

# EDUCATION AND DIGITAL CULTURE: CONSTRUCTIONS OF THE ONE-TO-ONE LEARNING PROGRAMME IN BUENOS AIRES CITY

**Maria Florencia Ripani**

Ministry of Education of Buenos Aires City  
fripiani@bue.edu.ar

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ABSTRACT

This paper seeks to establish whether the Plan Sarmiento BA, the one-to-one learning programme benefitting all state-run primary schools in the city of Buenos Aires, promotes pupil motivation and integration into digital culture, as well as the extent to which the results can be attributed to its design and implementation. A description is given of the Plan's pedagogical proposal, and observations are made based on quantitative and qualitative information provided by reports, projects and testimonials from pupils, parents and teachers. The study then goes on to detail changes in attitude and practices that demonstrate an increase in the motivation of pupils and their integration into digital society, which also extends to their family group, thus generating a significant impact on socio-educational inclusion. It concludes by associating aspects of the Plan's design with emerging changes and establishes the importance of creating spaces of consensus and collaboration in the construction of this type of project, as well as the need to conduct continuous observations in order to ratify or rectify the direction of work.

The study is of crucial importance since more knowledge needs to be generated regarding one-to-one learning programmes and their contribution to policy design.

**KEYWORDS:** One-to-one, digital literacies, Information and Communication Technologies (ICT), Digital Culture, Education.

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One of the main challenges of education in the context of digital culture is to integrate contemporary practices into the educational community so as to ensure that knowledge building takes into account the characteristics and demands of twenty-first century society (OEI, 2010; UN 2005; Buckingham, 2007).

This cannot be accomplished by the mere incorporation of technology, but instead demands a much more comprehensive and complex programme of educational innovation (UNESCO, 2011). In order to meet this challenge, the Ministry of Education of Buenos Aires City created a comprehensive plan for digital education (*Plan Integral de Educación Digital*, PIED), in the framework of which various actions and projects are carried out to integrate schools into the emerging modes of communication and culture of the twenty-first century (Miguel & Ripani, 2011a).

The Plan Sarmiento BA (PSBA) was launched in 2011, as part of the PIED, which is recognized as an example of good practice by the United Nations<sup>1</sup> (Sunkel & Trucco, 2012). The PSBA is a pedagogical innovation project based on a one-to-one model that seeks to promote quality education with equal opportunities and socio-educational inclusion. It covers all state-run primary schools in the city of Buenos Aires, including both ordinary schools as well as those providing special needs and adult education, and government-subsidized private schools. It is also implemented at teacher training colleges at the primary level. Its beneficiaries comprise around 600 educational establishments, 20,000 teachers and 250,000 pupils ("Implementation", n.d. para. 1).

The equipment for the PSBA includes the provision of laptop computers for both pupils (netbooks) and teachers (notebooks), and wireless connectivity in schools and across the city ("Preguntas frecuentes", n.d. para. 3). This is to ensure that access to cyberspace is available both while pupils are at school as well as during their free time, which is fundamental in order for them to continue with their learning and to facilitate the digital inclusion of the family group (CEPAL, 2010).

The main challenge faced by the PSBA is pedagogical innovation, with special emphasis on participation, collaboration, creativity, play, new modes of representation and the central role of the pupil as a producer of knowledge, among other core themes proposed, as expressed in the various documents that set out the framework for implementing the approach in the context of digital culture (Miguel & Ripani, 2011a; Miguel & Ripani, 2011b; Ripani, 2014 b).

This paper will attempt to explore whether it is possible to identify the emergence of changes in attitude and practices that encourage pupil motivation and the integration of the various actors in the education community into digital culture since the Plan was launched, and to determine to what extent they might be related to the design and pedagogical implementation of the project.

This hypothesis will be analyzed by presenting a conceptual framework, introducing the pedagogical proposal of the PSBA and observations on its imple-

1 The PIED was selected by the Economic Commission for Latin America and the Caribbean (CEPAL), a United Nations agency, as part of a basket of projects incorporating good practices on ICT in education.

mentation, based on quantitative and qualitative data. The information disclosed will include testimonials from different actors in the education community, projects carried out by pupils and teachers and follow-up reports.

