EDUCATION AND SOCIAL INEQUALITIES

We live in an era in which the role played by the so-called information and communication technologies (ICT) is increasingly more significant. For Castells (2007), although knowledge and information are important in pre-industrial societies, the uniqueness of the informational mode of development is that the production, processing and transmission of information constitute the main basis of productivity, made possible through the development of ICT and introducing a set of social relationships and structures. The development of ICT boosted forms of interaction, collaboration and activity among people, providing new possibilities, proposals and learning contexts, as well as opportunities to get acquainted with others and to acquire general knowledge and knowledge in specific fields (Viana, 2009). Thus, for children and young people who are born and grow up in a world of networked technologies - the "digital natives" (Prensky) or the "Internet generation" (Tapscott) - technologies become natural. They are instruments in their daily lives. On the contrary, for many adults, technologies mean an increased effort of learning ("digital immigrants", Prensky, 2001) to adapt to new social contexts, work and communication with others.

On the other hand, the problem of illiteracy does not arise like in the past. In developed countries, this issue has to do with the levels of literacy and the "info-excluded". As such, one of the serious challenges faced in today's society is related to social inequalities and the underlying power relations, which is a phenomenon that has assumed different names, such as info-exclusion, digital divide and digital gap. We are thus faced with a type of divide between two groups: those who have and those who do not have access to information technology. Recent research has made the contours of this divide visible (Cardoso, Costa, Conceição & Gomes, 2005; Cruz, 2008), and point to a complex and multifaceted reality. Thus, on the one hand, Almeida, Delicado and

Alves (2008) suggest a rapid spread in the use of computers and the Internet, with some blurring of social inequalities among children and young people at school; while on the other hand, Rodrigues and Mata (2003) note that the use of ICT has a stronger correlation with the level of academic qualification than with age, and thus blurring the generational effect (statistics show higher rates of ICT use in younger people because they are students, so they tend to be more skilled). In parallel, recent data show that in Portugal the number of children who use computers has increased, while at the same time the advantage that this group had on adults in the use of Internet has diminished (EU Kids Online, 2011; Ponte, Jorge, Simões & Cardoso, 2012).

Education has therefore become one of the key areas of intervention in face of the low levels of digital literacy and the underlying social inequalities found in Portugal. In the area of education, ICT holds a lot of potential. For schools, the computer and the Internet are seen as tools capable of enhancing new practices and new pedagogical relationships. Thus, ICTs are increasingly present in this milieu, even though technological renovation in schools does not necessarily imply pedagogical innovation (Coelho, 1992). Additionally, several studies point to the advantage of a prudent view regarding the effects of ICT, stressing that the simple application of ICT, without changing the practices of teaching and learning, does not induce significant changes in educational systems (Eurydice, 2001; Miranda, 2007).

Denoting an increasing weight in the schools, ICT are also increasingly present at home (INE, 2009), particularly in the case of families with school-age children. Incidentally, children's schooling arises as the main reason for families to acquire a computer and the Internet, as emphasized by Rodrigues and Mata (2003). For this reason, families with dependent children have more computers in comparison with those without dependent children (Almeida et al., 2008). Moreover, research suggests that not all families are proving to be equally equipped to perform their role in the "game" of school investment, noting inequalities in the mobilization for the education of their children, according to the sociological divide that permeates home-school relationships (Diogo, 2008; Diogo & Silva, 2010; Silva, 2003). Regarding the use of ICT, it is mainly the most socially advantaged groups that have such benefit

(Almeida et al., 2008). However, another study showed that extending the educational use of computers at home to different social groups can be translated into greater academic success (Fuch & Wossman, 2004). Thus, ICT may configure itself as a resource and an opportunity to access knowledge, with the potential effect of "compensating" the original social environment. However, this is not guaranteed and is even less automatic.

Research also shows that ICT can enhance communication in the relationship between families and schools, with the school and social effects that can arise, namely for children (Martinez-Gonzalez, Perez-Herrero & Rodríguez-Ruiz, 2005; Wiedemann, 2003). Thus, questions can be raised concerning the relationship of actors situated in family and school contexts. ICTs seem to open new channels of communication and participation, enhancing family-school interaction and possibly becoming a (material) medium that may contribute to the (socio-cultural) mediation (Silva, Coelho, Fernandes & Viana, 2010) between the school culture and the local culture, when considering home-school relations as a relationship between cultures (Silva, 2003). However, it is possible that some of the traits that have marked this relationship persist. Families are not a homogeneous group, and it is likely that their relationship with ICT not only varies depending on factors such as social class or ethnicity, but also on generation and gender, two key elements in intra-family relationships, as well as relationships with school.

3.A STUDY IN TWO SCHOOL COMMUNITIES

In this section, we briefly present the nature of our study, including the main tools for collecting and processing the data, as well as a characterization of the two school communities where the empirical work was conducted.

3.1. About the research

Both studies were conducted with a longitudinal approach (2009-2011) and are anchored in an ontological and epistemological stance of phenomenological nature, which is attentive to the intersection between

the deductive and the inductive, integrating an extensive component - based on surveys of teachers (four questionnaires)[3], parents (two questionnaires)[4] and students (two questionnaires)[5] - and an intensive one (through interviews with teachers and parents and the ethnography of a selected class in each of the two educational territories). The quantitative data were statistically analysed using SPSS and the qualitative data using thematic content analysis.

The research seeks to answer questions such as:

— Which social actors are linked to the Magalhães computer?

— What social representations do the different social actors have about the Magalhães computer?

— Who has and has not acquired the Magalhães computer? With or without the Internet? Why?

— What is the sociological profile of the acquirers of the Magalhães computer? And of the non- acquirers?

— Who uses the Magalhães computer (which social actors)? In what contexts?

— What are the modes of regulation of those uses? By whom? In what context?

— What are the uses of the Magalhães computer? In what contexts (classroom, playground, home,...)?

— What are the school and social effects of the uses of the Magalhães computer for the different social actors and in their interactions? In particular, in the classroom and in home-school relations.

— What characteristics singularize the Magalhães computer in comparison to other computers? And in comparison to the other didactic material? What are the effects that result from this singularity?

