http://dx.doi.org/10.1590/2175-35392019013039

Article

Possibilities for formal and informal learning in the digital era: what does the digital native youth think?

Vinicius dos Santos Tavares[1]; https://orcid.org/0000-0002-2814-1118

Rosane Braga de Melo[1]; https://orcid.org/0000-0002-9709-1599

Abstract

Nowadays, the technological advance is providing transformations in the school scenario and one of them is the relationship that the school establishes with the new generation of Digital Native students. The aim of this study was to evaluate the relationship between informal digital learning and formal school learning through the perception of students about the influence of digital technologies on their processes of knowledge acquisition. The empirical research was performed with the application of a semi-structured interview script to students between 14 and 18 years old from four high schools in the city of Rio de Janeiro. The data showed that young people are hyper-connected to digital technologies, which makes these technologies a tool in favor of school and the teaching-learning process. It is also observed that the young do not devalue the school experience, an experience that is advantageous mainly by the teacher-student relationship and the formation of social bonds.

Keywords: digital technologies; education; learning.

Possibilidades de aprendizagem formal e informal na era digital: o que pensam os jovens nativos digitais?

Resumo

Atualmente, as transformações no cenário escolar vêm sendo proporcionadas pelo avanço tecnológico e uma delas é a relação que a escola estabelece com a nova geração de alunos Nativos Digitais. O trabalho tem por objetivo avaliar a relação entre a aprendizagem informal digital e a aprendizagem formal escolar através da percepção de alunos sobre a influência das tecnologias digitais nos seus processos de aquisição de conhecimento. A pesquisa empírica foi realizada a partir da aplicação de um roteiro de entrevista semi-estruturada a alunos entre 14 e 18 anos do ensino médio de quatro escolas do Rio de Janeiro. Os dados revelam que os jovens estão hiperconectados às tecnologias digitais utilizando-as tanto para o lazer quanto para fins educacionais, o que torna tais tecnologias uma ferramenta a favor da escola e do processo de ensino-aprendizagem. Constata-se ainda que os jovens não desqualificam a experiência escolar, uma experiência que se mostra vantajosa principalmente pela relação professor-aluno e pela formação de laços sociais.

Palavras-chave: tecnologias digitais; educação; aprendizagem.

Posibilidades de aprendizaje formal e informal en la era digital: ¿lo que piensan los jóvenes nativos digitales?

Resumen

Actualmente, transformaciones en el escenario escolar sigue siendo proporcionadas por el avance tecnológico y una de ellas es la relación que la escuela establece con la nueva generación de alumnos Nativos Digitales. En el estudio se tiene por objetivo evaluar la relación entre el aprendizaje informal digital y el aprendizaje formal escolar por intermedio de la percepción de alumnos sobre la influencia de las tecnologías digitales en sus procesos de adquisición de conocimiento. La investigación empírica fue realizada a partir de la aplicación de un plan de entrevista semiestructurado a alumnos entre 14 y 18 años de la enseñanza secundaria de cuatro escuelas del Rio de Janeiro. Los datos apuntaron que los jóvenes están muy conectados a las tecnologías digitales utilizándolas tanto para el ocio como para fines educacionales, lo que vuelve tales tecnologías una herramienta a favor de la escuela y del proceso de enseñanza-aprendizaje. Se constata también que los jóvenes no descalifican la experiencia escolar, una experiencia que se muestra ventajosa principalmente por la relación profesor-alumno y por la formación de lazos sociales.

Palabras clave: tecnologías digitales; educación; aprendizaje.

1 Federal Rural University of Rio de Janeiro – Rio de Janeiro – RJ – Brazil; tavarespsicologiav@gmail.com; rosanebm@yahoo.com.br

Introduction[1]

At the end of the 20th century, the emergence of computers and the gradual development of the internet were observed in the most varied environments; since then, several transformations swiftly took place in the field of informatics worldwide with the increasing investment in telecommunication systems, the development of new information and communication technologies (ICT), besides the creation of the most varied types of websites, softwares and applications. Such changes allowed to multiply conversations and to improve the access to information, the speed and the sharing of data. From the development of informatics, access to information became faster, easier and more available than ever before, being available everywhere through digital technologies, affecting our social relationships.

The constant interaction with the virtual and the dependence on technological mediation for the most varied purposes in our daily lives lead us to question the impacts in the formation of a digital way of thinking and behaving in accordance to this new era. We could say that the contemporary youth is currently transiting between online (internet) and offline (offline) environments in their daily lives, a connectivity that may start when getting up, continue while at school, and be maintained until the moment of going to sleep.