The importance of this research lies in the fact that more knowledge needs to be generated about one-to-one learning programmes and the benefits they create for pupils, since this contribution is critical for policy design in this area (Valiente González, 2011; Área Moreira, 2011).

## 1. Methodology

The methodology includes the use of the PSBA's documentation for its description and a number of sources of qualitative and quantitative information to make observations about its implementation. As the author is involved in the project, most of the qualitative analysis was conducted among various actors from the education community and based on semi-structured interviews, which were video recorded and published on the internet, from where they can be publicly accessed. A focus group, based on an educational video game, was organized by InTec at School N° 5 DE 10 with the participation of 30 2nd and 5th year pupils and 4 teachers, whose testimonies were audio-recorded.

The quantitative data includes on-line surveys and questionnaires in digital format carried out by two departments from the Ministry of Education of Buenos Aires City: the Department for the Incorporation of Technology (InTec) and the Department for Quality Education (DGECE), in addition to a technical report about the use of the PSBA Internet Connection Network, produced by the service provider. The replies given by pupils (Figure 3) were taken from an on-line survey produced by InTec and DGECE, from a random sample of 85 state-run schools, including 52 ordinary primaries, 13 special schools and 20 establishments providing adult education.

The data for teachers and school managers (Figure 4) were provided by an on-line survey carried out in December 2013 by InTec among a random sample of 1643 teachers and 87 managers of state-run schools in Buenos Aires City covered by the PSBA. The information on Digital Pedagogy Facilitators resulted from a self-administered survey distributed among the entire population of facilitators (556) working in ordinary state-run primary and state-subsidized private schools. This survey is conducted twice a year in August and December.

## 2. Theoretical Framework

This section will present a theoretical framework related to the core themes of the PSBA mentioned in the introduction, which are associated with fundamental aspects of education and communication and take on particular importance in the context of digital culture.

To begin with, it is worth clarifying that the mere incorporation of technology cannot possibly be thought to achieve the desired objectives, since such a belief would imply an adherence to technological determinism (Área Moreira, 2011;

OEI, 2010; CEPAL, 2011). Technology is produced by human beings based on their needs at a specific moment in history and must always be regarded as inseparable from culture and society, that is to say, the human and the material cannot be separated, since the latter is produced by mankind (Levy, 2007).

In this context, it is important to define Information and Communication Technologies (ICT) as cultural forms. Computers and the various digital media are much more than just devices for storing and circulating information. Most of children's leisure time experiences involve the transmission of images and fantasies via computers, creating opportunities to free the imagination, encourage personal expression and promote play (Buckingham, 2007). ICT thus function as a medium through which interpersonal relations are established; in other words, they provide new forms of communicating, and of mediating and representing the world (Buckingham, 2007).

Digital media present new ways of constructing reality, from the multimedia universe (Castells, 2005) to hypertextual narrative or digital simulation, a form of knowledge construction typical of digital culture, which makes it possible to emulate complex processes in order to represent elements of reality (Levy, 2007; Barber, 2009).

In this context, the meaning of literacy, which is not static but rather historical and alters according to changes in requirements, social practices and writing technologies, cannot remain anchored to literate culture (Ferreiro, 2010). Literacy in the twenty-first century entails embracing multiliteracy, which seeks to provide a broader and more diverse conception than the traditional approach, by emphasizing the importance of contextualized learning within the socio-cultural reality (Cazden et al., 1996).

This perspective introduces the idea that there are various complex and interrelated ways of representing or producing meaning. It proposes incorporating other dimensions into literacy, including the visual – fixed and moving image –, audio, and audiovisual, in addition to the written language, and ceasing to unjustly regard the image as being inferior to the written word (Kress and van Leeuwen, 1996; Kress, 2003, 2010; Castells, 2005).

