USES OF ICT IN PRESCHOOL: TOWARDS CURRICULAR INTEGRATION

Nivel de desempeño autopercibido por futuras educadoras de párvulos sobre el uso pedagógico de TIC

Competências do século xxi: como desenvolvê-las através do uso de videogames em um contexto multigrau?

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ABSTRACT

The purpose of this research was to understand the uses of Information and Communication Technology (ICT) in kindergarten at a district educational institution through the observation and analysis of teachers' knowledge and practices, children's interests and their families' expectations. The research was conducted as a case study and it was framed in the qualitative paradigm; focus groups, surveys and interviews were used to obtain the information. Participants were five kindergarten teachers at a district educational institution and twenty-five preschool students with their respective families. The reflections and findings intend to serve as reference in the definition of strategies for curricular integration of ICT in preschool in public schools.

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RESUMEN

El propósito de esta investigación fue comprender los usos de las Tecnologías de la Información y la Comunicación (TIC), en el grado transición en una institución educativa distrital, mediante la observación y análisis de los saberes y prácticas de las docentes, los intereses de los niños y las expectativas de sus familias. La investigación se realizó como estudio de caso, enmarcado en el paradigma cualitativo; se utilizaron grupos de discusión, encuestas y entrevistas para obtener la información. Participaron cinco docentes del grado transición de una institución educativa distrital y 25 estudiantes de preescolar con sus respectivas familias. Las reflexiones y hallazgos realizados buscan servir de referente para la definición de estrategias para la integración curricular de las TIC en preescolar en los colegios públicos.

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RESUMO

O objectivo desta pesquisa foi compreender os usos das Tecnologias de Informação e Comunicação (TICs) ao nível da transição numa instituição educacional distrital, através da observação e análise dos conhecimentos e práticas dos professores, dos interesses das crianças e das expectativas das suas famílias. A pesquisa foi realizada como um estudo de caso, enquadrado no paradigma qualitativo, grupos de discussão, pesquisas e entrevistas foram utilizados para obter as informações. Participaram cinco professores de uma instituição educacional distrital e 25 alunos do pré-escolar e suas famílias. As reflexões e conclusões procuram servir de referência para a definição de estratégias para a integração curricular das TIC nas pré-escolas das escolas públicas.

Keywords: Technology in education, preschool education, ICT and education

Palabras clave: Tecnologías en educación, educación preescolar, TIC y educación.

Palavras chave: Tecnologias em educação, educação pré-escolar, TIC e educação.

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INTRODUCTION

Lately, the world has set its eyes on early childhood. Recent governmental efforts regarding international, national and local public policy have focused on fostering conditions to enable comprehensive development for children under six years of age. One of the main reasons for this is the economic advantage of return on investment for the State, but mostly it has to do with the knowledge corpus built around cognitive, physiological and social development and potentialities involved in the early years of life and how they may be decisive for an individual throughout his/her life (Bernal & Camacho, 2010; Simarra & Madariaga, 2011; Comision Intersectorial de Primera Infancia, 2011).

In this regard, education becomes fundamental for the comprehensive care provided to early childhood, most especially for public education, since it emphasizes on the population it services and which, in many cases, is vulnerable due to unfavorable social and/or economic circumstances. Thus, the challenge of public education is to create learning environments to allow decreasing existing social inequalities and develop the human potential of children under six years of age; this path ponders on the multiple factors associated with an adequate development of human being's dimensions and the skills he/she must attain to exercise his/her citizenship. These factors include incorporation and use of Information and Communication Technologies (ICT).

Several studies on the use of ICT in education report that the most adequate proposal to use ICT at any educational level is curricular integration, since it allows the enhancement of learning environments with the use of diverse devices and is a motivational element of students' interests and participation, letting them advance on their capacities and interaction with others to collaborate and learn through the mediation of technology.