It is in this increasingly virtual context that the school is inserted today, an institution that, by nature and function, receives many children and teenagers who were born in the digital era, with different demands from those from the previous generations. Thus, schools face some challenges since the digital technological development of the ICTs have been changing the way young people relate to formal and informal content to which they have access.

Digital native and digital immigrants

The term *digital native* has become known through the studies developed by the educator Prensky (2001), when referring to a generation of children and teenagers that caught certain attention from the researchers, a generation he identified as native and speaking of a digital technological language.

Digital natives may be understood as those who were born after the advent of the internet and, therefore, are not able to conceive the world without it, while those who were born before the internet and had to adapt themselves to it became known as *digital immigrants* (Cabra-Torres & Marciales-Vivas, 2009; Demo, 2011; Franco, 2013; Veen & Vrakking, 2009).

Digital natives are those individuals who have had contact with the language of the computers, videogames and internet in general since a very young age. They are *native speakers* of this language, and appear to be, since their first years, very attracted and easily adaptable to digital technologies. There are also those individuals who were not born in the digital era, but saw its emergence and adapted to it, the so-called *digital immigrants*. The latter, differently from the former, went through the gradual evolution of the information era; they experienced the world without the current dependence on technologies in our daily lives; they watched their rudimentary birth and now they deal, or try to deal, with these technologies (Prensky, 2001).

Regarding digital native children, according to Mello and Vicária (2008), there is a series of observable behaviors that indicate a precocious familiarization with the media. Since a very young age, children demonstrate attraction to digital pictures and videos; they show familiarity with computers by recognizing icons of certain operational functions, they know how to open programs and play with virtual games with no greater difficulties or further explanations and, sometimes, even before they have developed the abilities of reading and writing, they have already started their relationships in social medias as *Facebook*.

Online environments are constantly expanding and a countless number of information can be accessed on the several existing websites, blogs, social media as *Facebook* and video channels as *YouTube.* Information and communication digital technologies solidified the processes of globalization in such a way that they affected work, study, culture and many other aspects of social life. The diffusion of informatics allowed several services, which were provided in person, to slowly initiate a migration to the web, going from bank operations to online graduation programs, regarding the educational area.

The access to information expanded amazingly, and if previously we needed to resort to the aid of an expert to acknowledge something or to solve a problem, nowadays we generally find the solutions with a quick online search. We users have built and shared information that feed this dense virtual network, potentializing the distribution of information to other users.

The emergence of virtual friendships is merged with the history of personal computers and informatics at the end of the 1980s and beginning of the 1990s, when they became popular with the first chat rooms and *e-mails*. With time, virtual communication expanded and allowed the creation of several interaction tools, as instant messages applications and social media, having *Facebook* as one of the main representatives in Brazil.

Personal relationships are being increasingly developed in the web, in synchronous (online) and asynchronous (offline) contacts in a practical way (Viana, 2009). On the social media, acquaintances, friends, people with whom one has lost contact, or even strangers, meet and establish a virtual relationship much more frequently than it would be possible if such contacts were to be performed in person or by phone.

1 This paper comes from a Master's degree dissertation presented to the Federal Rural University of Rio de Janeiro – UFRRJ, entitled: "Educação e tecnologias digitais: a percepção de alunos sobre possibilidades de aprendizagem formal e informal", which evaluated the relationship between informal digital learning and formal school learning through the perception of students, influenced by digital technologies.

The different forms of maintaining personal relationships were broadened or reinvented by the use of digital technologies, sometimes in positive, other times in negative ways, but yet configuring some modern relationships.

Another recurring characteristic that is discussed about native digitals concerns the supposed cognitive gain involuntarily developed by the hyper-stimulation of the contact with digital technologies, pointed out as a multitask ability they possess (Kampf, 2011; Mello & Vicária, 2008; Prensky, 2001; Veen & Vrakking, 2009). It is possible to observe children and teenagers frequently performing several tasks at the same time, constantly starting and changing activities, studying while listening to music, or chatting online with friends, searching the internet on many open windows, in an apparently accelerated way. However, studies in the field of sciences that look for associations of cognitive gains or losses through virtual stimulation are still inconclusive or even no more than mere suppositions (Prensky, 2001; Cabra-Torres & Marciales-Vivas, 2009; Bruno, 2010; Castro, 2012; Loh & Kanai, 2016). These hypotheses end up creating a certain myth around a possible advantage of this digital native generation, which is questionable, especially when they scarcely consider intrinsic (motivations, stages of development) and extrinsic (culture and society) factors that affect the behavioral observations raised.