3 INQD1 (June, 2009); INQD2 (November, 2009), INQ3 (June, 2010) and INQD4 (June, 2011).

4 INQP1 (June, 2010) and INQP2 (June, 2011).

5 INQC1 (November, 2010) and INQC2 (June, 2011).

3.2. The school communities

The research was conducted in two sets of public schools, one based in the city of Leiria (Leiria Group of Schools) and the other in the city of Ponta Delgada (Integrated Primary School of Ponta Delgada).

The Leiria Group of Schools (LGS) is made up of eight Kindergartens, ten Primary Schools and one school for the 2nd and 3rd Cycles of Basic Education (CBE). In the school year 2009/10 the LGS had 1652 students, including 561 in the 1st cycle (1st through 4th grade). There were 185 teachers, distributed across the four levels of education, with 30 teachers in the 1st cycle.

The social environment of the five covered parishes includes a mix of urban and semi-urban influence and families with a wide range of academic qualifications and professions, with a significant number of middle class families. According to the survey of parents, over 90% of fathers and mothers are between 30 and 50 years old, with the fathers a little older (50% over 40 years old, compared with 37% of mothers). Regarding education, the majority has 2nd CBE, 3rd CBE or Secondary education (10th through 12th grade), with fathers having a slightly higher academic qualification (almost 30% with secondary and 14% with higher education, versus 18% and 10% of mothers, respectively). Regarding professions, more than 55% of fathers have blue-collar occupations (working class, agriculture/fishery), nearly 25% have administrative and service professions at an intermediate level and 16% have higher-level positions (senior staff, CEO and intellectual and scientific professions). As for the mothers, the distribution differs somewhat, with the majority working in administrative and service sectors. 10% of the women declared themselves as housewives. Also, 16% of the women have higher-level position. In general, there is social heterogeneity among the parents, with some preponderance of the working classes. There are about fifty immigrant families from Brazil, PALOP (Portuguese Speaking African Countries), Eastern Europe, China and Morocco.

The Integrated Primary School of Ponta Delgada (Ponta Delgada IPS), where the second study took place, consists of a total of seven schools, five of which include the 1st CBE. In 2009-2010 it had 204 teachers (79 in the 1st CBE) and 1949 students (978 in the 1st CBE).

The schools are located in urban and semi-urban parishes of Ponta Delgada, welcoming a socially heterogeneous student population, albeit with a considerable presence of beneficiaries of social welfare (58% in the case of the 1st CBE, in 2008-2009). As in Leiria, there is significant diversity of professions and education levels in the households. According to the survey of parents, more than two thirds of households have nuclear families, composed of both parents and children. The remaining are mostly single-parent households (13%), extended families (8%) and structures consisting of only one parent, child/children and other family members (5%). Fathers have a relatively higher average age than mothers: 38.7 years and 35.6 years, respectively. Regarding the level of parent academic qualification, there is a predominance of intermediate levels, with most having 2nd and 3rd CBE: 45% for mothers and 51% for fathers. Mothers tend to have higher level of academic qualification: 34% have a secondary or higher education degree, compared with 24% of fathers. As for the professional category, there is a greater incidence of more under qualified occupations in the case of the father (43%). In the case of mothers, there is a prevalence of intermediate categories, such as administrative and personnel services and sales (38%). Only 10% of fathers and 11% of mothers have senior management positions (senior managers, CEO and intellectual and scientific professions). Also, 18% of mothers are housewives.

4. TAKE UP AND USES OF THE MAGALHÃES COMPUTER BETWEEN HOME AND SCHOOL

We will present some of the main results regarding the acquisition of the Magalhães computer, its uses by children at home and at school, and the family role in the mediation between the two worlds of children: home and school. Simultaneously, whenever possible, we will cross these data with the issue of the social inequality of their uses and of family mediation. This second aspect, less common, will allow us to better check some possible social effects of the e.escolinha programme[6]. This is a case study (strictly speaking, a multi-case study), and as the

6 "E.escolinha" (literally meaning "e.little school") is the official name of this government initiative.

nature of qualitative studies does not allow generalizations, but instead contributes to a thorough examination of social processes with the consequent production of theoretical clues, it should always be confronted with other empirical studies.

The presented data result from the original final reports of each of the two projects (Diogo, Gomes & Barreto, 2011; Silva, Coelho, Fernandes & Viana, 2011).

4.1. Take up to the Magalhães laptop

We have noted that the Magalhães computer, through the e.escolinha programme, was the target of widespread acquisition by the families of both school communities. Thus:

- In the Leiria group of schools, initially 80% of families came into ownership, but with significant differences from school to school: between 95% and 28%. However, this acquisition has been increasing, with 89% ownership in 2009-2010 and 93% in 2010-2011. The data also show that upon arrival of the Magalhães computer (2008-2009), 94% of those on social welfare and 64% of those non-integrated on social welfare acquired the laptop;
- In the Ponta Delgada group of schools, the Magalhães computer was required by 92% of the families, ranging from 86% to 97%, depending on the school. Contrary to what happened in Leiria, and throughout the mainland, in the Azores there was just a phase distribution, and the equipment arrived at Ponta Delgada at the end of the 2008-2009 school year. During the second phase of national distribution, the programme e.escolinha was cancelled in the region.

Previous data suggest that this acquisition has led to a democratization of access to these technologies in the two school communities (Silva & Diogo, 2011), in which the slightly lower acquisition by the Leiria middle class families occurred when there was, in general, at least one computer at home (Silva et al., 2011). Table 1 shows that the possession of the laptop varies little in relation to the parents' academic qualification. The data presented below was meant to analyse

how this initially observed democratization of access was translated in the uses by children from different social groups.

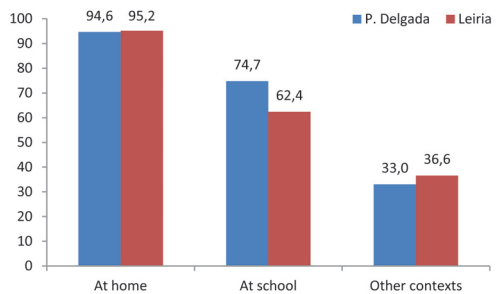
Table 1: Ownership of the MC according to the parents' Academic Qualification (%)

	LEIRIA		PONTA DELGADA	
	Father	Mother	Father	Mother
≤ 1st CBE	92,6	88,9	86,4	85,4
2nd/3rd CBE	93,1	93,5	88,3	86,3
Second./University	79,6	83,3	85,4	91,0
N	174	174	250	250

Source: INQC2

4.2. Contexts of the Magalhães use by children

The crossover of information collected from parents and teachers shows that children used the laptop in different contexts, albeit with different intensities and situations.