Some tensions are identified in terms of curricular integration of ICT, such as: teachers' attitudes and expectations regarding the contribution of technological devices in students' learning process (who in some cases are more used to the devices than teachers themselves); as well as unfair access to ICT resources and conditions that ease educational innovation to be articulated with public policies and teacher training proposals (Garassini & Padron, 2004; Area, 2010; Arbazua & Cerda, 2011; Clemente, Ramirez, Orgaz, & Martin, 2011; Can-Yasar, Uyanik, Inal, & Kandir, 2012; Blackweel, Lauricella, Wartella, Robb, & Schomburg ,2013; Cascales & Laguna, 2014). This research set out to characterize the practices related to the use of ICT in preschool at a public school located in a populous sector of Bogota, as a local outlook to the global phenomenon of ICT; and to identify, as per Winocour and Aguerre (2012, p.138) just how "the local dimension generates distinguishable appropriations of ICT". Three core conceptual axes were developed: ICT, connection of ICT with education and curricular integration.

INFORMATION AND COMMUNICATION TECHNOLOGIES

The National ICT Plan (Ministry of Communications, 2008, p.3) defines ICT as the "set of tools, equipment, computing software, apps, networks and means that allow compiling, processing, saving and transmitting information in the form of voice, data, text, video and images". According to Tedesco (2000) ICT include current devices such as television, computers and telephones; the Ministry of National Education (2008) adds the radio, networks and the Internet. In this research, ICT is understood as devices and apps that allow producing, transmitting, circulating and resignifying information, and that ease communication between people in different geographical locations by means of audiovisual resources and communication networks (Kristcautzky, 2012), as well as the mediation of teachers, students and content (Coll, 2009).

As proposed by Tedesco (2000) these devices develop processes and establish different relationships with users, depending on the link and the way in which the message is transmitted. On the one hand, traditional television establishes a connection that deposits intelligence on the issuer and gives the viewer a passive and receptive role, it uses images to emotionally shake the viewers. On the other hand, computers and tablets allocate intelligence on the device and the user, who acts as decision-maker, consults or produces information with the interactivity enabled by these technologies.

ICT IN SCHOOL

According to Gandara (2012) the forerunners in the interest of getting computers involved in educational processes are Skinner and other behaviorists, they were able to visualize the opportunity provided by computers in educating and offering a systematized instruction for the development of skills and basic capacities, based on the progress by some scientists in computer assisted learning software. These originated the idea of a controlled instruction, capable of being reproduced and assessed through objective indicators (Amigues & Zerbato, 1999). This meant complementing or substituting the teachers' educational task, in addition to the elevated cost of institutional endowment at that time.

Criticism of these devices (which were believed to program students) was counteracted with proposals stating that, on the contrary, devices allowed students to program computers and to apply problem solving skills to develop cognitive skills. Later, Papert a pioneer of the constructionist movement, developed the Logo programming language, which used turtle graphics to follow commands and allowed to socialize accomplishments with classmates (Gandara, 2012). Logo is a prevailing language applied in educational software such as Micromundos and Scratch.

Technological changes that took place in the 80's and 90's (20th century) greatly contributed in the adaptation of the graphic interface, the development of devices for information storage and computer interaction, the development and implementation of communication protocols between computers and telecommunications, and also decreased production cost for different devices. These technological transformations set up a new range of technologies available for information communication and dissemination (Gandara, 2012). Interest as well as reluctance to incorporate ICT in the school persist today (Cabello, 2012). However, devices on their own do not imply changes nor propose much, what is key is the teachers' notion regarding the teaching-learning process and the activities underlying the contexts of use and appropriation of ICT (Gandara, 2012; Coll, 2009).

Sunkel (2009) suggests that education is a strategic field to close or overcome the digital gap existing in some sectors of society. This requires, at least, access to technologies, meaning having a technological infrastructure that includes computers and other devices in the school, connectivity and an efficacious use. Computing density is a "factor that conditions the 'efficacious use' that students (…) may give to ICT" (Sunkel, 2009, p.37). And it is understood that the smaller the number of students per computer will achieve a more efficacious use per student. Computing density is obtained by adding the number of students and the available computers in the institution (excluding computers for administrative staff or teachers).

