REVISTA CÁTEDRA

Percepción de actores educativos acerca del uso de dispositivos móviles: un estudio de caso

Perception of educational actors about the use of mobile devices: A case study

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(Received on: September 10, 2019; Accepted on: September 12, 2019; Final version received on: September 16, 2019)

Suggested citation: Maldonado-Garcés, V., Balladares-Burgos, J., Rivas-Toledo, A., (2019). Perception of educational actors about the use of mobile devices: A case study. *Revista Cátedra, 2*(3), 40-54.

Resumen

La implementación de metodologías innovadoras relacionadas con el uso de recursos digitales ha permitido una participación relevante de las comunidades educativas. Este artículo da cuenta de las miradas de los estudiantes y docentes de una institución educativa fiscal beneficiaria del Proyecto Aula Digital Móvil ejecutada por Fundación Telefónica en el marco del Proyecto Profuturo y articulada con el Ministerio de Educación del Ecuador.

La investigación pretende determinar la percepción tanto de los docentes como de los estudiantes con respecto al uso educativo de dispositivos móviles. Se empleó el método inductivo, de manera que el punto de partida fueron los datos proporcionados por los 70 niños en edad escolar y 10 docentes para realizar la construcción de las categorías.

El 75% de los participantes de esta investigación asocian el uso del dispositivo móvil con el aprendizaje, refiriéndose además a un aprendizaje adquirido de forma divertida. Además, mencionan que la tableta les permite acceder a información, conocer otras culturas, posibilita la investigación lo que genera un aprendizaje significativo.

El dispositivo móvil dentro del aula ha logrado resultados positivos en los procesos de aprendizaje, la totalidad de los participantes perciben y valoran el recurso como positivo, lo asumen como un puente que les acerca al conocimiento de otras culturas, les da la posibilidad de investigar, de aprender valores, contenidos de asignaturas y de acceder a la lectura.

Palabras clave
Aprendizaje, dispositivos móviles, percepción, tabletas.

Abstract
The implementation of innovative methodologies related to the use of digital resources has allowed a relevant participation of educational communities. This article provides the views of the students and teachers of an educational institution benefiting from the Mobile Digital Classroom Project executed by Fundación Telefónica, part of the Profuturo Project and articulated with the Ministry of Education of Ecuador. The research aims to determine the perception of teachers and students in relation to the educational use of mobile devices. The inductive method was used, thus, the starting point was the data provided by the 70 children of school age and 10 teachers to perform the construction of the categories.

75% of the participants of this research associate the use of the mobile device with learning, also referring to the learning acquired in a fun way. In addition, they mention that the tablet allows them to access information, to know other cultures, to enable research, which generates significant learning.

The mobile device within the classroom achieved positive results in the learning processes, all participants perceive and value the resource as positive, they assume it as a bridge that brings them closer to the knowledge of other cultures, gives them the possibility to investigate, to learn values, content of topics and access to reading.

Keywords
Learning, mobile devices, perception, tablets.

1. Introduction
In the framework of the National Good Living Plan 2017-2021 and Ecuador's Nine Development Goals, Ecuador's Ministry of Education presented in 2017 the Digital Education Agenda (2017 – 2021) which aims to "strengthen and enhance the education-learning process in the National Education System through the increase of innovative practices that integrate technologies to empower learning, knowledge and participation" (2019, p. 2).

The Digital Education Agenda is based on a structure composed of five axes: Physical Axis, Axis of Digital Learning, Axis of Teaching Development, Axis of Communication and Promotion and Axis of Innovation. According to the Digital Education Agenda Approach, the fifth axis on innovation presents the mobile digital classroom as a pedagogical transformation project that looks for the insertion of technology into the classroom.

Based on these approaches, Fundación Telefónica, along with the Profuturo Proposal, implements the Mobile Digital Classroom Project in 70 public schools in Ecuador to benefit around 12,600 children and 2,100 teachers. Thus, it is meritorious to study the perception of educational actors about the use of mobile devices, in order to review whether teachers and students accept or reject the use of technology in the classroom.