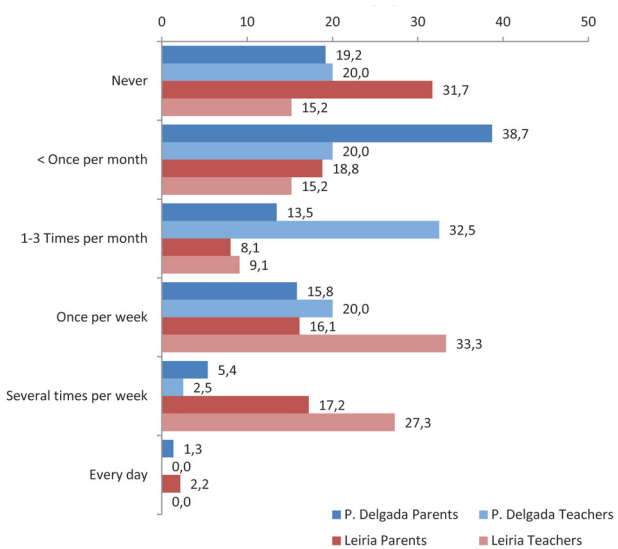
Source: INQF1
Note: Percentages calculated in relation to the total of those who possess the MC. Ponta Delgada: N = 297; Leiria: N = 186.

Figure 1: Magalhães use by children in different contexts (%)

After roughly a year of use, the computer was widely utilized at home by the children: 95% in Ponta Delgada and 95% in Leiria of those who possess the laptop, according to the parents, which represents 85% of total households surveyed in Ponta Delgada and 84% in Leiria. In

78% of Ponta Delgada families and 74% of Leiria families who have the equipment, the children use it at home at least once a week, and in 63% (Ponta Delgada) and in 55% (Leiria) of families, they use it several times a week or every day. Thus, we noticed regular use of the Magalhães by children at home.

The computer was also used by children in school activities, but more sporadically than at home. According to parents, 75% of Ponta Delgada children and 62% of Leiria children who have the laptop use it in class with the teacher. As for the teachers, 75% in Ponta Delgada and 76% in Leiria, surveyed in July 2010, stated that their students used the Magalhães in the classroom. We notice two aspects in this regard: a) the coincidence of values about computer use in the classroom in Ponta Delgada between parents and teachers b) some non-coincidence of these same values between parents and teachers in Leiria, with teachers indicating higher use.



Source: INQF1 and INQP1
Note: The percentages of parents were calculated in relation to the total of those who possess the MC (Ponta Delgada: N = 297; Leiria: N = 186) and the percentages of teachers to the total of inquired (Ponta Delgada: N = 40; Leiria: N = 33).

Figure 2: Frequency of Magalhães use in the classroom, according to parents and teachers (%)

However, there is one common aspect: the data in both communities point to use with low regularity. Only 23% of Ponta Delgada families and 36% of Leiria families, in which there is a laptop, indicate that the child brings it to school one or more times per week, which seems to show a smaller, but slightly more regular use of the Magalhães in the classroom in Leiria. The computer arises primarily as a resource that is sporadically used in the classroom. According to parents, 58% of children in Ponta Delgada and 51% in Leiria never use it or use it occasionally (less than once a month), while teachers say that it is 40% and 30% (Ponta Delgada and Leiria, respectively). On the other hand, 23% of Ponta Delgada teachers and 61% of Leiria teachers indicate that the computer is used in class at least once a week. According to 53% of Ponta Delgada teachers and 24% of Leiria teachers, the Magalhães computer is used by students less than once a week in the classroom. In other words, teachers tend to indicate higher frequency of use of the Magalhães in the classroom when compared with parents, with this gap being most notorious in Leiria. Especially in the latter case (Leiria), we have doubts about whether the teachers are presenting politically correct information, to the extent that additional information points to lower effective use of the MC in the classroom.

In addition to the family and classroom spaces, the Magalhães computer is used elsewhere by 33% of Ponta Delgada children and by 37% of Leiria children who have the equipment, according to the parents. The regularity with which the computer was used in other places (outside the home and the classroom) is far less than its use at home: only 12% of children from Ponta Delgada and 8% from Leiria use it several times a week or every day, with the main location for such use in the homes of relatives and friends (98% and 90%, respectively).

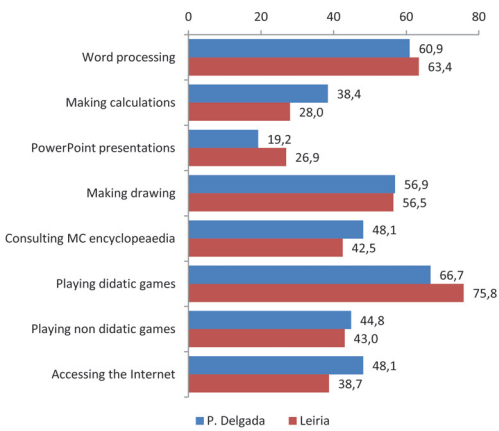
In both communities, the Magalhães computer was also used elsewhere, beyond the homes of relatives and friends. Although quantitatively unimportant, other contexts cover a diversity of locations, indoors and outdoors, such as the school playground, at leisure time activities, wireless spaces, commercial and food spots, libraries/museums, tutoring centres, gardens/parks, streets or cars, confirming the versatility of the laptop.

4.2.1. Uses of the Magalhães computer at home

In this section we describe the uses of the Magalhães in the home, which was the chosen context of use by the children. The data (Diogo et al., 2011; Silva et al., 2011) reveal that this household use derives largely from the initiative of the child, which led us to postulate that the Magalhães becomes a true personal computer for him/her. Working class families are the exception, where we noticed that the Magalhães is also used with some regularity by other family members, including siblings, and thus it partially emerged as a family computer.

