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## Knowledge of the natural and social environment in ICT consumer children

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### Abstract

This study shows the influence of the current technological culture and ICT in the dynamics of socialization and the process of interaction with the reality of 2 to 4 year old children who are active or passive consumers of digital technology. Following the action-research method proposed by Kemmis (2010), the results of a previous study conducted with students of the Early Childhood Education Degree are analyzed. An alteration is observed in the children’s mental representation of the natural and social reality, in their interpretation and interaction, showing the need to develop a training program for prevention and correction, together with students, teachers and parents-mothers. Pedagogical, educational, psychosocial and technical characteristics that the program should have are provided, in order to contribute to the prevention and intervention on the issue, from the attention to health and transcultural variables, such as emotional expression, self and co-regulation characteristics, the socialization patterns, the development of attention and memory, motor skills, motivation and horizontal technology transfer.

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### 1. Introduction

It is perceived by society and educational institutions current technological culture and ICT, have an influence in the dynamics of socialization and the process of interaction with the reality. This effect is even more noticeable in 4-

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5 year old children who become active or passive consumers of digital technology since very little or since they were born.

### *1.1. History of ICT use*

According to Aste (1998), ICTs were born in the 60s, when resources such as television, radio and telephone were incorporated into daily routines. In the beginning of the Cold War a first version of the Network with clear military targets was created. In the 70s, some schools began using mini-computers and mini-frames for administrative tasks and Apple contributed by donating some computers. In the 80s, the computer TI99 introduced a new generation of computers for its use in schools and offices, called “Desktop Models” and software tutorials and educational games were developed (Aste, 1998). In the 90s, multimedia computers started to be sold, and complete programs were developed, such as educational databases and simulation programs, which contributed to modernizing the functionality of the software. In this decade, the Internet (World Wide Web) revolution emerged causing a boom in the educational field and allowing the development of more multimedia programs. From the Twenty first century onward, ICT allow the processing, transformation, dissemination and communication of information and Internet has become a mechanism of propagation of information and a means of collaboration and interaction between individuals and their computers, regardless of their geographic location.

### *1.2. The Society of Information and Communication (SIC)*

Today's society has become the Society of Information and Communication (Gonzalez, 2008) in which technologies facilitate the creation, distribution and manipulation of information on cultural, social, economic and political activities. It is staging a historic change of mentality in which ICT will modify human behavior worldwide (Bauman, 2007). However, in the midst of the maelstrom, it is necessary to stop and reflect on the path chosen by humanity towards an exacerbated consumerism which imbalances the planet trying to redirect to a sustainable and balanced development (Louv, 2009), in order to avoid future consequences which could be dire.

Since the emergence of ICTs, its use is not bounded to the educational field but extends to all areas of a person's life. Therefore, it is very difficult to establish a control when it has become another tip over our body and it is used at any time, and any moment in any context. Overexposure to the use of digital technology and its lack of limitation has caused a cultural change in society in which new generations of children will be full-time consumers of ICT and it is not known the impact this can have on their overall development as individuals.

Authors such as Aroldi (2007) and Silverstone (1999) illustrate in a very effective way this concern:

“Indeed consumption and mediation in numerous respects are fundamentally interdependent. We consume media. We consume through the media. We learn how and what to consume through the media. We are persuaded to consume through the media. The media, it is not too far fetched to suggest, consume us. [...] Consumption is itself a form of mediation”.

In this sense, digital culture can be considered as a global phenomenon that transcends cultural boundaries, therefore encourages transculturality and fulfills a horizontal transfer of technology. This dizzying trend must be regulated to complete the natural ecological cycles described in the architectures of educational practices (Bronfenbrenner, 1979) and in the ecologies of practices (Kemmis et al., (2009); Capra (1995) and Schatzky (2002)) and to persist in the sustainability of progress in the field of education. Nevertheless, Prensky (2010) states: “We are not going through a transition to another faze of stability, and that is the key point. People will always be behind now and that will be a stress they have to cope with”.