In Brazil, young people constitute the larger group of technological consumption, with the higher rates of internet use (IBGE, 2010), especially in the age between 15 and 17 years old, while there is a decrease in these rates from people older than 25 years old. Young people are the main drives of the *Cyberculture*, which materializes in daily communicational practices, such as accessing *e-mails* on the phone anywhere, send and receive data as images and music, watch, follow or even produce video channels (*videoblogs*) about the most diverse subjects on *YouTube*, keep continuous interaction with other people through chat groups on applications as *WhatsApp*, participate in virtual communities that share interests, as well as other activities that today have become usual through the use of the *internet*. The experience of the *cyberculture* is thus characterized by the possibility, or even the necessity, that the individual has of being continuously connected to digital technologies (Pereira, 2009).

It must be considered that even though digital technologies are undoubtedly innovative, the virtual society is nothing more than an extension of the social human relationships that occur in other ways, nonetheless in a more seductive way. The youth, in the *cyberculture*, move on the digital interfaces through experimentation, self-learning and sharing of knowledge. They are attracted by the innovative characteristics of the virtual webs that allow their participation in the construction of the *cyberspace*; the multiplicity of access to knowledge and the non-linear ways of learning correspond to part of the experiences of the youth included in the *cyberspace* (Pereira, 2009).

Though it is possible to observe the access of most of the individuals to digital technologies in large urban centers, there are indicators that, despite the advance, there is still a considerable part of the Brazilian population without access to virtual webs (FGV, 2003; IBGE, 2010; IBGE, 2015; The World Data Bank, 2013). According to the sample of 2013, the indices estimate that 49% people over the age of 10 have used the internet. There are regions in the country with different economic and social realities that affect their purchasing power to acquire technological devices and internet services, in addition to cities with lower technological development of web infrastructure, which difficult the access to computerization of certain populations. The matter of infrastructure and services of connection to the internet is a generalized problem in the country, positioning it in the 53rd position of the world internet speed ranking (Opensignal, 2017), below neighbor countries as Chile and Uruguay, indicating how much advance is still required in Brazil to increase the supply of quality digital webs, promoting better digital inclusion and use potential.

The structuring of the internet as mediator of information and the solidification of the *cyberculture* implicate changes in many areas in which schools are inserted. The discourse of access to information and learning methods is highlighted in the *cyberculture*, propelling schools to rethink the role of internet and the digital natives in the process of learning. It is worth noting that when talking about school we refer to a learning institution strongly defined by oral and printed communication, both to students and teachers.

The school and the technologies

According to Paulo Freire (Gadotti, 1992), we need a Pedagogy and a school that promote a permanent learning, not only by the student – who already carries an information load that surpasses their family context, especially regarding communication – but also by the teachers, since in the face of continuous changes in cultural legacy we all become learners.

While school, in general, remains the same (Lins e Silva, 2013), students come to it very differently than the previous generations; nevertheless, what they find is an institution planned with outdated technology. At school, there are instructors who are *Digital Immigrants*, who use an outdated language (of the pre-digital era), who are struggling to teach a population that speaks a completely new language (Prensky, 2001). This conflict between adaptation of the old school to the new students has been one of the greatest challenges of the current education, since there is a clash in the school space, with the *digital* student in one side, and the *analogical* school[2] in the other (Veen & Vrakking, 2009).

We must consider that traditional communication resources, as textbooks, are not outdated or excluding forms to the digital technology; however, what appears to be demanded from education is the opening to the implementation of new teaching-learning practices raised by the changes in the learning space-time (Santos & Weber, 2013), as we find in long distance learning platforms, where physical and time limitations are surpassed with the support of technologies.

Learning is not restricted to school and might be understood in three ways (Monteiro, 2012): *formal learning*, characterized as a set of educational models and practices directly connected to schools of instruction centers; *non-formal learning*, which represents the set of educational activities organized outside the formal system, separately or as an activity with specific objectives (even the non-educational ones); and the *informal learning*, which can be defined as any activity involving the search for understanding, knowledge or abilities that occur without the external imposition of curricular criteria.

Informal learning is usually spontaneous; it might happen in any context of daily life, and even though not always intentionally, it also takes place when the student deliberately searches knowledge and is aware that there is active learning during the experience (Monteiro, 2012).