4.2.1.1. Characterization of its uses by children

As for what the child does on the Magalhães computer at home, parents explain a variety of uses, emphasizing the educational uses and those more compatible with schoolwork.

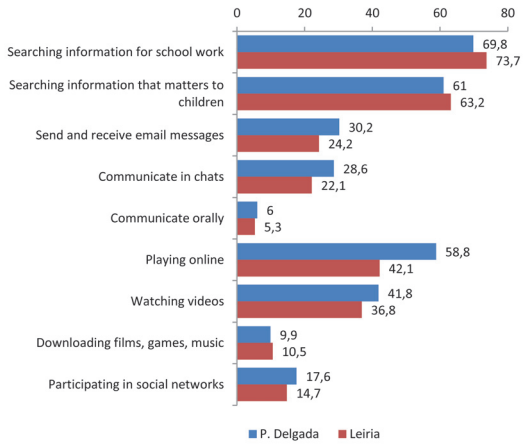


Source: INQF1
Note: Percentages calculated in relation to the total of those who possess the MC. Ponta Delgada: N = 297; Leiria: N = 186.

Figure 3: Activities usually done at home by children with the MC (%)

In both contexts, educational games (67% and 76%) and word processing (61% and 74%) stand out among the uses. Secondly, use for making drawings (57% and 57%), consulting encyclopaedias on the

computer (48% and 43%), Internet access (48% and 39%) and non-didactic games (45% and 43%) are mentioned.



Source: INQF1
Note: Percentages calculated in relation to the total of those who possess the MC. Ponta Delgada: N = 182; Leiria: N = 95

Figure 4: Children's use of the Internet on the Magalhães at home (%)

Accessing the Internet appears as the most frequent use, according to the parents, for researching information for schoolwork (70% and 74%) and subjects that interest the child (61% and 63%). These uses occur more than most recreational uses, such as playing online (59% and 42%), watching videos (42% and 37%) or downloading movies, games or music (10% and 11%). Also, uses that involve communication with others occur less than researching information (30% and 24% send and receive email messages, 29% and 22% communicate in written chats, 18% and 15% participate in social networks, 6% and 5% communicate orally).

As we see, both in the uses of the Magalhães, in general, or of the Internet, in particular, there were no significant differences between Ponta Delgada and Leiria.

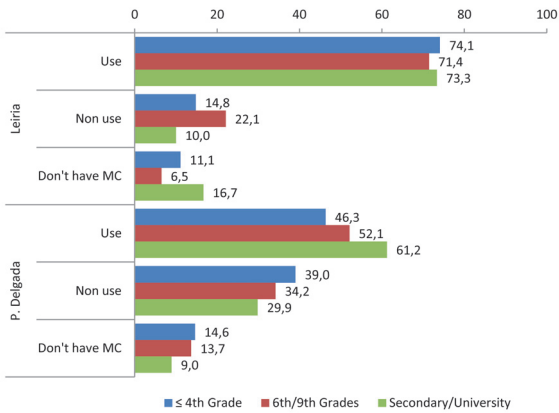
4.2.1.2. Uses at Home by Different Social Groups

To analyse the uses of different groups in society, in order to not overload the text, we took into consideration the academic qualification of

parents. In most cases we present only the data related to the mother since she is the one who more often supervises children's use of computers in school and in general, including the Magalhães laptop (Silva & Diogo, 2011).

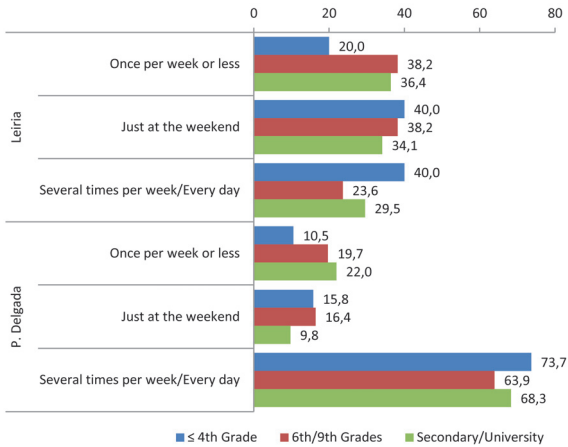
In examining the percentage of children who used the Magalhães computer at the end of the 2010-2011school year, by level of education of the mother, in Figure 5 we noticed some inequalities in both school communities, particularly in Ponta Delgada. In Leiria, although the proportion of children who use the computer is about the same in the various levels of academic qualifications, we note that it is in families where the mother has higher academic qualification that there are: (i) more cases of children who do not have the laptop (which matches the previous observations), (ii) fewer cases of children who do not use the laptop for breakdown. But it stands out that in Ponta Delgada there is less computer usage for breakdown associated with lower academic qualifications of the mother: 48% of children whose mother had the 1st CBE or less would not use the laptop for breakdown, and this percentage was substantially lower for those with higher education (28% in 2nd/3rd CBE and 29% in secondary/university). These results suggest other forms of inequality beyond the ownership of the equipment and that have to do with the ability of households to maintain the laptops, pointing out the limits of any programme that is limited to distributing computers to children.

Regarding the frequency with which children use the Magalhães, there are also noticeable differences in use, with regard to the mother's academic qualification (see chart 3). A higher proportion of children with less educated mothers use the laptop on a regular basis. In Leiria, 40% of children of mothers with the 1st CBE or less were using the computer several times a week or every day, while the same was true for 24% for those who have mothers with the 2nd/3rd CBE and 30% with secondary/university education. In Ponta Delgada, there is the same trend, although the differences are less marked: when the mother has the 1st CBE or less, only 11% of children use the computer with low regularity (1 time per week or less), whereas in families where the mother has secondary or higher education, use increases to 22% of children.