The incorporation of ICT in daily life somehow implies an expansion of the concept of literacy, to the extent that some technological devices enable innovative social practices of information exchange and communication. In that regard, Kriscautzky (2012) states that:

> "Nowadays, literacy is conceived as a long process of knowledge construction that is broader than the process of using letters: it is the knowledge of the social functions of writing, of its associated practices and of the rules that govern the exchanges mediated by writing" . (p. 244)

In that regard, the introduction of ICT in the classroom is a way of acknowledging the new sense that these advancements bring to the concept of literacy, and as added value, of acknowledging that access to information and technological devices is a way of citizen participation (Secretaria de Educacion Distrital, 2007, p.59).

USES OF ICT IN EDUCATION

This research considered the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, & Davis, 2003) to understand preschool teachers' attitude towards the use of ICT in their practices. Although technological infrastructure in the school, connectivity and digital resources are important for applying technology in the classrooms, more often than not, digital

resources in teaching are underused (Coll, 2009) especially due to teachers' attitude towards ICT. On the other hand, the proposals by Coll (2009) regarding a typology of uses of ICT that connect technological tools and educational practices are also expounded.

Venkatesh, Morris and Davis (2003) formulated the unified theory of acceptance and use of technology (UTAUT) based on a review of the differences and commonalities of the core constructs of the theories that explained (up until then) the use of technologies. In the analysis, the authors identified and conceptualized four factors that influence the use (or lack thereof) of technologies in the development of a task, as follows: 1) expectation of the functioning, 2) expectation of the effort, 3) social influence and 4) facilitating conditions that are determined by gender, age, experience and will to use technologies. UTAUT was the conceptual basis to analyze the current use of ICT in preschool since it has been validated by several studies in the educational scope (Blackweel et al., 2013; Madera, Torres, & Quevedo, 2012).

Coll (2009) introduces a classification of the uses of ICT that comprises the characteristics of technological devices and the dimensions of educational practices. This typology is supported on a socio-constructivist perspective of the teaching-learning process, which intends to provide elements of analysis of the scope and impact of ICT in the educational act, is not a scale to judge or identify practices that are more or less adequate. Coll (2009) justifies this proposal with two main ideas:

> "The first is that, due to its intrinsic nature, ICT may operate as psychological tools that are susceptible to mediate inter and intra psychological processes of teaching and learning. The second is that ICT fulfill that function -when they do- of mediating relationships between the elements of the interactive triangle -students, teacher and content- and contributing to the context of activity in which these relationships take place ". (p.121)

Based on these premises, five categories of use were identified, as follows:

Table 1. Categories of uses of ICT and representative examples

Instruments mediating:	Examples of action
a. Relationships between students and learning content	Searching for and selecting learning content Accessing content that uses different representation forms and systems (multimedia and hypermedia material, simulations, among others) Accessing homework and activity repositories to enable interaction Doing homework and learning activities or certain parts

b. Relationships between teachers and teaching-learning content	Searching, selecting and organizing information related to teaching content Accessing repositories of learning objects Accessing teaching-learning activities data bases and proposal banks Producing and keeping a record of the conducted teaching-learning activities, of their development, participation of students, products and results Planning and preparing teaching-learning activities to be developed in the classroom (engaging in class planning, presentation preparation, among others)
c. Relationships between teachers and students or between students	Undertaking communicative exchanges between teachers and students, not directly connected with teaching-learning content or homework and activities Undertaking communicative exchanges between students, not directly connected with content
d. Joint activity rolled out by teachers and students	During the teaching-learning activity As assistants or amplifiers of certain teacher actions (explaining, illustrating, relating, synthesizing, among others) As assistants or amplifiers of students actions To follow-up on students' progress and difficulties To request or offer feedback, guidance and help pertaining the development of the activity, its products or results
e. Construction of work environments or spaces and learning	Setting up individual online learning environments or spaces (e.g., self-sufficient materials aimed at autonomous and independent learning) Setting up collaborative online work environments or spaces (CSCL tools and environments - Computer-Supported Collaborative Learning) Setting up online activity environments or spaces to be developed alongside and which participants may opt-in or opt-out as per their own criteria

Source: taken and adapted from Coll (2009, pp.121-123).