With respect to socialization, ICT have taken over part in the role traditionally assigned to the family and school, since the various activities performed by children and adolescents in cyberspace using different computerized devices – communicating via social networks, watching videos, playing video games, etc. – are those that currently provide them with models and patterns of behaviour that are attuned to a new sensibility (Martín-Barbero, 2006; Livingstone, 2009; Buckingham, 2007). However, despite the incorporation of computers into the classroom, schools have been much slower in changing their teaching methods (Livingstone, 2012) and in some cases the educational uses of ICT have been constrained by the nature of the schools (Selwyn, Potter & Cranmer, 2009).

Cyberspace – understood as a new medium of communication arising from the global interconnection of computers, and composed of the universe of content that passes through it, and the people who surf it and construct it – is the main meeting place for digital culture (Levy, 2007). It offers reading and writing devices that foster collaboration between different people, transcending geographical and temporal barriers, and presents itself as the material setting where knowledge is constructed and circulated (Levy, 2007).

The advent of cyberspace is related to the emergence of participatory cultures (Jenkins, 2009), in which there is an emphasis on collaborative production, including the reappropriation or reworking of material created by others. Collective experience with people who are both like and unlike us validates our perceptions of reality and, therefore, young people need to participate in the public arena, make their own mistakes and learn from them (Boyd, 2007). Within this context a migration is taking place in the materialization of knowledge, from traditional encyclopaedias to cyberspace, a fundamental aspect of which is that it can be accessed by children and young people, not just as readers-spectators, but as producers and constructors of knowledge, both alone and in collaboration with others (García Canclini, 2007; Levy, 2007; Buckingham, 2007). In this regard, it is necessary to think about the teacher and pupil as authors and to emphatically promote production in a framework of diversity that understands the modes of representation characteristic of digital culture, in order to transform schools into spaces of creation rather than reproduction (Jenkins, 2009; Preto, 2012; Himanen, 2002).

It is essential that production takes place in a context that fosters creativity, imagination and learning through play because of its relevance to both education based on motivation and enjoyment, and the possibility of transforming the world (Freire 2009 & 2010; Bachelard, 1971; Rodari, 1993; Paley, 1990; Ripani, 2014). Creativity and play are the basis of human development and innovation, and promote the construction of symbolic models that facilitate social change (Robinson, 2011; García Canclini, 2007, Freud, 1994; Winnicott, 1982; Martín-Barbero, 2001; Freire, 1995).

This change is emerging in a society that is increasingly organized around networks and that – consequently – is dynamic, open and capable of innovating (Castells, 2005). The role of education is thus crucial in order for pupils to learn and acquire the relevant cultural practices that ensure social inclusion (Castells, 2008; Jenkins, 2009).

The ideas developed in this section enable us to establish a theoretical framework, based on certain practices and significant features of digital culture, to present pertinent aspects of the pedagogical proposal the PSBA and guide the search for relevant observations relating to its design and implementation.

### **3. Pedagogical proposal of the PSBA**

The fundamental principles of this PSBA are aimed at creating cross-cutting mechanisms, based on comprehensive approaches to the changes in education demanded by emerging forms of culture and communication in the twenty-first century.

Among the resources designed to meet this objective there are various documents that set out the framework for implementing the PSBA in the context of digital culture. These focus not on the instrumental aspects of digital media but rather on the teaching practices and competencies associated with the needs of the twenty-first century (Miguel & Ripani, 2011a; Miguel & Ripani, 2011b; Ripani, 2014 b). The pedagogical guidelines of the PIED define the program objectives, which include promoting quality education with equal opportunities and chances and socio-educational inclusion (see Figure 1). They also propose integrating new educational practices into the education community, through a process of

gradual transition that takes prior knowledge and transforms it into new strategies and ways of working.

The document promotes participatory learning, collaborative production, a student-centred and network-based pedagogy, learning through play, familiarization with emerging narratives and encouragement of digital environments as spaces of trust and creativity. It also promotes a central role for the pupil as a constructor of knowledge, while it suggests the teacher should become a change leader and a mediator.