Source: INQC2
Note: Percentage in relation to the total of inquired, by level of academic qualification. Ponta Delgada: N = 250; Leiria: N = 174.
* Mostly owing to breakdown

Figure 5: Children who used the MC at the end of 2010-2011, according to the level of mother's academic qualification (%)

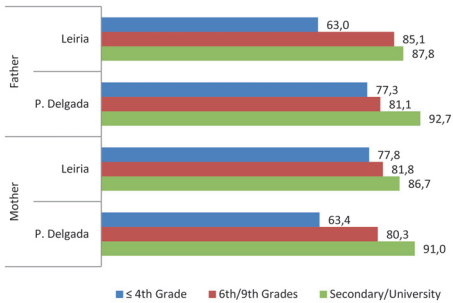


Source: INQC2
Note: Percentage in relation to the total of those who own the MC, according to the level of academic qualification. Leiria: N = 124; Ponta Delgada: N = 134

Figure 6: Frequency of the Magalhães use by children at home, according to the mother's level of academic qualification (%)

One of the possible reasons for this less regular use of the Magalhães by children from more educated families could be the use of other computers at home. Indeed, Figure 7 highlights a lower use of other computers in families where parents have a lower level of education in both school communities. In Leiria, 88% of children whose father has secondary/higher education use other computers at home, and 63% when the parent has the 1st CEB or less. Considering the mother's academic qualification, the trend is similar (87% and 78% respectively). The data are particularly contrasting in Ponta Delgada, if we look at the education of the mother: 91% (secondary/higher) versus 63% (1st CBE or less).

In short, despite a higher proportion of children in the most disadvantaged social groups who stop using the Magalhães computer due to equipment breakdown, those are also the same children who use the laptop more often, through more assiduous use, possibly because it is the only way for a significant number of these children to access new technologies.

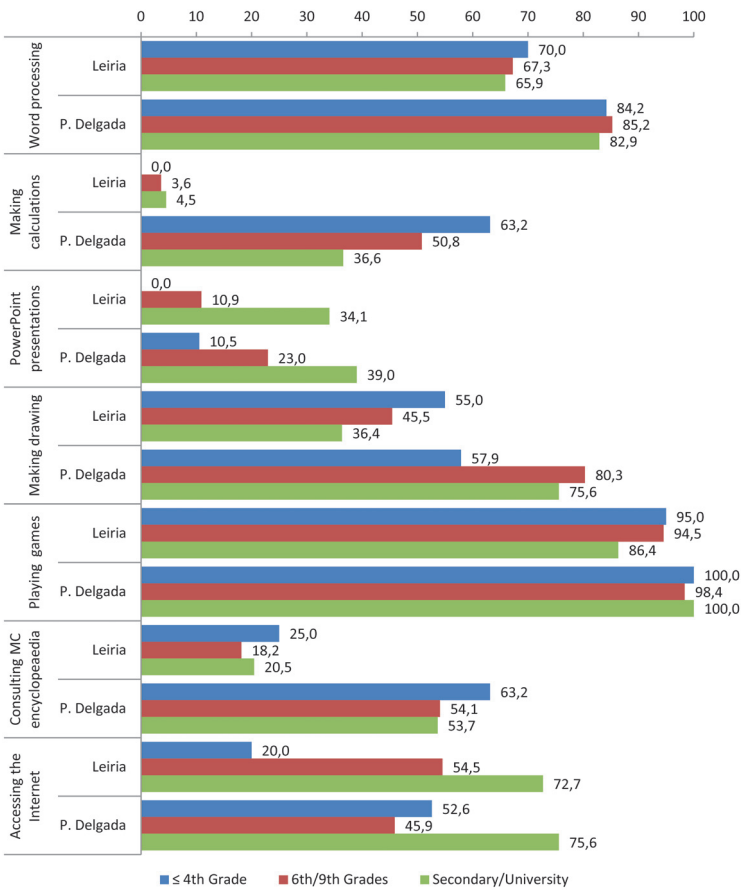


Source: INQC2
Note: Percentage in relation to the total of inquired, by level of academic qualification. Ponta Delgada; N = 250; Leiria: N = 174.

Figure 7: Usage of other computers by children at home, according to parents' academic qualification (%)

From analysing what kids do on the Magalhães, in relation to the mother's academic qualification, Figure 8 shows that word processing (ranging between 66% and 70% in Leiria and between 83% and 85% in Ponta Delgada) and games (ranging between 86% and 95% in Leiria, and between 98% and 100% in Ponta Delgada) appear as activities that generally occupy the children, regardless of their social background in

the two contexts under study. According to these data, children from various social groups seem to have generally appropriated the computer of the programme e.escolinha for activities of a diverse nature, suggesting some effect of democratization of use.



Source: INQC2
Note: Percentage in relation to the total of those who use the Magalhães. Ponta Delgada: N = 121; Leiria: N = 119.

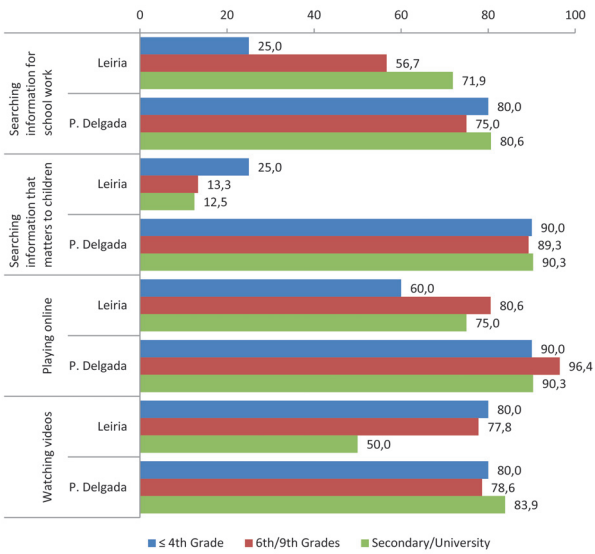
Figure 8: What children do on the Magalhães at home, according to mother's academic qualification (%)

Nevertheless, there are some socially dissimilar uses. This includes making presentations (PowerPoint or similar software), which occurred with children from families in which the mother is more educated, both in Leiria as in Ponta Delgada.

There is a similar pattern for Internet use in the two school communities, although in a more accentuated way in Leiria. There, only 20% of children from less educated families access the Internet on the laptop, in contrast to the more educated families in which the same is true for 73%. In Ponta Delgada, there are still relevant differences: 53% and 76%, respectively. Thus, the use of the Internet seems to be an important social divide in the uses of the notebook.