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CURRICULAR INTEGRATION OF ICT

According to Sanchez (2003) curricular integration of ICT is understood as the use of technological devices to mediate students' learning the concepts, processes or contents of a curricular discipline. It transcends the simple use of ICT and emphasizes on the teaching and learning processes, thus, the focus lies not just on technological devices. This process implies assuming ICT as part of the educational activity taking place in the school, accordance with educational principles and mediation between knowledge and learners (including students as well as teachers). Sanchez (2003) sustains that curricular integration renders ICT invisible since it is not a peripherical element, but part of the school's day to day.

In order to achieve curricular integration, it is necessary to create learning environments that contemplate the experiences of students' cultural background, enable meaningful learning, develop skills and competences with education's current demands. Interestingly, these demands engage very well with ICT through the integration of resources that may drive learning processes and obtain information for the development of students' projects.

Lopez (2009) explains that, in Colombia, Fundacion Gabriel Piedrahita Uribe (FGPU) proposes a model of curricular integration of ICT that is gradual and takes into consideration the variables followed by the process in an educational institution regarding institutional direction, ICT infrastructure, teaching and digital resources. Also, FGPU affirms that teachers go through different stages in their professional practice before reaching a level of competence in the integration of ICT in teaching and learning processes.

According to Coll (2009) integration of ICT in the classroom must focus on the analysis of its implications on student learning (which are contingent on multiple factors) and may also be considered as support to modify educational practices that benefit the creation of inclusive learning environments.

METHODOLOGY

TYPE OF STUDY AND DESIGN

This research was developed as a case study intended to understand the complexity of a particular phenomenon (Stake, 2007; Perecman & Curran, 2006; Yin, 1989, cited by Paramo, 2011), which is to say the dynamics occurring in the transition of a district educational institution in regards with the use and appropriation of ICT to generate a description of how the phenomenon happens in a natural context. This research design was selected because it allowed to define the use of ICT in an institution as an entity that is susceptible of being submitted to an in-depth analysis through quantitative and qualitative processes (Hernandez, Fernandez, & Baptista, 2010).

The scope of the research is descriptive-comprehensive, to the extent that it wanted to understand the use and appropriation of ICT in preschool based on a description of the practices that are developed with ICT in the transition of a district educational institution, parents' expectations and children's' interests.

PARTICIPANTS

The study was conducted in a district educational institution in Bogota, which services a population of SEL 1 and 2 in the locality of Bosa. Participants were five preschool teachers and twenty-five kindergarten students with their respective guardians. This institution's preschool level is made up of kindergarten only.

CHARACTERIZATION OF THE INSTITUTION IN REGARDS WITH ICT

The educational institution has ninety-two computers arranged in three computer rooms, aulas amigas, library, audiovisuals room, multipurpose room and natural sciences area classrooms. Some equipment is found in the teachers' lounge: one for preschool and elementary and one for high school. The number of students per day is of 1,650, divided by the number of computers to which they have direct access, results in a computing density of 17.9 students per computer in the institution (Sunkel, 2009).

Kindergarten has access to the elementary computer room once per week and to the preschool computer room once per week; fifty-minute sessions have been allocated for each class. In this room, the preschool homeroom teacher develops the activity, which means there is no computers teacher. This room's schedule organization took into consideration the recess of the elementary level as idle time; following this recess, comes the preschool level class, according to the classroom's work organization and institutional commitments, the room can be used for an hour and a half on a weekly basis.

The procedure to access the aulas amigas, library, audiovisuals room, multipurpose room, laptops, video recorder and photo cameras must aide by the institutional schedule and requires booking the space (which will be assigned depending on availability and type of activities to be developed). Some of these spaces and materials are subject to the administrative operation, which starts after 8:00 a.m.

TEACHERS

The five teachers that participated in this study formally work for the district and are preschool education professionals. Their teaching experience ranges between fifteen and twenty-five years of working in preschool at private and public institutions. They have been engaged in the current institution for nine years, a time in which they have

shaped the work group and have undertaken kindergarten's curricular design.

STUDENTS

The children that participated in this study are in kindergarten (known as Transicion in Spanish) and are between five years and six years and ten months of age. It is important to state that the research stage of the analysis of ICT practice involved five groups of preschool, each with twenty-five students, for a total of one hundred twenty-five. However, surveys and interviews related with ICT were only developed with a group of twenty-five students (thirteen girls and twelve boys) and their respective families, due to the access and contact between the researcher and the group on a day to day basis.