In addition, another objective is to analyze the usability of resources in the framework of learning teaching processes. This topic becomes important when related to educational quality. The use of technology could be a decisive factor capable of achieving meaningful learning in education, reason for which the perceptions of teachers and students about the implementation of the Classroom Digital Profuturo Project have been analyzed. On the other hand, perceptions were categorized and these results were related between teachers and school-age students.

For the purpose of this study it is important to review the objective of the Mobile Digital Classroom Project, which aims to:

> Contribute to the acquisition of skills of children, through technology, and the empowerment of teachers for the implementation of innovative teaching methodologies (Telefónica Foundation, 2017, p. 1).

The public educational institution participating in this research received a set of technological resources from the Telefónica Foundation. These consisted of a computer, tablets, a charging hub, a Wi-Fi router, a mini projector and a strip. In addition, the Mobile Digital Classroom, through the tablet device, has several resources that students can access under the guidance of the teacher. The digital classroom offers a base of digital content and activities arranged on its platform: weclass.

Training and accompaniment to teachers and authorities of the schools where the project was implemented is an important axis in the implementation of the digital mobile classroom. Teachers received pre-implementation training of the project. Courses were conducted under face-to-face using the reverse class methodology and also the training was carried out through a virtual platform weclass.

All these actions occur in the area of digital learning. It refers to the new teaching and learning practices typical of the digital age. Its objective, for MINEDUC, is to develop critical thinking, creativity and prominence in solving life's problems in students and teachers. These strategies must be linked to the environment, using virtualized digital objects in a playful, visual and intuitive way. To make this possible, a decisive factor is the perception of teachers and students in the face of digital learning.

Perception is placed within the so-called basic psychological processes. According to Colmenero (2014), "perception is as a complex transformation of the effects that stimuli exert on our sensory systems on information and knowledge about the different elements, objects and entities of our environment" (2014, p. 46). From this, perception can be considered as one of the most important psychological processes, because it is at the basis of our ability to develop in the world.

The definition of perception has evolved over time. Various disciplines, such as Anthropology, Philosophy and Psychology have studied this topic. Perception is the cognitive process of consciousness that consists in the recognition, interpretation and

significance for the elaboration of judgments (Vargas, 2004, p. 48). It must be emphasized that when talking about perception, ideological and cultural references are involved that reproduce and explain reality, in this way they are applied to the various experiences of the regular basis.

2. Related studies

First, one of the studies carried out on the subject is that of Arancibia, Cosimo and Casanova (2018), which refers to one of the most recurrent perceptions of teachers in language on the use of ICT in the school context. They determined that these are important sources for teaching and for preparing the material. They also point out, as a result of the study, the facilitation of learning thanks to the use of tools such as videos, documentaries, power point presentations, hence, allowing to develop "playful" and "entertaining" classes. They also maintain the concentration and interest of students due to the closeness and naturalness with which digital natives use these technological tools in their daily lives.

Secondly, another study on this subject is the one published by the electronic educational research journal entitled "The Perception of the Usefulness of Technology conforms its use to teach and learn", study which concludes that technology is beneficial for achieving learning objectives, selecting curriculum content, organizing time and space for learning, and improving the quality of learning (Badia, Chumpitaz, Vargas and Suarez, 2016). It is important to clarify that the participants of the above study were teachers and the results were not correlated with the perception of the students.

Thirdly, another study on this subject is "Using Information Technologies in the Classroom" (Jaramillo, 2005). Children between 8 and 11 years old participated in this work. Evidence suggests that, in general, students when using the computer do not develop arguments around a topic, nor do they recognize the need for information. In the same way, they do not advance activities that facilitate the development of products to express their understanding on any subject.

Fourth, another study on this topic is the one entitled "Perceptions of Young People about the use of information technologies in the school environment" (Silva, Borrero, and Marchant, 2006), which points out an important result: students perceive that teachers do not value ICTs in the teaching/learning process, so they feel that they place restrictions on use in different subjects. This difference in vision means that technologies do not enter the school process and leads young people to establish different strategies for the use of ICTs.