A higher percentage of children from families in which the mother is poorly educated also tend to consult the encyclopaedias on the laptop, in both contexts, but especially in Ponta Delgada, which is likely to be due to the fact that these children have less Internet access. Nonetheless, this is interesting in that there is a possibility to search for information in the encyclopaedias incorporated into the Magalhães itself, as part of the e.escolinha programme, which may have some compensation effect over the observed inequalities in accessing the Internet.

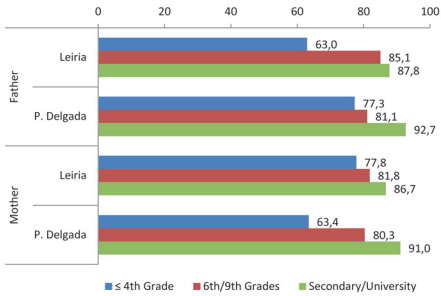
As for what the kids do on the Internet on the Magalhães computer, by the mother's academic qualification, Figure 9 shows different trends in the two contexts under analysis. In the case of Ponta Delgada, the various uses of the Internet differ slightly, depending on the mother's academic qualification. In any case, note that this use hides the previously found inequalities in access to the Internet. In Leiria, the previously mentioned inequality adds socially differentiated use of the Internet. Research for schoolwork and online games are most often performed by children of "more educated" mothers than by the "less educated"F: 72% versus 25% (in relation to research) and 75% versus 60% (in relation to games). In contrast, the search for information about issues that matter to children and watching videos are a more common practice in low SES families: 25% versus 13% (in relation to research) and 80% versus 50% (relative to watching videos). A more educational use by families with higher education was also observed in the context of other studies carried out in Portugal (Almeida et al., 2008).



Source: INQC2
Note: Percentage in relation to the total of children using the Internet on the Magalhães. Ponta Delgada: N = 69; Leiria: N = 65.

Figure 9: What children do on the Internet on the Magalhães at home, according to the mother's academic qualification (%)

The above results suggest that accessing the Internet is an important divide in the uses of the Magalhães, which corroborates other studies (Almeida et al., 2008). Thus, the e.escolinha programme seems to compensate little for the disadvantage of low SES children in accessing ICT, as observed in the use of other computers and demonstrated in Figure 10. It shows that the use of the internet on the other computers at home is quite marked by parental education in the two contexts: in Leiria, only 44% of children of parents with lower academic qualification (52%, considering the mother's education), while in families where the father has secondary/higher education the proportion is 82% (73%, considering the education of the mother). In Ponta Delgada, the contrast in computer use is even higher, especially considering the mother's academic qualification: 51% versus 90%, respectively, in the two extreme categories of education (64% versus 90%, considering the father's education).

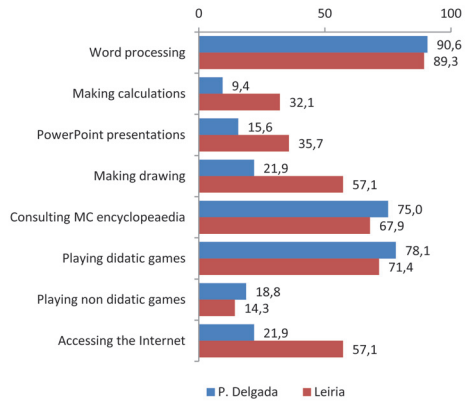


Source: INQC2
Note: Percentage in relation to the total of inquired by level of academic qualification.
Ponta Delgada: N = 250; Leiria: N = 174.

Figure 10: Children who use the Internet on the other computers at home, according to parents' academic qualification (%)

4.2.2. Uses of the Magalhães computer at school

The use of computers in the classroom, besides being sporadic, appears to be less multifaceted than at home, especially in Ponta Delgada.

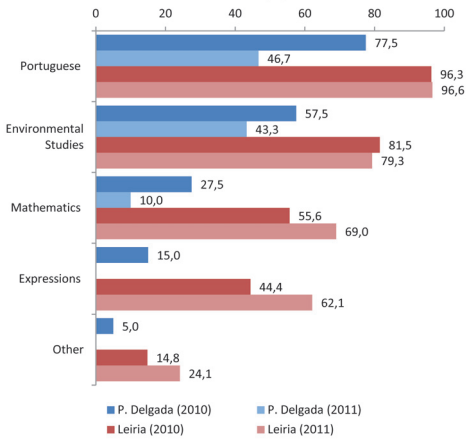


Source: INQD3
Note: Percentage in relation to the total of teachers who use the Magalhães in the classroom. Ponta Delgada: N = 32; Leiria: N = 28

Figure 11: Type of Magalhães' use at school by children (%)

In both communities, the use of the laptop in school activities reveals the same trend, and according to teachers, focuses on didactic

games (78% and 71%), consultation of encyclopaedias (75% and 68%) and, especially, word processing (91% and 89%). In relation to this, the curricular areas that are most common when using the Magalhães are Environmental Studies (72% and 79%) and Portuguese Language (97% and 93%). Mathematics (34% and 54%) and "Expressions"[7] (19% and 43%) include little use of the computer.



Source: INQD3 and INQD4
Note: Ponta Delgada: N = 40 (INQD3), 30 (INQD4); Leiria: N = 27 (INQD3), 29 (INQD4).

Figure 12: Curricular areas worked through the Magalhães use, according to teachers (%)

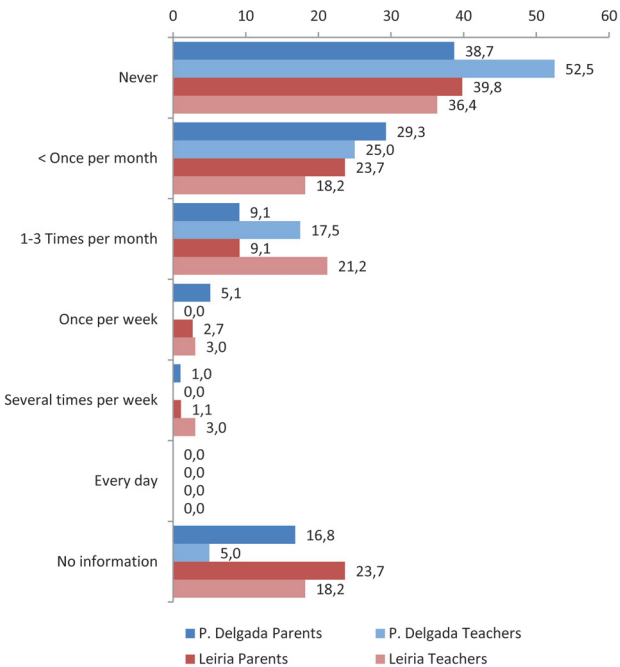
The big difference - unlike what happens at home – is related to the use of the Internet in the classroom, as this is rarely used in the teaching activities in Ponta Delgada (22%), contrary to what occurs in Leiria (57%). This disparity seems to be linked to the fact that there is limited Internet connection in the classrooms of Ponta Delgada schools, while in Leiria all school classrooms have a wireless network. When the Internet is used, it is mainly for research: 90% and 73%, while it is also used by 50% and 27% of students to play games (Ponta Delgada and Leiria, respectively). In the case of Leiria, accessing blogs is as significant of an activity as the games: 27%.