FAMILIES

The families that were part of this research were represented by the child's guardians in the institution, who consented to the research and participated in the discussion groups; parents that were interested and willing to participate were invited to do so.

The highest percentage of families have high school studies and posterior technical studies. The remaining 44% has elementary, incomplete and complete secondary studies (up to 9th grade). 52% of the guardians are homemakers, 28% have formal jobs that pay social security, 16% do not have a steady job and work per days in family homes, the remaining 4% is engaged in technical studies at SENA.

PROCEDURE

This research was conducted in two stages: connection with ICE in daily life and ICT and its connection with education, as follows:

Stage 1. Connection with ICE.

This stage delved into the knowledge and daily use of ICT in teachers, students and families' personal lives in order to establish what they understand from ICT, the devices they know, the devices they have access to and the appropriation that has taken place in their daily routines. Surveys aimed at teachers, students and families were used to gather this information.

Stage 2. ICT in education.

This stage looked into families' expectations and students' interests regarding the use of ICT in the school, and the knowledge and practice of teachers in terms of incorporating ICT into their pedagogical practice. To obtain this information, teachers were given surveys and families and teachers participated in discussion groups. An audiovisual record of nine classroom sessions was kept to recognize the usage and appropriation practices of ICT by preschool teachers and students' participation to proposed activities. The

UTAUT survey was applied to understand the attitude of teachers in terms of incorporating ICT into their pedagogical work.

The instruments illustrated in the following chart were used to compile the information of the use of ICT in preschool.

INSTRUMENTS

Table 2. Instruments used in the study

TEACHERS	FAMILIES	CHILDREN
Class observation form. Audiovisual material Surveys: relationship with ICT. ICT in education UTAUT Survey Discussion group. ICT in education	Survey Discussion group. ICT in preschool	Survey Semi-structured survey Observation form. Class audiovisual records of uses of ICT

Source: compiled by the authors (2015).

ANALYTICAL STRATEGIES

The analysis of the information compiled by this research's surveys, interviews, discussion groups, class observation and document analysis was organized in a corpus as per the research's objectives; analysis strategies were established based on the type of information gathered, as follows:

The information corresponding to teachers' practices in the use of ICT (obtained with videotapes of sessions) was analyzed by means of the typologies proposed by Coll (2009), which were mentioned earlier in the concept framework, each was considered, then a description of the observed

experiences was classified and presented. These experiences of use of ICT were collected and analyzed with the curricular integration of ICT in stages proposed by Lopez (2009).

The information obtained from the Likert scale UTAUT survey that was applied to teachers was graded, the resulting average was the addition of the total score in the scale (PT) divided by the total statements (NT).

The analysis of the information provided by the students and families was conducted with the transcription of interviews and discussion groups. The analysis of the obtained reflective corpus and the data from the inquiries led to the organization of propositions in emerging categories, depending on the observed relationship and the use of the terms. Surveys' statistical data was processed and percentages were allocated as per each criteria established in the survey.

RESULTS AND DISCUSSION

It was found that the five preschool teachers include ICT in their pedagogical practices and leverage the technological resources available for preschoolers, especially the institution's computer room. Overall, the group of teachers has a favorable attitude towards the use of ICT in their pedagogical practices mostly because they have high expectations regarding their impact over students' learning; they believe ICT to be a didactic tool that may contribute to the teaching and learning processes because they assist the interaction between teachers-students-content through multiple resources and play (Coll, 2009; Bartolome, 2006).

Although the experiences found in the use of ICT do not precisely correspond to methodological innovations, these seek to contribute in children's learning taking their interests into consideration, the interaction that can take place between participants of an ICT-mediated activity and the analysis of teaching practices. A trend of using personal devices for institutional work is observed, maybe because the institution does not have the devices required by the teacher or because of administrative complications involving difficulties of availability for the development of an activity. This trend is characterized by the willingness and interest of the teacher to enrich students' experience and contribute in the development of their skills, this strategy is known as BYOD (Bring Your Own Device) and it allows different pedagogical proposals to be deployed through the teachers and students' technological devices. According to Johnson, Adams, Becker, Estrada, & Freeman (2014) this strategy will become more strongly incorporated in the educational sector in the short term.