The results of these investigations provide valuable information. The data show the perceptions of teachers and, on the other hand, of students in the university field. This study will provide data on school-age children and is also intended to categorize students' perceptions about the educational use of mobile devices and something useful is the possibility that this research allows to relate the perception of the teacher with the perception of the student.

3. Materials and methods

This study refers to the case of a regular educational institution that offers Elementary School. It is located in the historic center of Quito, capital of Ecuador. Its teaching mode of study is face-to-face.

This research is descriptive and qualitative type. The design is non-experimental with a descriptive cross-sectional type, because the aim is to examine the impact on students' and teachers' perceptions of the tablet use. The level of this research is descriptive as it seeks to characterize the impact of the use of tablets on teachers and students.

3.1 Participants

The students from this school who use the tablet in their learning process participated in this study. The population is composed of 160 children from the second to seventh year of Elementary School. The sample was made up of 70 children, 10 teachers and authorities from the educational community, who authorized the work with the above sample. The inductive method was used, so that the starting point was the data provided by children and teachers to carry out the construction of the categories.

3.2 Normas éticas de investigación Ethical standars of research

Informed consents were signed with research participants (institution managers, teachers and parents). The children signed an informed consent.

3.3 Instruments

Semi-structured interviews with teachers from the educational institution were conducted in this study, and focus groups were also created; however, emphasis was placed on the fieldwork with 70 children. 21 are in the fourth year of Elementary School, 26 children are in the sixth grade and 23 children are in the seventh year Elementary. The instruments used were validated by professionals in the field of Education and Psychology.

The children participating in this research make regular use of the tablets in the classroom during the approach of the different subjects and contents according to the official curriculum in force since 2016. These children actively collaborated in the proposed activity of handwriting a letter where they were asked to express their perceptions of the use of tablets. The children wrote freely with the slogan that the letter would be read by children from the Amazon region of Ecuador who did not yet know anything about tablets and their use in the classroom.

3.4 Data analysis techniques

An encoding of the data involving segmentation in topics was performed to place them in the different categories. As for these categories, they were determined from the analytical questioning and mental comparison of the different situations reflected in the data. Part of the process included an analysis of letters written by children to establish categories that encompass children's perception on the use of tablets in the classroom.

3.5 Procedure

Initially an interview was conducted with the highest authority of the Educational Institution to share the objectives of the research project and request an authorization to start the study. Subsequently, the focus group was conducted with the teachers who received training on the use of tablets in the classroom, in order to detect their perceptions, fears and expectations about the use of a digital resource during the classes.

Individual interviews with teachers were consecutively conducted with the aim of analyzing the pedagogical and didactic work they perform during the teaching process and perception about the educational use of mobile devices. In a next step, children were included in order to explore their senses, emotions, perceptions about the educational use of mobile devices. Subsequently, comments were made during classroom work and the various activities proposed outside the classroom, specifically in recreational spaces. The information obtained was classified into categories according to the expressions of the students.

4. Results

The results obtained in this research are presented in relation to the objective of "Determining the perception of teachers about the educational use of mobile devices".

In the focus group prior to the use of tablets in the study school, teachers mentioned certain fears referring to:

- Fear of possible damage from tablets.
- Replacement of the table in case of damage.
- Poor training in the software of the tablets.
- Commitment to carry out the project at the Institution.

Teachers' expectations can be detected:

- Digital resources are an instrument for improving learning.
- Fears will go away with the practice.
- Extended training to replicate what has been learned.
- Children will get to use tablets better than teachers.
- Parents will accept the use of digital resources in the classroom.
- The software is viable to generate other programs.

In individual interviews, teachers expressed their experiences in using tablets despite the fears expressed prior to the implementation of the use of digital resources. They currently value positively the use of technology in the classroom. They mention that children have greater openness, that education becomes more practical and that by manipulating, seeing, observing they learn and understand much more. They also add that the use of tablets is positive because it is a tool that attracts the attention of children and, because they like it, they concentrate more. In addition, teachers refer to tablets as motivating resources that give children the opportunity to experiment, excel, not limit themselves and go further.