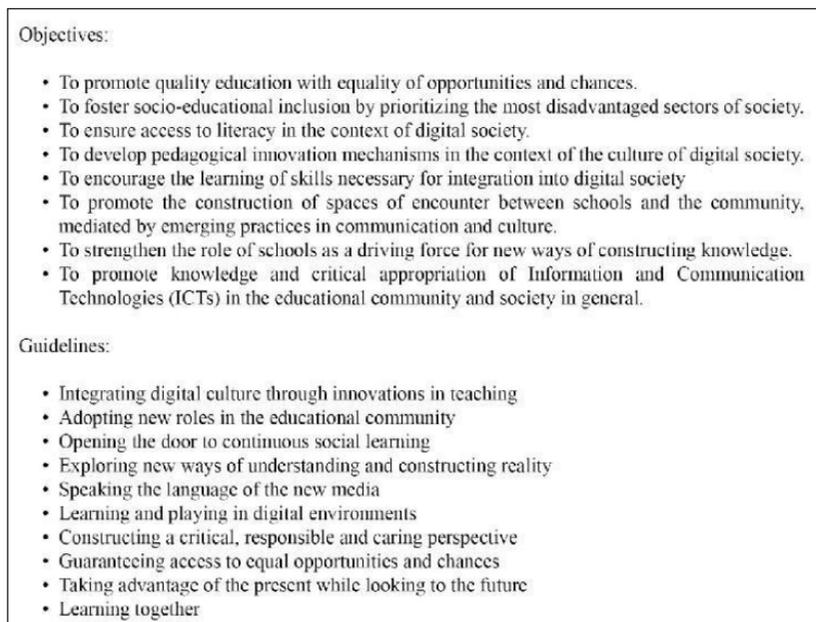


Fig. 1. - Summary of the Pedagogical Guidelines of the PIED

## 4. Educational content and resources

The PSBA promotes project-based learning, as set out in the pedagogical framework of the PIED (Miguel & Ripani, 2011b) and in the document entitled Curricular Design of Digital Education for Primary Education (Anexo Curricular de Educación Digital Nivel Primario) (Ripani, 2014b), which is based on competencies and was especially created for the PSBA. Contents, in this context, are regarded as resources to be constructed jointly by teachers and pupils according to the educational projects of each school, which make up the curricula for Digital Education and other areas of knowledge.

To facilitate participation and collaboration through the publication and exchange of resources and experiences in cyberspace, the *Integrar*<sup>2</sup> portal was cre-

2 The *Integrar* portal can be accessed at [www.integrar.bue.edu.ar](http://www.integrar.bue.edu.ar)

ated, which invites the whole community to participate in the construction of educational resources<sup>3</sup> (Integrar, n.d.).

The aim is to incorporate diversity, through a plurality of materials and participatory knowledge (Pretto, 2012). The PSBA thus promotes the collaborative and decentralized production of content and leaves behind the centralized form of publication and distribution associated with the old paradigm of mass culture (Ripani, 2013).

The laptops distributed to pupils and teachers include more than 120 free applications, mostly free software, accompanied by educational tutorials, around 3,000 multimedia resources and about 60 books published in digital format with open licenses. Also included are over 600 links organized by curriculum areas.

## 5. Training and accompaniment

The PSBA is supported by a broad structure of training and accompaniment provided by staff specialized in ICT, with the permanent presence of a Digital Pedagogy Facilitator in all the recipient schools (GOInTec – Ministerio de Educación GCBA, 2014). The personnel assigned to the schools help teachers to integrate ICT into their lesson planning, within a framework of creativity and freedom, while taking into consideration the diverse socio-cultural conditions of each educational community. In addition, workshops on digital education are provided for pupils' families. Optional specialized out-of-hours training courses are also offered to teachers, in virtual or classroom-based formats (Ministerio de Educación – CABA, 2013b).