In that sense, it is worth mentioning that curricular integration of ICT will not be possible without availability (or lack thereof) of devices in the institution, moreover when 40% of the students

who participated in the research do not have a computer at home. As stated by Sunkel (2009) with the difficulties and stakes that might occur in school, this is the space in which inequalities in access to ICT in the household can be significantly compensated, as proven by the experiences of teachers that have failed to have contact with a computer upon enrolling in the institution, in a few sessions, children learn how to handle a mouse and a keyboard and engage with children's educational software.

The only institutional provision concerning the use of ICT is a schedule assigned for each preschool group in the computer room, weekly. The work undertaken in that room with the students' group, as well as the other proposals to use ICT in institutional spaces, as found by Arbazua and Cerda (2011), respond to teachers' particular motivations that are not framed in institutional programs nor explicit in kindergarten's curricular program; the academic debate it would draw and its continuity, regardless of homeroom teacher changes that take place in public educational institutions.

Throughout the use of the computer room (which only has two computing software for children) it is observed that the experience proposed by the teacher enables the deployment of an activity according to the children's interests and knowledge, the leveraging of existing resources to strengthen children's skills and promote cooperation among peers. However, it was observed that seldom, the work in the computer room was related to classroom projects.

It is evinced that despite the changes and conviction regarding the use of ICT by the preschool teachers who participated in the research, some restrictedly use ICT in the planning and/or production of didactic material (Coll, 2009; Cabero, 2007), particularly due to lack of knowledge of useful software and to the lack of appropriation of technological devices that might contribute the teaching and learning processes.

The reflection of the use of television should be considered in preschool teachers' schedules, this media offers a wide array of shows that meet the demands of new generations and add to children's learning; the popularization of children's programming networks includes shows that allow the child to answer questions, make crafts with step-by-step instructions, be in touch with content in a second language, explanations of scientific concepts or awareness of animal and vegetable species that are unlikely to be found in their daily context. Public networks such as Señal Colombia and Canal Capital offer children's programming with national and classic children's shows that deliver to the development of basic concepts such as classification, counting, approach to conventional reading and writing, nature, coexistence and problem-solving, among others.

In the family's setting, an important finding is the acknowledgement by most guardians in terms of

the contributions of computers, tablets, television and other devices to the learning and development of different skills in children. It is not about expectations; they have tested children's performance in handling the devices and in deploying acquired knowledge in different situations and daily conversations. It is emphasized that families ensure guidance and accompaniment in the use of different devices in order to prevent potential contact with inadequate content and guarantee the selection of games and apps that positively influence children's educational process. There is a clear contribution of the use of computers at home in terms of the interaction between children and families, in the majority, children accessing virtual content are accompanied by their families and share their experience together, thus, strengthening emotional bonds between them.

Children are exposed to direct contact with new social forms of reading and writing with their observation regarding the use of ICT in their family context, as proposed by Kristcautzky (2012), Ferreiro (2011) and Cabanellas (2006), which leads them to create an idea from the contexts of use of written language promoted by ICT. Kindergarten students are familiar with text messages, instant messaging and chats. Moreover, it is important to add that families do not have restrictions with children being present when they log in to their social networks; in some cases, they let them use apps and games that are considered suitable.

Although most participant families acknowledge the potentiality of ICT over learning processes and its importance their children nowadays, they fail to mention their expectations in terms of what the educational institution could contribute with the use of ICT at children's age. It may be concluded that this attitude comes from school guardians' traditional ideas, which makes it difficult for them to have alternative teaching concepts that differ from their own experience, and on the other hand, from the passive role that family's expectations and interests have had in connection with their children's learning process (Bartolome, 2006).

As for the children's interests in terms of the use of ICT in school, it can be said that their prefer playing, meaning engaging in the exploration of a computer or device on their own to be able to play, discover and share. It is important to highlight that interaction between peers when using ICT enables zones of proximal development (Vygotski, 2000) since children that are more skilled in computer handling act as guides to those with less experience, thus contributing to their learning. Practices in the educational institution of the study do not reveal differences in skills or willingness to work between genders: male and female children manipulate the devices with the same ease and curiosity.