Below are the results that account for the goal of determining the student's perception of the educational use of mobile devices. Likewise, the categorization of students' perceptions will be observed according to the level of basic general education they pursue and, also, the relationship of perception among educational actors.
In the Children's Group of Elementary School, responses about their perception of tablet use were classified into the following categories:

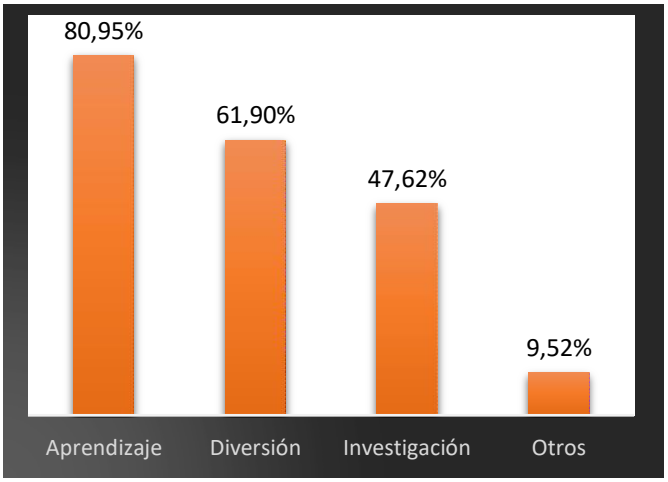

Figure 1. Categories of 4th grade

One noteworthy aspect is the reference made about the tablet being used to investigate. It is a remarkably positive indicator because educational institutions must foster an interest in researching, consulting, discovering and investigating, and this is precisely what children are referring to. It is observed that the teacher applies "the reverse classroom" during the teaching process.

The inverted classroom or flipped classroom is:

> A teaching method whose main objective is for the student to assume a much more active role in their learning process than the one they traditionally occupied. The main idea of this methodology is framed in the possibility for the student to review, study, report theoretical concepts with the support of various resources or tools (Berenguer, 2016).

The research carried out shows that the participating teacher motivates their students to carry out a previous home review of the content that will be addressed in class, the children carry out that review not only by using internet since not everyone has electronic devices in their homes or internet access, children can research through other resources mentioned: physical texts, newspapers or information extracted from their relatives. They come to the school with previous knowledge and also the possibility of having a time to review the contents in the tablets. This procedure helps them achieve meaningful learning as expressed by the teacher.

Significant learning is based on the following idea: "true knowledge can only originate when new content has a meaning in the light of the knowledge already learned" (Ausubel, 2002, p. 122).

The group of children in the Fourth Year of Elementary highlights the methodology of the teacher as motivating and significant in the research. One of the children expressed that working with tablets was the best thing that could have happened to him at school because he learned and had a lot of fun while researching with the tablet.

In the Sixth Grade of Elementary, the answers were classified into the following categories.

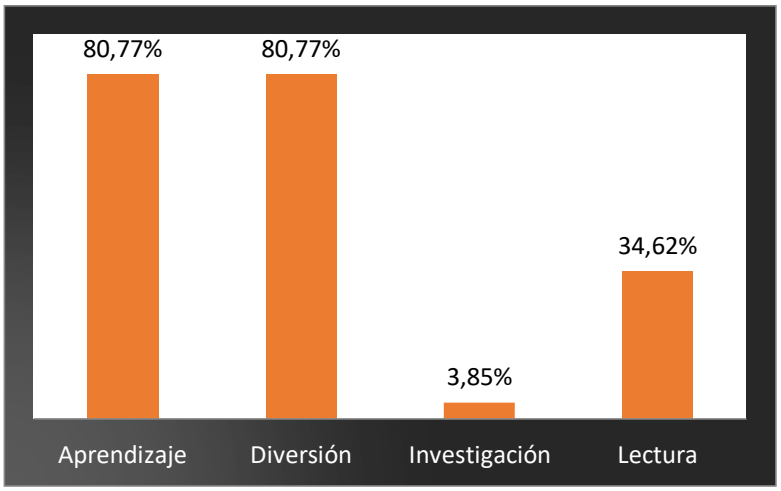

Figure 2. Categories 6th of Elementary

The results of the responses obtained in sixth graders are directly related to the answers issued by the fourth-year-old students in terms of categories. However, the students coursing sixth grade consider that the use of tablets is directly related with learning and fun. These two categories reach exactly the same percentage and a minimum percentage considers the tablet as a resource to investigate. In this group there is another category related to reading.