We understand the virtual experience as something that provides their users with a vast field of information that contribute to an informal learning, facilitated by digital technologies, which for Demo (2009) is no novelty at all. What is new is the way it rivals formal education due to the new technologies on the one hand, and the demands of labor market on the other, which demand permanent learning from laborers, allowing them to search for solutions in a fast and autonomous way.

One of the main contributions of the adoption of ICTs in daily life is how it enabled the broadening of pre-established limits of what is traditionally known as learning spaces (Monteiro, 2012). However, are schools threatened by the innovation and the constant advance of information and communication technologies?

If formal education has particularities concerning the transmission of knowledge, we ask ourselves about the conditions for learning in our modern society. In this context, regarding the youth that is native and speaker of a digital language, which is equipped with technological resources for the access to information and connectivity, it is necessary to understand: the measure in which pedagogical models based on the transmission of content and on the teacher (the specialist), as holder of school knowledge, may lose terrain with the opening of other learning spaces? Would the digital native youth and its ways of learning be completely reflected in a virtual model of learning, since they move among several spaces and ways to obtain information?

Our research aimed at considering the relationship between informal digital learning and formal school learning through the perception of high school students and, additionally, identifying how the presence of technologies is inserted in the daily lives of young students through the availability of access and interaction with digital media, besides evaluating the importance given by students to school and to autonomous learning through digital means. From the questionings above, the empirical investigation was performed in two research axes: the first on the presence of digital technologies on the daily lives of students and availability of access to digital media, in order to obtain information from the students themselves about the intensity level of their interaction with digital technologies; and the second, on the importance attributed by students to school and to autonomous learning through digital media, i.e. an evaluation of the importance modern students give to school for learning, in a moment when the availability of access to information is increasingly facilitated by digital technologies.

Method

The teenagers that voluntarily participated in the study were high school students from four different learning institutions, from both genders, with age between 14 and 18 years old, attending the 2nd and 3rd grades. Among the 80 participants, 40 were in the public educational system and 40 from the private system. Such distribution was an attempt to maintain the parity in the representativeness of the sample, keeping it relatively balanced regarding differences in the access to digital technologies imposed by the supposed difference in the economic level of the families. This study was performed in 2015 and 2016 as part of the Master's Course in Psychology of the Federal Rural University of Rio de Janeiro (UFRRJ), approved by the Ethics Committee in Research of the UFRRJ, process 23083.001183/2015-06.

The chosen schools are located in the municipality of Rio de Janeiro, in the neighborhood of Campo Grande, the largest of the municipality considering the population, with 328,370 inhabitants (IBGE, 2011; IPP, 2015) and the age group of young people between 14 and 18 years old estimated at 45,555 individuals in 2010, representing about 13.88% of this population of Campo Grande, according to the indicators of the City Hall of Rio de Janeiro (DATA RIO, n.d.).

Data collection was performed with the application of a semi-structured questionnaire elaborated from the objectives of the study to evaluate the relationship between informal digital learning and formal school learning through the perception of high school students, and, in addition, to identify the presence of these technologies in the daily lives of the students through the access availability and the interaction with digital media, and to evaluate the importance given by students to school and to autonomous learning through digital media.

The items composing the questionnaire were distributed in two large axes: AXIS 1 – on the presence of digital technologies in the students' daily lives and the availability of access to digital media, composed of six items; AXIS 2 – on the importance given by students to school and to autonomous learning through digital media, composed of eight items.

The data obtained were analyzed qualitatively, even though we used quantitative analyses to clarify or illustrate a frequency. The concepts and methods used for the empirical investigation and discussion of results were those presented by the content analysis model (Bardin, 1977). Thus, the participants' answers were categorized by the semantic criterion, through similarity of contents expressed in each question,

originating categories that translated their perception regarding the research axes.

Results

According to the questions of AXIS 1, the research aimed at identifying ***the presence of digital technologies in the daily lives of students and their availability of access to digital media***, in order to produce knowledge from the students themselves about their interaction intensity level with digital technologies.

Our results indicate that *daily technological experience is a reality for all the participants*, with varied level of access to technologies as notebooks, tablets, desktop computers or smartphones. The *daily average virtual interaction* was approximately 10 hours a day, with highlight for the mobile connection of smartphones, which resulted in the higher average among the devices, about 7 hours a day, followed by notebooks, desktop computers and tablets.

Regarding the *local of access to technologies*, the higher prevalence was the use in their own residences (100%), followed by *homes of friends or family* (74%) and *public places* (64%). School appears in fourth, with 60% of the answers, and lan houses (6%) and work places (6%) were tied in the last position. It is important to note that, specifically about access in the workplace, the low prevalence of positive answers is directly related to the fact that few students in the study were inserted in the labor market because most of them were underage.