As stated in the Pedagogical Implementation Report Plan S@rmiento BA 2010-2014 other complementary activities are carried out to promote the construction of play-based experiences with digital resources, which serve to promote the creative use of netbooks and to give pupils a central role. These include digital festivals and congresses where pupils present their learning and production experiences. Additionally, an annual contest<sup>4</sup> is organized to acknowledge those educational projects that creatively incorporate ICT into the teaching and learning process.

## 6. Observations

Since the pilot test for the PSBA in 2010, and the full-scale launch of the PSBA beginning in the 2012 academic year, several follow-up reports have been pro-

- 3 The Plan seeks to promote the use of free applications and the production of Open Educational Resources (OER). These are teaching, learning or research materials that are in the public domain or that have been published with flexible intellectual property licenses which, in various forms, allow them to be used, adapted and distributed free of charge.
- 4 The "Menciones Plan Integral de Educación Digital" [Comprehensive Plan for Digital Education Awards] Contest, which is held annually to acknowledge the efforts and dedication of students, teachers, managers and supervisors.

duced based on the abovementioned records of the experiences and testimonials of the various actors in the educational community. This material serves as a source of quantitative and qualitative data, and helps to guide the observations included below, in accordance with the hypothesis presented in the theoretical framework. A selection of testimonials and quantitative data are included further in this section (see Figures 2, 3 and 4).

An increase has been observed in pupils' level of motivation since the introduction of netbooks, which are the main resource associated with the PSBA. Within this framework, both the qualitative analysis from testimonials as well as the quantitative data suggest that learning with netbooks is more enjoyable for pupils and that having this resource available makes them more eager to go to school and to do homework (see Figure 2 and Figure 3). Greater interest is expressed in using computers both in the classroom and at home. In addition, pupils' intellectual curiosity is shown to have been stimulated (see Figure 4), along with the desire to explore the devices, which has resulted in greater autonomy. Pupils familiarize themselves with their netbooks, install programs, create their own activities, save files of the output they have produced – often the result of collaborative work –, download videos and put together their own image and sound banks (DGECE, 2012).

There has been a significant increase in the number of activities in which pupils produce content with still or moving images, which promotes creativity and the development of new modes of representation, including animations, simulations, multimedia productions and hyperlink narratives (see examples in the section entitled “Experiences”). This is evidence of the creation and use of multimodal texts.

Another trend identified is the increase in learning through play and fun activities, which are encouraged by the use of digital resources. For example, in School N° 18 D. E. 5<sup>5</sup>, the teacher Graciela Blasco created a project based on a story about witches. The pupils made comics, recorded videos of tricks that they themselves performed at home and read QR codes to decipher secret messages from the sorceress (Escuela N° 18 D. E. 5, 2011).

5 D. E.: School District, which represents a geographical division of the educational system within the City of Buenos Aires

	Silvia Bisso Headmistress of School N° 17 D.E. 5.	The institution's learning dynamic has changed in the sense that there has been an increase in collaborative work. The children self-manage and serve as a support for other classmates. More importantly, it should be emphasized that these children, who perhaps have never had or never would have access to a netbook or a computer or to new technologies, now have that access since the Plan Sarmiento was implemented.
	Gabriela Fernández Teacher of 2nd cycle at School N° 5 D.E. 2.	Every time we propose an activity involving the netbook, the children are much more interested in working, and they approach the work in a different way and with more enthusiasm.
	Margarita Aillapán Pupil's mother.	Since she brought the netbook home, my daughter seems much more eager to do her homework, it is an added attraction for her, she no longer makes excuses not to do it. And well, my older children also use it and it fulfils the function it is meant to fulfil.
	María Laura Moya Aillapán 5th year pupil at School N° 17 D.E. 5.	It is a bit difficult to teach my mum, but... first I taught her how to turn it on, then I showed her how to access the Internet. Now she can log on and see what friends or relatives send her.
	Sol Puca 5th year pupil at School N° 17 D.E. 5.	I like bringing the netbook to play and learn every day.
	Zoe Rezoagil 2nd year pupil at School N° 5 D.E. 2.	I put clothes, rings and dresses on my character. My avatar was cute and he was funny. When I moved the mouse, he moved his eyes like this.
	Demián Duarte 5th year pupil at School N° 21 D.E. 4.	You can make videos using photos, you can create characters, animals, whatever you want.
<p>Figure 2. Selection of Testimonials. Adapted from Ministerio de Educación CABA. [IntegrarCABAArg]. (2013, April 9). <i>Implementación pedagógica del Plan Sarmiento BA (versión extendida)</i> [Video file]. Retrieved from: <a href="http://www.youtube.com/watch?v=mGXoANzWWBQ">http://www.youtube.com/watch?v=mGXoANzWWBQ</a></p>		