Another group of children consulted expresses that the tablet is used to read, this relates directly to what is referred by the teacher responsible for this group of children. In the interview the professor mentioned that the tablet is a good resource for children to read, especially stories as they consider the information loaded on the tablets to be very basic and poor. On the other hand, one of the children of this group expressed that using the tablets is "great", it is like using a book, but it is also possible to find stories, word search and many more things".

In the children's group of seventh grade, the responses that show children's perception of the tablet were classified into the following categories:

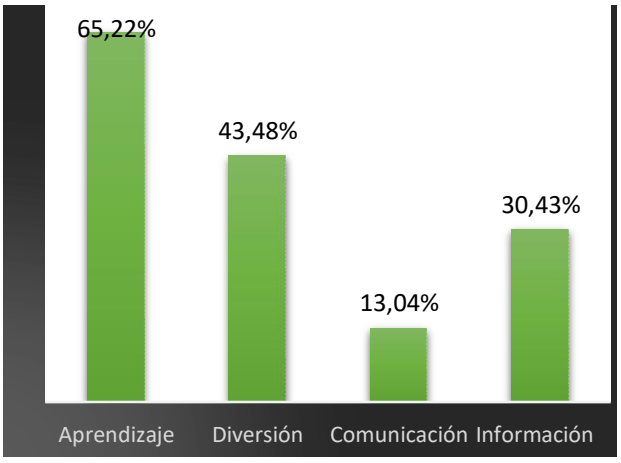

Figure 3. Categories of 7th grade

Two new categories appear in the seventh grade: communication and information. Communication is related to the use of social networks and information with the possibility of using the tablet as a resource to obtain information. These two categories were not

observed in the previous study groups. At this point, it is considered relevant to mention that seventh-year students aging from 11 to 12 benefit when they do things with their peers. At this stage they "develop skills necessary to practice sociability and intimacy, which allows them to have a sense of belonging" (Papalia, 2012, p. 336). This feature of the development stage of this group of children relates to the ideas they mention about the correlation between tablet use and social media. Children in this age "learn roles and rules as well as leadership, cooperation, and communication skills" (Papalia [2012], 336). This last aspect – communication - has a direct involvement with social networks. It should be clarified that in the classroom, teachers do not allow the use of social networks, the resources used are not aligned to this topic; however, the idea provided by children of this age should be considered.

The students in this group confirm what the students of fourth and sixth grade have pointed out, i.e., they perceive the tablet as a resource of learning and having fun.

5. Discussion and conclusions

Significant results were found in this study, since it is observed that 75% of children participating in this research associate the use of the tablet with learning. They mention that the digital resource allows them to access information in areas related to the subjects that are part of the curriculum. They also add that it serves them to "study" by referring to their pre-performance preparation of academic assessments.

Therefore, if tablets allow learning, it would be important to analyze educators' teaching strategies, i.e., consider the possibility that tablets also serve to teach thinking that technological resources are means to obtain the knowledge. However, it must not be forgetten that these are not an end in itself. The methodologies used in the classroom must be aligned to the surrounding world and respond to the interests of the students achieving a motivation to learning.

Several studies have shown that improving the teaching-learning process is directly linked to the motivational factor. Ospina (2006) stated that “one of the most relevant aspects for learning is motivation and there is no doubt that when motivation does not exist, students hardly learn” (p. 158). Students participating in this study showed signs of being motivated against tablet use. Their teachers also report positive aspects in the attitudes of students that would demonstrate a good level of motivation towards the use of the device, this would facilitate learning.