From the *technologies present at home*, smartphones also emerge among other technologies with 96% of the answers, above notebooks (79%), desktop computers (59%) and tablets (48%). Even though traditional desktop computers have been created as a domestic device, the current mobile devices are prominent among the acquisition choices of users, as verified in the results, sometimes by the preference for mobility, but also because several models have a more accessible value when compared to traditional desktops. Another important relation with the use of smartphones is the private character or their use, while other devices are shared by members of the house:

> *"Cellphone is privacy. The other devices I share with my parents."*

> *"The computer is shared; the cellphone is for personal use".*

The web pages with high access highlighted by the students were the social media *Facebook*, the video channel *YouTube*, followed by another social media, *Twitter*. The research web site Google and the social media *Instagram* appeared with lower frequency in the students' answers. Thus, the use of the internet to access social media and video channels, to maintain connection with friends and have fun, and for educational means, prevails, since they can freely research the internet, watch video classes through video channels, or even exchange information with other friends, facilitated by social media. The participants revealed that the use of technologies for educational purposes is recurrent and occurs in an autonomous way in 58% of the answers, when they search for information in known web search sites. Besides, in this group, 55% of the participants mentioned they follow guidelines for virtual searches when they are presented in the classroom. A small group (13%) indicated low use of ICTs as educational tool.

On the importance attributed by students to school and to autonomous learning through digital media, addressed through the items of AXIS 2, our research reveals that, in an informal way, young people spontaneously access various contents through the *internet*, either for a personal curiosity or in an unintentional way, but which can contribute to promote the knowledge of formal contents presented in the school environment.

The answers given about the occurrence of *learning situations through the internet, before presented in class by the teacher*, show that the majority of the students (68%) relate some personal experience of learning by using ICTs prior to the presentation of similar content in classroom.

> *"... in geography class, the teacher was asking for a work on 'megacities' before explaining the content. And a week earlier I was reading some news about that content. Result: I got along!"*

> *"...* [in] *knowledge of physics and mathematics on the internet. There are lots of videoclasses that help learning."*

Other responses indicate that 78% of young people consider *social networks as facilitators of learning*, 13% say they do not facilitate and 9% say that this is relative, consider that social networks are more for leisure, but help in some situations of study.

> *"I think it facilitates access to material, because if you miss class, you can ask the content to one of your friends."*

> *"Sometimes, yes, because there are people who set up groups of virtual studies."*

Regarding *school importance*, 91% of the students evaluated the school positively, attaching great importance to learning and to studying there. On the other hand 3% answered that although important the learning at school, they perceive in their experiences a precarious provision of education, not reaching a good formation as estimated by themselves and 6% of the participants affirm that the issue of the school or virtual environment is relative because some school content is seen as important while others no longer perceive meaning in learning them, or even certain contents are better learned on the internet. Predominantly, we perceive the strong association of the school as a learning place, a place that enables future (professional) perspectives, content found in 59% of the answers:

"... that is the purpose of the school, to teach us and prepare people for a decent future."

"... I learn everything I need to a good college"

The responses also showed the school as a social bond (20%), the school as a place of encounters, affective exchanges and contact:

"... I do not only learn the subjects, but also learn to deal with people and live with them"

"... I learn the subjects, to live with different types of people and to respect the differences"

Despite the positives aspects attributed to the school, youth dissatisfaction was also exposed in the answers, because a portion of the students expressed criticism about the deficient way in which learning takes place (13%) in their daily experiences, whether due to difficulties encountered in the classroom environment or in general by the educational scenario, which for them is still far from the ideal of enabling better chances of a formation that prepares for competitiveness in the future professional or even to enter higher education, according to the participants:

"I learn very little, because teaching today is limited."

"... I would learn more by studying at home, but school is important for sharing information."

"I think I learn, but not much, because the students do not help ..."

Participants also evaluated the comparison between formal and informal education, where the evaluation of the school as an environment or facilitator of learning obtained a greater number of positive responses (38%) compared to the informal mode of information transmission via the Internet (24%). It is curious to note that the same percentage (38%) was observed in the evaluation of participants who position themselves in order to relativize the importance of both the school and the internet. The main justification for the preference for studying at school was to be able to count on the support of the teacher during the studies (25%), since it facilitates to clarify the possible difficulties found in the learning process. The school has a method and a facilitating environment for the study (9%) and directs the formal teachings, understood as necessary for the professional future (7%).