In summary, the ICT activities conducted by preschool teachers in this institution are strongly led by children's interests and limited by the available software and/or connectivity. Although families get involved in the students' training

process and this is crucial in the development of kindergarten's curricular plan, it is necessary to further encourage their participation in decisions concerning curricular design and exchanging ICT learning experiences within the family context to enrich the children's learning process.

The following ideas may guide the construction of a proposal of curricular integration of ICT as per the practices found by this research and the concerns resulting its analysis.

NOTES ON CURRICULAR INTEGRATION

ICT on its own is not enough to transform schools nor it is useful to renovate the practices that perpetuate traditional education, the idea has to transcend those who are present in the classroom or in the school's daily life. These tools have to be made visible in terms of the ways in which they change the way of teaching, of creating bonds between teacher-students, student-student and content (Gandara, 2012; Coll, 2009).

The process of curricular integration of ICT must start with the teacher's willingness to learn how to use software that may add to their classes' planning and development, to the creation of virtual didactic and physical material through computing tools, and also aid in the evaluation, design and presentation of didactic material through technological resources to enhance learning environments in the development of classroom projects, moreover, to design learning experiences for preschoolers to produce and express their ideas regarding their understanding of the physical and social world that surrounds them.

It is important to take into consideration ICT mediation to benefit the teaching-learning process as a complement of the multiple experiences that preschoolers require. As proposed by Sanmarti and Izquierdo (2006) it is not possible for learners to build their understanding on a specific concept just by using specialized software or information available on the Internet, interaction with a specialized adult is necessary to tailor the activity to the characteristics and interests of students, thus encouraging an exchange between peers and enabling learning.

In this respect, the key element delivered by ICT is play, an activity that allows accessing information, building knowledge by corroborating ideas and enjoying newly acquired knowledge (in this case, for both preschool children and teachers). It is important to add that play is one of the three pillars of preschool education and is considered an activity through which the child builds knowledge and understanding of his/her surroundings (Decree 2247 of 1997).

The following is a list of strategies that can be undertaken to achieve curricular integration of ICT in preschool, bearing in mind the characteristics of the educational institution.

- Conducting an inventory of the technological devices that are available in the institution and become familiar with the administrative protocols to access them.
- Having socialization and feedback sessions with the group of preschool teachers regarding handling and operation of ICT available in the institution; exchanging ideas on the possible pedagogical activities that might be supported by the use of ICT and complementing didactic materials available in the classroom.
- Recognizing activities that students may develop with the software available in public institutions.
- Building an audiovisual record of classroom experiences by the teacher and motivating children's participation with video recorders and photo cameras to keep a visual record of daily activities that are meaningful to the group.
- Developing didactic material with the support of basic design software, such as Publisher, to create worksheets connected to the classroom projects.
- Designing interactive didactic material with the aid of software such as PowerPoint, Scratch or Micromundos, or developing blogs to encourage children's participation.
- Locating and sorting a list of online resources to help preschoolers' learning process.
- Using personal devices with the institution's Internet connection to collect information that might add to the classroom projects.
- Using videotapes to develop children's oral skills and image acknowledgement.
- Applying existing writing tools in computing software to allow new written forms.
- Using social networks such as Facebook, Edmodo or blogs to encourage joint activities between children and their families in order to strengthen learning processes.
- Selecting and organizing audiovisual material (children's movies, TV shows, online videos or institution's videos) according to developmental processes and contents in order to access these materials and support learning included in the study plan.
- Becoming familiar with television's educational offer and free educational apps for mobile phones or tablets to suggest them to the families and contribute to children's learning that is based on ludic and interesting activities.
- Using the video beam to screen sets to enrich theatrical play and dramatization.
- Connecting students' families through a socialization of ICT implemented by teachers of the institution with preschoolers, creating touchpoints to share strategies and apps and to discover possibilities of the use of ICT in the households.
- Looking into students' prior knowledge and skills in terms of handling devices, in order to

contribute to their learning process and create environments to encourage them to teach their peers.

- Acknowledging children's interests and involving games that are familiar and that benefit their training process.

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