On the other hand, something that can be valuable is the perception that students express when referring to the tablet as an optimal resource to investigate. This is considered highly positive in view of the need for educational institutions to promote an interest in researching, consulting, discovering and investigating, and this is precisely what children are referring to.

Ossa Jorge (2005) in his study “Educate is to teach to investigate, research as a process of formation”, affirms the need to "demystify research with the aim of eradicating the myth that research is unattainable" (p. 526). Human beings can investigate in view that being human means being curious. Being an inquirer is not an elite business, it is natural to the human. Therefore, investigating at an early age allows the early development of scientific acquisition strategies.

If the tablet is seen as a resource for research, fact internalized in students, then teachers and the education system in general already has an excellent tool, a resource that can report quality access to knowledge. In this sense, a strengthening of the use of the resource is required in order to sustain and improve the student's view of this technological resource. Additionally, the fourth-year children participating in this study claim that the tablet allows them to carry out activities related to research. A relevant fact is that this result relates directly to the methodology used by the teacher responsible for the group, since it emphasizes research, awakening interest and curiosity in the inquiry of topics related to the areas of curriculum. The teacher considers that a book is limiting and that the internet and technology allow the students to go beyond what is established in the ordinary curriculum, thus, the professor daily runs the methodology of the reverse classroom to allow a more dynamic learning, and participatory with many possibilities of interaction between students. The use of the tablet for teachers is a key resource that allows the implementation of innovative methodologies in the classroom.

If thinking as Leiva (2008) who claims that teachers believe that the origin of the conflicts that occur in their educative centers is mainly social (51.3%), we can provide more value to the judgment issued by children about the tablet as a vehicle of knowledge to other realities. In the same research, 23% of teachers consider that the origin of conflicts in their schools is emotional. 15.4% of teachers value the origin of conflicts in the cultural dimension, while only 10.3% believe that this origin occurs in the academic field itself. This result is relevant since it confirms a tendency among teachers to conceive that school conflicts increasingly have a social dimension instead of a purely academic (Leiva, 2008, p. 5).

It is therefore concluded that interculturality must be proposed and worked in educational institutions in order to generate attitudes that, based on respect for other cultures, overcome the deficiencies of cultural relativism. Respect and appreciation of other cultures will lead to coexistence, a scant virtue in our society. According to the perception of students and teachers, the use of the tablet would then allow to know other cultures through the search in programs like google. This is possible thanks to the project's tablets with internet access. This activity should be proposed and guided by the teacher in view of the knowledge that the resources previously installed on the tablet do not include any element that facilitates this knowledge.

The proposal to use the tablet in various activities as mentioned above requires the creative and innovative capacity of the teacher. However, it also requires sustained and regular training that also gives teachers the security to solve classroom processes.

It is also important to consider the unwillingness towards the use of an innovative resource. Prior to the start of the implementation of the Digital Classroom Project, teachers expressed fears about some aspects of the lack of training received. In this sense, the also mention the lack of practice with the tablet before its use in the classroom with students.

For some teachers, the tablet could be related to a threat since many consider that children are digital natives versus teachers as digital immigrants. The use of the tablet lowered the levels of fear against the use of a digital resource unknown to many, especially for those teachers who are over 45 years of old and have a long history in the Ecuadorian Education.

Teachers also expressed fear of physical damage to the electronic device and questioned how the return of the electronic device would be made in case of damage caused by the same teacher or by one of the students. It should be emphasized that teachers who work at elementary (second, third and fourth year) show more fear for the damage of the tablets in relation to those teachers at the other levels (fifth, sixth and seventh grades) and mention

that children at an early age do not take care of their objects, and they also indicate that prior to the use of tablets it is advisable to spend time preparing students in the optimal care of the device. These aspects highlight the need to train teachers and think about pre-implementation work of projects with students, it is important to determine needs, make an adequate diagnosis based on this plan and execute projects linked to the community, institutional and personal needs.

Another aspect that children refer to is the possibility of learning mathematical operations, through the use of tablets, a process of great relevance in elementary school. In this study, participants show interest in technological use linked to learning Mathematics.