In early childhood education, and with an incipient development of consciousness and autonomy, students face a double influence of new technologies. On the one hand the relationship with adults and children within their families, is associated with the consumption of digital technology: video games, cyber, mobile games, laptops, video games, digital cameras, etc. Parents increasingly downloading stress of caring for children or having to care for them in a few hours of their busy lives, providing electronics for domestic consumption at the same time provide them with entertainment and pleasure, while they work, study or face the housework. On the other hand, the relationship with peers and teachers at school is also mediated increasingly by the computer world.

### 1.3. The term “Digital natives” and its educational implications

Our concern for this issue arose from the sporadic observation of the reactions of children in childhood age, when they were prevented access to electronic resources and devices to which they were accustomed (Buckingham, 2000). Prensky (2010) defined “digital natives” as those born into an innate “new culture” while the digital immigrants are old-world settlers, who have lived in the analogue age and immigrated to the digital world. According to UNESCO (Policy Brief, 2011), digital natives represent the first generation to grow up with this new technology. They are used to all kinds of digital toys and tools, which are an integral part of their life. Digital activity is like a mother tongue for them. They are the generation of technological acceleration, of the Internet and its networks. Growing up in such an environment, they think and process information in a totally different way than previous generations: their thinking patterns have changed, and Mark Prensky (2010) says it is likely that their brains have physically changed, too. They are “native speakers” of the digital language. This is such a radical change, that there is a big discontinuity between their generation and previous ones.

At a didactic level, it poses a serious problem in the classroom: the use of new technologies in the school context, even to perform a task, strengthens non-relevant behaviors in relation to consumption, or provokes an alteration in the process of knowledge and interaction with reality, if it has not associated a deconstruction of mental formulations linked to it, or if it has not provided spaces for students to become aware of what is happening with these new media in which respects to learning, interacting, getting to know their environment or doing a task.

Given the above background, we proceeded to carry out a study whose aims were:

- a) To develop a specific study on Early Childhood Education to provide qualitative and quantitative data on the impact of new technologies on the following variables health and transcultural in children Childhood Education: emotional development, interaction with objects, socializing with peers, attention interpersonal, working memory, motor skills, and that help to generate awareness of this reality parents-mothers and teachers.
- b) To provide educational keys to developing a positive relationship of children with ICT in school and social and family environments.

## 2. Material and methodology

This study was conducted with students of the Early Childhood Education Degree who performed their practical training in different Early Childhood Education Schools in Navarre (Spain). The implemented methodology was the action-research method proposed by Kemmis (2009), which aims at changing three things: practitioners’ practices, their understandings of their practices, and the conditions in which they practice. These three things – practices, how we understand them, and the conditions that shape them – are inevitably and incessantly bound together with each other.

In the class context, two interviews were designed to study students’ habituation to any technological device: one of the interviews was directed to teachers and another one, to parents-mothers of 22 subjects. Sixteen students constituted the experimental group (EG) and eight (who did not use any technological device), the control group (CG). The EG were active consumers of technology, and had a Tablet and a PlayMobil hardware whose use was allowed by parents-mothers who organized almost all routine activities with their children, including entertainment and leisure, or entertainment while eating or bathing. Subjects who accessed the mobile of their parents as an element of play were also included in this group. The CG belonged to traditional families who had chosen to preserve their children's access to technological consumption until they were older. For six learning situations (LS) behaviors of children in relation to the six studied variables were observed:

LS1. Story Group

LS2. Working with Tablet / No Tablet during lunch.

LS3. Activity in threes with a Tablet to name types of objects.

LS4. Observation of the leaves of the trees in a park when using a PlayMobil hardware.

LS5. Class session about food.

LS6. Search known animals figures in a photo album

### 3. Results

It is noteworthy that there were differences between groups in emotional responses projection feelings towards inanimate beings. The EG did not show distressed with the told story, because they recognized that "the characters were not real" and did not associate history to situations in their real environment. In the CG a projection of feelings to real situations showed evidence is very limited. Greater projection of feelings and greater deployment of imagination was evidenced.