"[I prefer to study] *At school, because beyond matter, theory, teachers explain, making it easier to understand."*

"At school, because at school you learn what is needed."

In the evaluation of the advantages of learning at the school, we confirmed the importance of teacher support (41%) for learning, followed by the relation of the school environment as a facilitator of learning due to the pedagogical organization (26%); the presence of other students and the possibility of learning together in the classroom (10%) as an important factor also appear in the answers:

"... The advantage is that the teacher can answer things on time."

"... learning is clearer and broader; I know the method of teacher explanation."

"At school we have a study environment, where information is exchanged all the time, like ideas and opinions. In turn, on the internet this exchange does not exist, because it is only you face-to-face with the content you will learn."

From the disadvantages of learning at school, the higher prevalence appears in relation to the dispersion of attention in class by other students (27%), making it difficult to follow the teacher's explanation or concentration in the accomplishment of tasks.

"... At school, you can focus on studying, but often there are those students who talk a lot."

"... now if he [the teacher] *is in the classroom and the students are making a mess, the person does not learn."*

In turn, **through digital means**, the advantages of learning on the internet are the possibility to learn interesting content from various forms and explanations, analyze counterpoints, allowing to delve into topics that are sometimes seen superficially; the deepening of content (38%) was one of the recurring themes in the answers found, besides the convenience (50%) in the access to information by digital devices, which makes the use of technologies attractive, with fast search and accessible language means:

"[I prefer to study] *On the internet, because there are more explained forms and you can repeat until you understand, for example videoclass*."

"*On the internet, because at school they give you the basics, on the internet the knowledge is deeper."*

"In some cases, I learn more on the internet. For example, in chemistry my teacher does not explain very well, so I search the internet."

"... we are in the comfort of our home; in a completely informal and playful way we feel invited to learn; we can repeat the videoclass a thousand times."

"Advantage of good information, speed of searches and easy absorption of content."

"The content is more comprehensive, explained in a freer way and you can access it at any time."

In the evaluation of the disadvantages of learning on the Internet, the biggest complicator in the participants' perception was the doubt about the veracity of the information found on the Internet (24%) and even in situations where truthfulness leaves no doubt, participants also affirm sometimes not everything that is searched on the Internet is clarified (13%). The lack of teacher support (19%), the transmission of information directed by another person, such as at school, in a process with beginning, middle and end, seems to be the set of disadvantages presented by these categories, a difficulty for self-taught learning. Another notable consideration was the recurrent distraction in the use of the internet (26%), whether through social networking notifications with friends' conversations or even through other pages due to the large number of hyperlinks – suggestion of pages while browsing.

"[We find] *some tangled contents and some lacking in truth."*

"... sometimes the video teacher does not specifically talk about the subject we are looking for."

"The problem is that a lot of information is wrong, information with formed opinion convincing the reader of something and not thinking for itself."

"Disadvantage: Misinformation, grammatical errors and viruses."

"The disadvantage is that it can open doors for things beyond what it needs."

"I try to study, but social networks sometimes get in the way."

Among the methods of personal study, the use of technologies becomes a new option that young people can use and organize themselves in order to learn, being familiar with the digital media. About 42% out of the 71% of students who said they study through digital means do so mainly through videoclasses. Another 16% reported a general study with Internet research, and 13% responded with the support of other friends, virtually, confirming that the habit of using technology is predominantly in their out-of-school study practices.

"When I had to retake test in literature, I searched for videos on the internet and managed to take 8.0 in the test."

"... when I could not get the content in the classroom and I could not get in touch with the teacher to explain and yet I would have to deliver school work, I had to go to the internet to help me."

On situations in which social networks have brought problems, participants narrate distractions by chats with other friends; sound signals of conversations updates by the applications, links of images sent or videos, that end up interrupting and deconcentrating the study process (82%). On a smaller scale, part of the participants answered that they perceive social networks causing problems in the relationship at home with the parents (4%), being entertained in the technologies and failing to talk more with the familiar members.

"Yeah, because I wanted to do the work on the internet and the friends in the WhatsApp did not let it, they take our attention, and we do not even like it, right?"

"... in the same way that it helps, it disturbs. I often preferred to talk on WhatsApp than to read a book."

Final Considerations

From the results and their analyses, we conclude that *cyberculture* influences the way in which digital native young people relate to learning since the use of digital information and communication technologies is part of their daily lives to access general information or to understand contents from school activities. Virtual environments are attractive, offer practicality, speed, and their use are mastered by digital native children and teenagers.