Other children also refer to a learning of values through the use of tablets, this aspect is related to the National Agreement announced by the Ministry of Education (MINEDUC, Vuelven a las aulas el maestro, los valores y la alegría, 2019) where it is mentioned that values will be recovered through education. For this reason, incorporating resources in tablets that support the work of Education in values aimed at fulfilling the development of citizen capacities would optimize the desired results in this current national agreement. The discourse of the highest authority of the Ministry of Education seems to be internalized by the teachers participating in this study and, therefore by the children who tend to replicate not only the discourse but the attitudes of those who consider their model: the teacher/authority.

Another aspect that the children participating in this study mention is the possibility of reading stories in this digital resource. Reading allows a highly significant contribution to the learning process. This aspect has been considered by the Ministry of Education which states that "the absence of reading activity is one of the great weaknesses in the construction of the sense of citizenship in Ecuador" (MINEDUC, Textos escolares y lectura en el sistema educativo, 2018).

Therefore, the Ministry of Education promotes projects that seek to strengthen motivation and a desire for reading throughout the educational community, not just for students. In fact, a web portal of the same Ministry states that "if teachers do not read, we will hardly be able to have students to do so". Consequently, if the use of the tablet in the classroom allows the approach and possibility to read, this process should be strengthened and aligned with other government projects such as the "National Plan for the Promotion of the Book and Reading of Ecuador, based on a public policy covering the main problems related to reading stimulus in Ecuador" (Ministry [2019], p. 4). This project also determines the need to encourage reading behaviors and reading consumption to promote an equitable and sovereign society, as determined by the Organic Law on Culture in Articles 120 and 126. The fulfilment of this constitutional mandate is the responsibility of the Ministry of Culture and Heritage and the National Government" (Ministerio, 2019, pág. 4).

While it is true that the implementation of this project is the responsibility of the Ministry of Culture and Heritage, efforts must be unified between that Ministry with the Ministry of Education in addition to the private company - as is the case of Fundación Telefónica - in such a way that results, in the field of reading processes, have a significant impact on learning-teaching processes. If children perceive and value the tablet as an optimal resource for reading and discover it as equal to a book, it would be appropriate to propose activities articulated with the use of the tablets at all levels of education, further encouraging reading in teachers.

To conclude the discussion regarding children's appreciation of the tablet as an educational resource, it can be concluded with the idea of the importance of fun learning or, by its counterpart, the fun led to meaningful learning. In fact, any educational process should be perceived by a child as a space of fun that allows learning for life.

In the application of tablets as a resource in the classroom, it has been understood in this study that the guidance, perception, assessment and acceptance of the digital resource by the teacher has a direct and considerable influence on the perception of students.

Therefore, the role of the teacher in the classroom through the use of the tablet will have a significant impact on the perception, use, usefulness and assessment that the students have of the digital resource directed towards a motivation for learning. Therefore, sustained teacher training is required with monitoring and evaluation processes that allow for adjustments in the implementation of the Digital Classroom Project as well as the use of other innovative methodologies in the classroom.

It is clear that the tablet as a digital resource in the classroom has achieved positive results in the learning processes. All participants perceive and value the resource as positive. They assume it as a bridge that brings them closer to the knowledge of other cultures. It gives them the ability to research by generating meaningful learning.

This research gives light into improve student´s academic performance by using a tablet.

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Acknowledgment

The authors thank Fundación Telefónica and its team ProFuturo project. In addition, the inter-agency collaboration required to present this work was made possible by the Ministry of Education of the Republic of Ecuador within the Digital Education Agenda 2018-2021. Finally, the recognition is extended to the research team of PUCE "Project Digital Classrooms Fundación Telefónica", Burgos Jorge, Cruz Silva Jorge, Egas Reyes Verónica, Loza Aguirre Edison, Maldonado Garcés Verónica, Miranda Orrego María Isabel, Rivas Toledo Alexis, Roa Marín Henry and Salao Sterckx Emilio. The students, Grijalva Alvear Isaac, León Bayas Cristina, Terán Paz and Miño Daniela, Rivadeneira Yépez Ana Dominique.

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