7 "Expressions" is a term that, in the Portuguese school context, encompasses subject matters such as arts and crafts, drama or music.

Data suggest that use of the Magalhães in school activities did not have any significant impact in the daily life within classrooms, which does not display a broad and effective integration of this resource in the teaching activities.

4.2.3. The Magalhães computer between home and school

Notwithstanding that the Magalhães computer is a portable device, offering the possibility of continuity between the work done in school and at home, and, as we have seen, to be used by children either at home (regularly) and at school (less frequently), it is not a widely and regularly used resource for homework in the two communities.



Source: INQP1 and INQD3
Nota: Parents' percentages in relation to the total of those who have a Magalhães (Ponta Delgada: N = 297; Leiria: N = 186) and teachers' percentages in relation to the total of inquired (Ponta Delgada: N = 40; Leiria: N = 33).

Figure 13: Frequency of the Magalhães' use for homework, according to parents and teachers (%)

The data collected from parents and teachers show that in less than half of the cases in Ponta Delgada do teachers ask for homework to be done by students with the Magalhães computer (44% of families owning a computer and 43% of teachers surveyed). In Leiria, the situation is very similar if we consider the responses of teachers (45%), and it is slightly lower in the responses of parents (37%). The regularity of laptop use for homework is generally sporadic: only a small residual number of families (6% and 4%) and teachers (0% and 6%) in Ponta Delgada and Leiria indicate that homework with the use of the Magalhães is passed more than once a week. Therefore, mobility, allowed by this equipment and enhanced in other contexts, is not often used as a link between schoolwork done at school and at home.

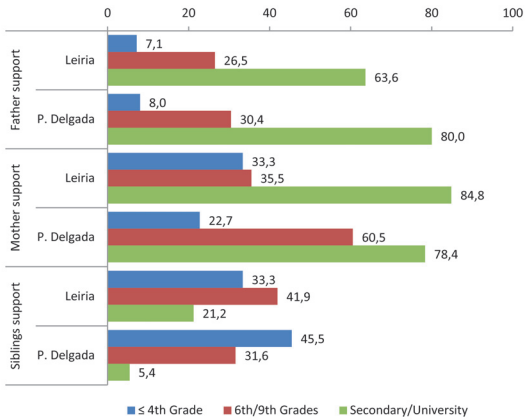
When this type of activity is developed, it involves computer uses similar to those in school activities, both in Ponta Delgada and in Leiria: word processing (71% and 100%, respectively), researching in encyclopaedias on the computer (59% and 79%) and accessing the Internet (47% and 50%). In the case of Leiria, we should also highlight the significant use for making PowerPoint presentations (43%).

4.2.3.1. Family mediation on the use of the Magalhães and other Computers

As the Magalhães is predominantly used by children at home, we tried to trace the mediation of families in the uses of computers, in general and for schoolwork.

4.2.3.2. Family Mediation by Gender and by Social Group

Besides being the family member who is most involved in homework in general (Diogo et al., 2011; Silva et al., 2011; Silva & Diogo, 2011), the mother is also the person who accompanies the child the most in the use of the Magalhães to do homework, as well as in the overall use of the Magalhães and other computers in both school communities (Diogo et al., 2012). Against this backdrop - which seems to confirm the idea of being the 1st CBE before a predominantly "female relationship" (Silva, 2003), that is to say mainly among women teachers (over 90% of the teachers at this level of education) and mothers (at least in regular and informal interactions) - we tried to understand the possible variations in this support according to the level of education.



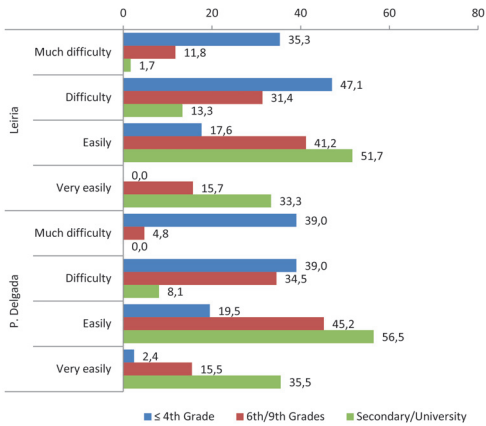
Source: INQP2. N = 171 (father); 171 (mother); 171 (siblings)]
Note: Percentage in relation to the total of children who have homework to be done with the Magalhães, by level of academic qualification. Ponta Delgada: N = 97; Leiria: N = 70.

Figure 14: Support for homework with the Magalhães computer, according parents[8] academic qualification (%)

The support given by parents for their children's homework to be done with the Magalhães varies quite a lot according to the level of parental academic qualification. In general, support is higher from those who have a higher academic qualification and vice versa. This finding applies to both fathers and mothers. We should note that the need for two types of knowledge seems to cross school knowledge, so to speak, and also "technological" knowledge. The possession of cultural capital, probably with a greater academic component, appears to make a difference. On the other hand, siblings tend to replace parents in households with lower academic qualification, thus matching what we found in another study concerning family involvement in schoolwork, in general (Diogo, 2008).

The perception of the degree of difficulty reported by parents to help their children in using computers points out significant contrasts between less and more educated parents. These contrasts again suggest that access to ICT alone will not automatically result in a democratization of its use.