The formal pedagogical models and the teacher - as an agent of the transmission of scholarly knowledge - do not seem to lose ground for the opening of virtual spaces for informal learning. In our analysis we verified how the school is still a learning place highly valued by the students, despite presentation of virtual practices as an accessible reality for the youth. Our focus is that the more the school and teachers take ownership of these resources and the experiences of digital native students, the more productive the teaching--learning process will become in the school context.

Access to informal knowledge has undoubtedly increased with digital technologies, enabling significant possibilities of reaching the most varied types of knowledge available in the extension of cyberspace and virtual environments. Students' adherence to the increasing use of digital information and communication technologies can contribute to changing this *analogical* school, provided that educators can integrate the use of technologies with their pedagogical methods, extracting the potential of virtual networks for the teaching-learning process.

Many issues were not addressed in the present study. The limits of the present study include the restriction of the sample to the population of young students residing in a part of the western zone of the city of Rio de Janeiro, crossed by significant social inequalities, characterized by the lowest human development index of the city with few cultural indicators, such as museums, libraries, cultural centers, theaters, difficulty in urban mobility in several places, a lack of universities and public technical schools to meet the population demand, and that concentrates 41% of the population of the city in the region (IBGE, 2010; Instituto Rio, 2016). A valuable contribution

to research could be the comparison of students' perceptions with the educators' impressions about this relationship between digital technologies and the teaching-learning processes.

Although the sample division was idealized between students from private and public schools, in this study there were no significantly divergent expressions in the questions raised by the study, neither concerning the access to technologies, their way of using them, the representativeness of the school in their lives or even regarding their perception about the learning possibilities using digital technologies.

We conclude that the virtual environment demonstrates all its attractiveness and practicality of interaction through the possibility of access to information at any time from the use of the most varied ICTs. Young people are hyperconnected to digital technologies, they are digital natives, they are present in virtual networks, but at the same time do not disqualify the school experience. Despite criticisms, the school is described by the students as a scenario that brings advantages to learning by being able to offer a direction to learning, by the teacher-student relationship as a support for learning, as well as being a means of formation and maintenance of social bonds. Finally, digital devices are used by young people not only for leisure, but for educational purposes and present themselves as resources for individual and collective studies, which indicates that they may become potential facilitating tools for teachers in the teaching process.

References

Bardin, L. (1977). *Análise de conteúdo* (Reto, L. A. & Pinheiro, A., Trad., vol. 70). Lisboa: Edições.

Bruno, A. R. (2010). Aprendizagens em ambientes virtuais: plasticidade na formação do adulto educador. *Revista Ciências e Cognição*, 15(1),43-54.

Cabra-Torres, F.; Marciales-Vivas, G. P. (2009). Mitos, realidades y preguntas de investigación sobre los 'nativos digitales': una revisión. *Universitas Psychologica,* 8(2), 323-338. Retrieved: 15 oct. 2013. Available: https://core.ac.uk/download/pdf/27167144.pdf

Castro, G. (2012). Screenagers: entretenimiento, comunicaión y consumo em la cultura digital. *Meios y Enteros: Revista Digital de La Escuela de Comunicación Social* - Universidad Nacional de Rosario. Retrieved: 20 may 2013. Available: https://mediosyenteros.unr.edu.ar/home/?p=823

Data Rio. (n.d.) - População residente por grupos de idade e sexo, segundo as Áreas de Planejamento (AP) e Regiões Administrativas (RA) no Município do Rio de Janeiro - 2010. *Prefeitura da Cidade do Rio de Janeiro*. Tabela 2962. Retrieved: 18 jun. 2019. Available: http://www.data.rio/datasets/popula%C3%A7%C3%A3o-residente-por-grupos-de-idade-e-sexo-segundo-as-%C3%A1reas-de-planejamento-ap-e-regi%C3%B5es-administrativas-ra-no-munic%C3%ADpio-do-rio-de-janeiro-2010

Demo, P. (2009). *Educação hoje: "novas" tecnologias, pressões e oportunidades*. São Paulo: Atlas.

Demo, P. (2011). Olhar do educador e novas tecnologias. *Boletim Técnico do Senac: a Revista de Educação Profissional*, 37(2), 15-26.

Fundação Getúlio Vargas [FGV] (2003). *Mapa da exclusão digital.* Coordenação Marcelo Côrtes Neri. Rio de Janeiro: FGV/IBRE, CPS.