Fig. 2 - Selection of Testimonials

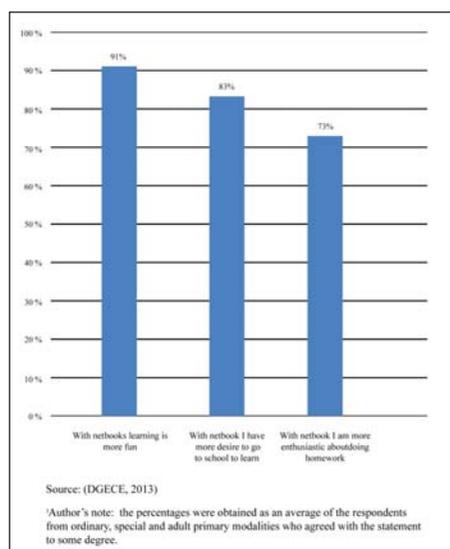


Fig. 3 - According to Statements about the PSBA - Pupils

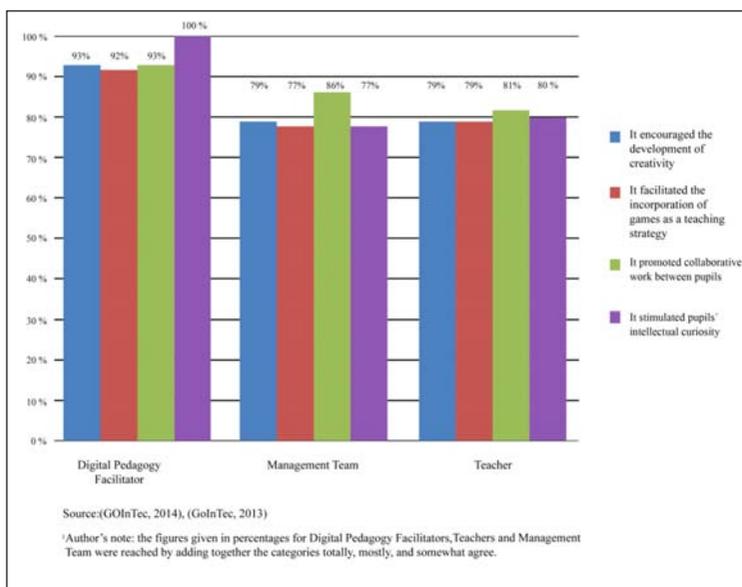


Fig. 4 - Perception of the PSBA

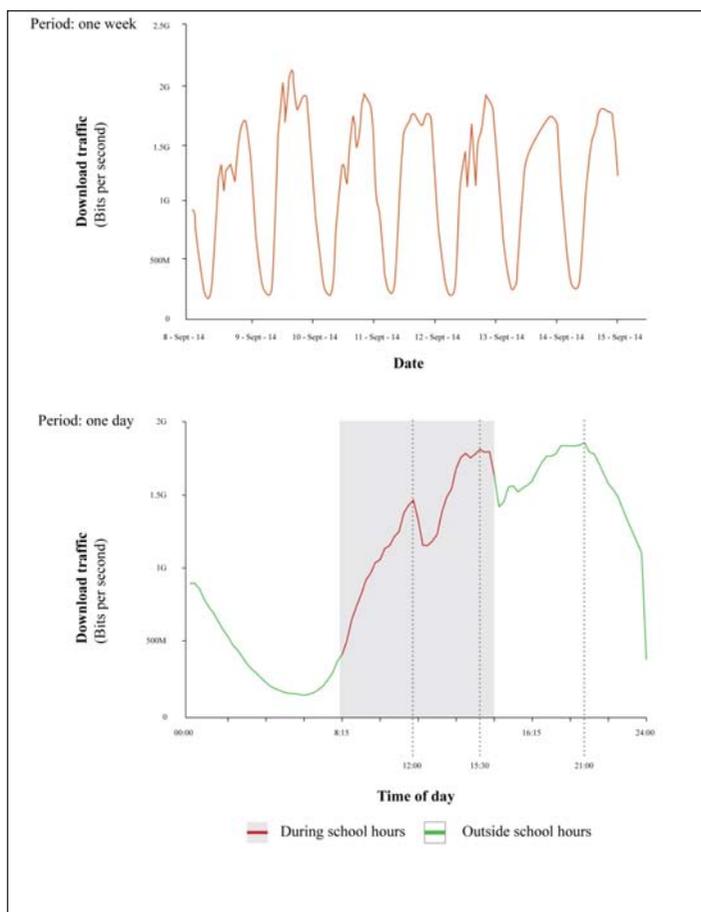
It should be emphasized that the use of video games as an educational resource proved extremely popular with pupils. For example, in 2013 and 2014 a videogame was used to guide pupils on how to surf the internet safely, responsibly and in a collaborative manner (Integrar, 2014). In the focus group study conducted at School Nº 5 D.E. 10 pupils reported having more fun and learning more with this resource than with the normal class dynamic.

Pupils tend to become more engaged in activities that encourage the development of fantasy, imagination and personal expression. In an educational project carried out at School Nº 5 D. E. 2, the teacher suggested that pupils use an application to create avatars that would speak for them about their favourite game. The testimonial of one of the pupils (see Zoe Rabovich in Figure 2) illustrates the degree of involvement generated by this activity (Ministerio de Educación - CABA<sup>6</sup>, 2013b).

In addition, an exponential growth has been recorded in access to cyberspace for information access, collaborative work, publishing productions and communicating with others. Reports on the use of the PSBA internet connection network show high traffic both during school hours as well as after school and during the weekends, when pupils are at home (see Figure 5). It should be noted that peaks can be observed between 8 pm and 10 pm, which are related to the incorporation of pupils' family members as users of the devices. This is a significant piece of data considering that almost 40 percent of pupils' homes did not have computers or internet access prior to the implementation of the PSBA (DGECE,