8 We considered the academic qualification of the father in the case of the support given by the father and mother's academic qualification to examine the support given by the mother and the siblings.



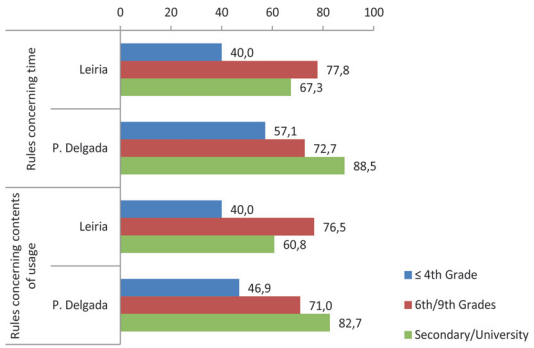
Source: INQP2
Note: Ponta Delgada: N = 187; Leiria: N = 128

Figure 15: Degree of difficulty/easiness of parents to help the child to use computers, according to their academic qualification (%)

Another aspect of parental mediation of children's use of new technology has to do with the imposition of rules. Regarding the Magalhães computer, most families stated that they impose usage rules on the children. In particular, we found that such rules were concentrated on two aspects: use of time (daily or weekly, for example) and content. However, we again observe (Figure 16) variations according to social group. Both in Leiria and Ponta Delgada, mothers with lower academic qualification are less willing to impose rules, and this finding is valid for either of the two types of rules (time and content). In Leiria, mothers with an intermediate level of schooling impose more rules (in both contexts), while in Ponta Delgada more educated mothers impose rules the most (again, in both types of rules). It should be noted that the intermediate imposition of rules by mothers with higher academic qualification in Leiria are much closer to those of the mothers who imposed the most rules (with an intermediate academic qualification) than the mothers of the lowest academic qualification (which never exceed 40% in this community).

Thus, consistent with the previously presented data, the rule that lower cultural capital is translated into the imposition of fewer rules

at home remains “valid”, while the opposite is only partially true (in Ponta Delgada).



Source: INQP2
Note: Percentage in relation to the total of children who use the Magalhães computer. Ponta Delgada: N = 146 (rules of usage), 153 (rules about time); Leiria: N = 100 (rules of usage), 108 (rules about time).

Figure 16: Existence of rules at home for the child to use the Magalhães computer (time and contents of usage), according to the mother's academic qualification (%)

4.2.3.3. Profiles of the Magalhães Computer and Family Mediation

In order to obtain a synthetic and integrated view of the results that we presented, we conducted a multivariate analysis (cluster analysis performed from the factorial axes of a multiple correspondence analysis), presented in more detail in another text (Silva, Diogo, Gomes, Coelho, Fernandes & Viana, in press), according to which three different groups were identified with regard to their relationship with the Magalhães Computer:

- Cluster 1: Offline use of the MC / Social heterogeneity and access to ICT;
- Cluster 2: Non-use of the MC / Lower access to ICT / Families with lower school capital;
- Cluster 3: Widespread use of the MC / Higher access to ICT / Families with intermediate or high school capital.

Crossing these three profiles related to the usage of the MC with the indicators of family mediation in the use of ICT, we found that families

tend to frame and regulate the use of the MC and other computers in an unequal way depending on their school capital, as follows:

- Cluster 1 does not impose rules of usage of the MC (time and content) for the child.
- Cluster 2 is characterized by a) greater difficulty in helping the child to use computers, and b) a lower presence of cases in which parents support the child in homework achievement when it are required to be done on the laptop;
- Cluster 3 stands out as an overrepresentation of cases in which a) it is easier to help the child to use computers, and b) the parents support the child in homework achievement using the laptop.

Thus, it is possible to say that these three groups, which have different profiles regarding their relationship with the MC and other computers, as well as their social inclusion, are characterized by establishing family mediation that is different both in the mobilization and capacity of parents to support their children in the use of computers, particularly for schoolwork, as well as in the regulation of computer use. In particular, there is a split between those family contexts that have this mediation in the several mentioned aspects, and those family contexts that are characterized by the absence of mediation, following a social class divide, with "higher" mediation in socially advantaged groups and "lower" mediation in socially marginalized groups.

In short, as in other studies (Almeida et al., 2008; Ponte, 2011), these results confirm the role of family mediation in the uses of new technologies by children and how this mediation is constrained by the educational/cultural capital of parents. Thus, parental mediation arises as a mechanism through which educational/cultural capital acts on the relationship of children with ICT, alerting us to the perverse effects that any political programme can produce if it limits itself to merely distributing equipment to families and to democratizing access without taking into consideration the framework provided in the home and at school on how to use such equipment, or in other words, it does not consider democratizing only access, but also success.

5. CONCLUDING SUMMARY

In summary, let us recall that the data show:

- Massive acquisition of the Magalhães, which seems to aim the goal of the governmental policy when distributed that laptop as a way of "democratizing" access to ICT;
- The existence of a greater proportion of other computers in the home by the families with higher academic qualification, which explains a slightly lower ownership of the Magalhães by these groups in the region of Leiria;
- The home as the main context of Magalhães use for the child, not closely followed by the classroom (with increasing usage) and other contexts (particularly homes of family and friends);
- Using the laptop in school activities includes mainly word processing, didactic games and researching in encyclopaedias, and in the classroom, Portuguese is the subject which more uses the Magalhães, followed by Environmental Studies, and with much smaller representation, Mathematics and Expressions;
- A more frequent and widespread use of the Magalhães at home by children of parents with a higher degree of education;
- Significantly uneven family support, denoting a quantity and quality of aid, which is stronger in socially advantaged groups;
- Less imposing rules on the use of the Magalhães at home by families with less education.

Thus, the data suggest a double trend: a) widespread acquisition of the Magalhães computer, which is even a bit higher in the case of socially disadvantaged families in Leiria; and b) a selective use of the computer by the different social groups, accompanied by family mediation that is also selective.

The first aspect is related to a democratization of access to ICT, through the Magalhães, and the second one denotes a social inequality in the uses of ICT, which is not automatically removed with access. This means that, although the first political goal of the e.escolinha programme (while the question of what happened at the national scale remains) has apparently been fulfilled, it still lacks the next step, which addresses the effects of the socially differentiated uses of ICT at school and at home.

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