Franco, C. P. (2013). Understanding digital natives' learning experiences. *Revista brasileira de linguística aplicada*, 13 (2), 643-658. Retrieved: 25 jun. 2015. Available: http://dx.doi.org/10.1590/S1984-63982013005000001

Gadotti, M. (1992). *Diversidade cultural e educação para todos*. Rio de Janeiro: Graal.

Instituto Brasileiro de Geografia e Estatística [IBGE] (2010). *Censo Demográfico Populacional 2010: resultados gerais da amostra.* Rio de Janeiro: IBGE.

Instituto Brasileiro de Geografia e Estatística [IBGE] (2015). *Acesso à internet e à televisão e posse de telefone móvel celular para uso pessoal: 2013* / IBGE, Coordenação de Trabalho e Rendimento. – Rio de Janeiro: IBGE.

Instituto Pereira Passos – IPP. (2015) - Perfil sociodemográfico dos jovens na Cidade do Rio de Janeiro. *Prefeitura da Cidade do Rio de Janeiro*. Estudo 3434. Retrieved: 05 may 2016. Available: http://www.data.rio/search?groupIds=0f4009068ec74e17b25eb3e70891b95f&sort=-modified

Instituto Rio (2016). *Sobre a Zona Oeste*. Retrieved: 01 may 2016. Available: http://www.institutorio.org.br/sobre_a_zona_oeste

Kampf, C. (2011). A geração z e o papel das tecnologias digitais na construção do pensamento. *Rev. Comunicação e Ciência*, (131). Retrieved: 18 set. 2014. Available: http://comciencia.scielo.br/scielo.php?script=sci_arttext&pid=S1519-76542011000700004&lng=en&nrm=iso

Lins e Silva, P. K. (2013). A escola na era digital. In: Abreu, C. N.; Eisenstein, E.; Estefenon, S. G. B. (Orgs.), *Vivendo esse mundo digital: impactos na saúde, na educação e nos comportamentos sociais*(pp. 136 – 145).Porto Alegre: Artes Médicas.

Loh, K. K.; Kanai, R. (2016). How has the Internet reshaped human cognition? *Neuroscientist*, *22*(5), 506-520. doi: 10.1177/1073858415595005

Mello, K.; Vicária, L.(2008, Junho). Os filhos da era digital: Como o uso do computador está transformando a cabeça das crianças – e como protegê-las das ameaças da internet. *Rev. Época,* 486, 82-90.

Monteiro, B. S. (2012). *Modelo de aprendizagem suportado por tecnologias sensíveis ao contexto do aprendiz*. Projeto de pesquisa para tese de doutorado. Universidade Federal de Pernambuco. Retrieved: 15 oct. 2014. Available: http://www.cin.ufpe.br/~bsm/SAAP_BrunoMonteiro_2012_02_27.pdf

Opensignal (2017). *Global State of Mobile Networks*. Retrieved: 02 mar. 2017. Available: https://opensignal.com/reports/2017/02/global-state-of-the-mobile-network/

Pereira, M. G. C. B. (2009). *O Caso de Amor dos Jovens pelos Meios de Comunicação Digital - Análise dos usos, valores e competências desenvolvidas em TIC por jovens do 3º ciclo do ensino básico, no contexto escolar e familiar: a influência do contexto e o factor divisão digital na relação dos jovens com a tecnologia*. Dissertação de mestrado em Educação na área de especialização em Tecnologia Educativa, Universidade do Minho, Braga.

Prensky, M. (2001). Digital Natives, Digital Imigrants- part 1.*Onthehorizon*, 9(5), 1-6. Retrieved: 07 out. 2013. Available: http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Santos, E.; Weber, A. (2013). Educação e cibercultura: aprendizagem ubíqua no currículo da disciplina didática. *Revista Diálogo Educacional***,** 13(38). Retrieved: 10 nov. 2014. Available: www2.pucpr.br/reol/index.php/dialogo?dd99=pdf&dd1=7646

The World Data Bank (2013). *Internet Users.* Retrieved: 25 oct. 2014. Available: http://data.worldbank.org/indicator/IT.NET.USER.P2

Veen, W.; Vrakking, B. (2009). *Homo Zappiens: Educando na era digital* (pp. 10-40). Porto Alegre: Artmed.

Viana, J. A. D. (2009). *O papel dos ambientes online no desenvolvimento da aprendizagem informal*. Dissertação de mestrado, Ciências da Educação (Tecnologias Educativas), Faculdade de Psicologia e de Ciências da Educação, Universidade de Lisboa, Lisboa. Retrieved: 10 oct. 2014. Available: http://hdl.handle.net/10451/2086

Received in: August 1st 2017
Approved in: November 21st 2018