6 CABA stands for *Ciudad Autónoma de Buenos Aires*, which means autonomous city of Buenos Aires.

2012). The testimonials provided by the school children and their parents indicate that the netbooks are not just used by pupils but by the entire family circle (see Figure 2) (Ministerio de Educación- CABA, 2013b).



**Fig. 5 - Use of the PSBA Internet Connection Network**

The positive assessments of the PSBA made by the pupils' parents include the acquisition of new knowledge associated with digital society, to which they did not have access previously (GOInTec, 2012). In this context, virtual learning spaces emerged as a new means of communication that facilitates exchange within and outside of school. These are used, for example, to share information and to ask teachers questions about classroom activities or homework. This fosters a more horizontal and collaborative way of working, in addition to network learning.

The testimonials also mention the increase in peer learning, which occurs informally as well as in an organized way. For example, in School Nº 10 D. E. 6, in 2012, the fifth year pupils taught the first years pupils how to look after their net-

books and how to take photos. The activity proved highly rewarding for both year groups.

The observations recorded point to significant changes in class dynamics and the physical spaces used. Classroom furniture was rearranged to allow pupils to work in groups. Occasional use was also made of spaces other than the classroom for teaching classes, such as school playgrounds or nearby parks, where the pupils usually sit in a circle on the ground.

