

## 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 governments 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<sup>1</sup> 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

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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<sup>2</sup> 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

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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 Programa

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 sociability 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; Finkelievich, 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; Finkelievich, 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 3<sup>rd</sup> to 6<sup>th</sup> year, and the afternoon shift, from 1<sup>st</sup> to 3<sup>rd</sup> 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 1<sup>st</sup> and 6<sup>th</sup> 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 4<sup>th</sup> and 5<sup>th</sup> 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<sup>3</sup> 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

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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
<b>One computer</b>	11%	63%
<b>Two computers</b>	28%	25%
<b>Three computers</b>	39%	6%
<b>More than three computers</b>	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 N° 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 defined 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<sup>4</sup>. 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

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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, and 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 (from 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<sup>5</sup>, 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

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<sup>5</sup> 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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