The EG was not able to tell the difference between real food and the observed on the screen. Unlike the CG, the EG showed preference for foods they had on the displayed screen and showed disdain for the color, texture and flavors of real foods that were part of their lunch; therefore, they gave greater "validity" to the virtual object representing food than to the real one.

Regarding the use of the Tablet as an object of socialization with peers, the EG showed a clear trend of individual work. Each student wanted to dominate the tablet, and could not agree with the other children to complete the worksheet given by the teacher.

EG students preferred virtual objects instead of natural objects. In the experiment, they chose to collect evidence on the type of plants from the indications of the PLAYMOBIL hardware, instead of manipulating, smell, touch, natural leaves that were in the park. They did not care interacting with the teacher in a natural context.

As to working memory, a decrease in the EG was shown in the number of words in a series they were able to memorize (no more than four). In the case of the digits, no more than three. The short-term memory was being influenced by an overstimulated sensory memory. Conversely, the CG showed greater retention capacity words and the series of digits, associating them more easily to an explanation given in class by the teacher regarding a topic related to food.

Finally, in developing fine psychomotricity, group differences were also observed. In the activity of manipulating a photograph album to search for the animals they knew and that they were asked to identify, EG used mechanisms related to operating in virtual media, such as "touching the screen"; "Moving the picture"; "Selecting an icon"; "Backtrack", etc., and students showed desperate to have to move sheet to sheet to achieve the goal. By contrast, the CG used fingers and clamp position and touched the figure sought associate in the memory. CG expressed patience to search and joy at finding the sought object.

### 4. Discussion and conclusions

Once analyzed the results through the six dimensions and variables used for the study, we can confirm there are clear indicators of ICT excessive consumption by 4-5 year old children, of lack of control in the time and the webs accessed by children, of lack of attention in children and lack of care for children when parents consume ICTs, of altered socialization dynamics in which virtual wins the real, of an alteration in children's mental representation of the natural and social reality, of their interpretation and interaction. If we continue this indiscriminate use of ICTs, without stopping for a critical reflection (Kemmis, 2009; Spitzer, 2014; Honoré, 2004; Carr, 2010), there may be negative effects in the health, social and educational field. In the field of health, it could affect a trend toward a sedentary lifestyle, with consequences such as obesity, ergonomic problems (in the cervical vertebrae, lumbar) and visual disturbances (tired eyes, dry eyes); in the social field, it could give more importance to the virtual than to the reality, and language body and interpretation and interaction would suffer an alteration since there would be less elements to interpreting the reality; in the educational field, several aspects would change (Carr, 2010) such as our cognitive structure and the way we learn, think, read, write and remember. We are facing a new revolution which goes always ahead of us...whose management can bring anxiety and stress. As we mentioned in our last objective, all these changes must be contemplated in a protocol or program for the prevention and intervention, addressing pedagogical, educational, psychosocial and technical characteristics. ICTs will continue to develop, but we must establish some rules to navigate in the huge amount of information; otherwise, we will be in danger of drowning in the ocean of ICTs. In the anthropocentrism towards technology leads us, we must not forget all the positive

psychology techniques which deepen in the human values (Seligman, 2002; Csikszentmihalyi, 2014). In this very sense, Prensky (2001) stated: "Let us hope that the technologies of the future will also be designed to protect that which is sacred, and that which is important in our own understanding of being human".

A good regulation in the spaces of interaction with peers using electronic devices, allows students to determine the choice of some objects, how to enjoy them, when they hurt us, how to exercise their control, how to get out of their dependency, etc. It is easier to learn if there are joint spaces where peers of the same age reflect on these processes.

At the level of mental health, deregulated ICT use is causing negative development of variables: emotional development, interaction with objects, socializing with peers, interpersonal attention, working memory, motor skills...; so to our understanding, it is necessary to study this issue, and prevent and intervene on those situations that represent its antithesis.

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