In respect to the teachers, evidence was observed of increased communication with pupils and a willingness to learn from them. A fluid exchange of experiences is taking place, even with teachers from other schools, which facilitates cross-cutting work.

## 7. Educational Projects

With regard to the type of activities carried out to integrate ICT into the development of curricular content, projects were found to clearly apply the Curriculum Design for Digital Education and the PIED pedagogical guidelines, which is oriented towards creative strategies of appropriation. That is to say, no particular software is used as the basis for a project or a didactic sequence; instead a motivating idea is proposed to invite participation from pupils in the collaborative construction of resources for learning in play-based contexts, which make use of various applications and digital resources.

In the context of this paper, two projects will be mentioned among a large number of possible examples. One is the proposal put together by School N° 2 D. E. 1 to celebrate the bicentenary of the birth of the Argentine patriot and former president Domingo Faustino Sarmiento. On that occasion, pupils and teachers, along with the Digital Pedagogy Facilitator created a wide variety of activities based on internet research, ranging from the production of digital comics to timelines, and even a 3D animated video, in which Sarmiento answered pupils' questions (School N° 2 D. E. 1, 2011).

Another example is the "Laugh out loud" project carried out by the teacher Ana López Terrones from School N° 5 D. E. 3. Using a poem as inspiration, pupils were invited to describe and share daily situations that make them laugh. Based on their ideas, they composed their own poem, which they performed and recorded in a stop motion video produced with the help of their netbooks (Ministerio de Educación - CABA, 2013a).

## Conclusion

Based on observations made within the schools covered by the PSBA, it was possible to identify the emergence of changes in attitude and practices that encourage pupils' motivation and the integration of the various actors in the school community into digital culture, thereby fostering quality education and promoting equal opportunities.

Pupils find it more enjoyable to learn using netbooks and feel that this re-

source increases their desire to go to school and to do homework. The PSBA was seen to encourage the development of their creativity and intellectual curiosity, in addition to collaboration and communication. The use of play as a teaching and learning strategy proved to be highly motivating, as did the use of video games as an educational resource. Pupils tend to become involved in activities that encourage the development of fantasy, imagination and personal expression.

Within this framework, signs can be seen of the emergence of a new learning context that integrates practices of digital culture. This includes an increase in activities with ICT and the production of digital content by pupils, which is often multimodal and emphasizes visual and audio-visual aspects as well as emerging formats of representation. There has also been an exponential increase in internet access – from both schools and homes –, information searches and publication of work produced in this area, and the use of virtual learning spaces.

A major impact was generated on the socio-educational inclusion of the most disadvantaged sectors of society, given that 40% of the families of the 160,000 pupils benefitting from the PSBA did not have a computer or internet connection prior to the implementation of the PSBA. In addition, pupils teach their parents how to use their netbooks, thus generating informal spaces of digital literacy.

It could be suggested that the design and implementation of the PSBA have fostered the above-mentioned changes. It was essential, for example, not to offer digital content designed in a centralized manner to be used by all schools but rather, on the contrary, to encourage each educational community to create content collaboratively, thereby promoting the central role of pupils in the construction of knowledge and respect for diversity.

Another fundamental aspect identified was the cooperative and consensual design of the PSBA, which later facilitated the emergence of collaborative practices between the different actors in the educational community.

Although the observations presented in this paper express a positive assessment of the PSBA, given its recent full-scale implementation, it is not yet possible to make a conclusive evaluation. The development of high-impact plans of this type demands continuous observation of what is happening in schools, as part of a two-way process – top down and bottom-up – that enables the direction of work to be ratified or rectified. These processes are not linear and require gradual transitions that take previous knowledge and transform it into new strategies and ways of working, which creates a demand for further research.

By way of conclusion, it should also be mentioned that there are ongoing challenges that arise during projects, such as ensuring the proper functioning of the technological infrastructure, and other matters related to the educational culture, which are perhaps less tangible but no less important. These include the vertical and stratified paradigm that cuts across the organization of the education system, in contrast to the network-based and horizontal relations proposed by digital culture.

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