Ubiquitous learning, communication interfaces and media skills

Aprendizaje ubicuo, interfaces de comunicación y las competencias mediáticas

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Abstract

The present work deals with the hypermobility that generates new learning possibilities that propose new challenges to the producers of content and the educators. Ubiquitous learning derives from these new hyperconnected environments and, although it incorporates m-learning characteristics, it does not constitute an educational plan, it is totally informal, it is "spontaneous, contingent, chaotic and fragmented". In this context, a Brazilian experience is presented: the Geekie Games application, which aims to assist candidates in preparing for the ENEM (National Examination of Secondary Education) and is available in the online stores of mobile devices with the Android operating system. The user can access the simulated, animated video-lectures and tutorials, images and exercises specific to each discipline, developed by the Lemann Foundation, in partnership with other institutions of the private sector and with the support of the Ministry of Education. A first reflection on how this new device is related to media skills and its dimensions, as conceptualized by Ferrés. Communication flows become intense in the era of hypermobility and ubiquity. Mobile devices have been a great protagonist in this communicational ecology that is designed and changing learning.

Keywords

Ubiquitous learning, game, mobiles device, media competence, tactility, hypermobility.

Resumen

El presente trabajo trata de la hipermovilidad que genera nuevas posibilidades de aprendizaje que proponen nuevos desafíos a los productores de contenido y a los educadores. El aprendizaje ubicuo deriva de estos nuevos ambientes hiperconectados y, aunque incorpore características del *m-learning*, no constituye un plan educacional, es totalmente informal, es "espontánea, contingente, caótica y fragmentaria". Este trabajo se propone destacar, en este contexto, una experiencia brasileña: la aplicación Geekie Games, que tiene el objetivo de ayudar a los candidatos en la preparación para el ENEM (Examen Nacional de la Enseñanza Media) y está disponible en las tiendas online de dispositivos móviles con el sistema operativo Android. El usuario puede acceder a los simuladores, vídeo-clases expositivas animadas y tutoriales, imágenes y ejercicios específicos de cada disciplina, desarrollados por la Fundación Lemann en asociación con otras instituciones del sector privado y con el apoyo del Ministerio de la Educación. Aquí haremos una primera reflexión respecto a cómo este nuevo dispositivo está relacionado con las competencias mediáticas y sus dimensiones, como las conceptuadas por Ferrés. Los flujos de comunicación se vuelven intensos en la era de la hipermovilidad y la ubicuidad. Los dispositivos móviles han sido grandes protagonistas en esta ecología comunicacional que se diseña y cambia el aprendizaje.

Palabras clave

Aprendizaje ubicuo, juego, dispositivos móviles, competencia mediática, tactibilidad, hipermovilidad.

Introduction

The emergence and popularity of digital mobile devices changed the relationship between the man, technology and the environment. With the media convergence, the technical devices went on to perform different functions, many that even extrapolate the main objective of interpersonal communication. Today, with a single device, it is possible to organize the agenda, monitor heartbeats, book accommodation in a hotel, verify the location of the bus in real time, watch videos, manage profiles on social networks, and send and receive e-mails, send messages and talk on the phone. In addition to the facilitation of concentrating numerous functions in a single device, technological advancement allowed information mobility to be added to it. With the advent of mobile phones, notebooks, pagers, palmtops, etc., the movement was initiated, but the technical structure restricted the potential of these devices to the extent that the connections still needed technical support and the Informational mobility was reduced.

From the creation of 3g and 4g networks, Wi-Fi technology and bluetooth connection, georreferential devices guaranteed that the connections could also be mobile, propitiating hypermobility (Santaella, 2013), which extends and refines the modes of presence expanding as technologies are more available and mobile, leading to increased information flows and connectivity. What is strongly raised in this converging environment is precisely the way in which information is distributed.

The user, in turn, has in his/her daily life the presence of these devices, which happen to mediate a significant part of their interactions, whether interpersonal, with the environment, with their daily tasks, with their leisure, with their emotions. The feelings also happen to figure and configure the intimacy that also lives in the converging environment. The digital revolution brings with it a transformation in the behavior of the receiver. Participatory culture (Jenkins, 2009) is the great phenomenon that has altered all the processes involved in communication. Production now becomes thought, or should be, in the possibilities of interaction and feedback.

Before the medium, the message and the one who transmitted it concentrated mainly the efforts of the scientific thought; nowadays, even if these elements are not excluded, it is the receiver —or the new user, prosumer— who guides the studies that seek to understand new communication practices. Jenkins (2009) points out this trend in approaching participatory culture, placing the collective process as a main element of information consumption practices.

On the other hand, the public develops other stimuli with the content that interacts to. Before, the medium defined the sense affected in the reception as sight, hearing, smell. Now, the relationship occurs in multisensory, even tactile spheres, with the haptics interfaces of smartphones and tablets (Haywards *et al*., 2004 in Palacios and Cunha, 2012, p. 2). Santaella argues that these devices "relate to users in new ways, engage their senses and their body in different ways" (2010, p. 69). The author argues that everything and almost all people are mediated by digital technology, including educational practices.

In the hyperconnected environment given by the context of the media convergence, as mentioned above and the learning modalities that derive therefrom, cause the need to rethink the studies of "education". Communication flows become intense in the era of hypermobility and ubiquity. Mobile devices have been a great protagonist in this communication ecology that is designed, as well as users who are inserted in this new

social cartography; however, are we able to cope with these new forms of communication and devices?, how is our involvement with interfaces used in the hyperconnected environment that stimulates autonomy, collaboration, organization and operationalization of multiple tasks? The aim is to understand this phenomenon in the light of media competencies.

New learning models and the ubiquitous learning

From the interaction with the new communication technologies, new teaching-learning models have emerged. Santaella (2011) highlights the emergence of e-learning, M-learning and ubiquitous learning. In these paradigms, the support made it possible to shift the educational processes at home, work and street environments, all of them by moving. The consumption and fruition of the information became more individualized and personalized, at the same time, these modalities stimulated more collaborative and participatory practices, which favored self-taught learning modalities.

The intensive use of ICTs in order to search online, access various content and even to build the intellectual repertoire of individuals and establish relationships of sense has reconfigured the relationship of users with informative content, generating spontaneous forms of education.

In the educational perspective, Belloni and Gomes argue that ICT provides an effective environment for educational practices. The learners are related to colleagues, with more experienced adults, who share and debate opinions, building collaborative and participatory knowledge. The authors also argue that autonomy is an essential competence for the learning process and highly stimulated in the content absorption through ICTs. When deciding which tools and functions of the devices to use, the navigation path and how to elaborate a text, the user participates in a more favorable learning environment, mainly in the cases of children and young people who realize that they can learn without adult intervention (Belloni, 2009; Gomes, 2008).

Learning without a teacher in virtual environments (*Autodidaxia no cyberspace*) is only one of the forms that come from ICTs and constitutes a process that should be complementary to more traditional teaching practices. Without dispensing other modalities, this learning acts as a booster of the development of the competencies necessary for the cognition process, as it stimulates autonomy, collaboration, organization and the accomplishment

of multiple tasks. In the ubiquitous learning, the self-taught learning is the central element, since it gives the bases for the constitution of the competencies associated to this new learning style.

On the other hand, E-Learning or electronic learning is a model that replaces the old distance education. In the age of hypermobility and all its transformations, ubiquitous practices changed in individuals the notions of presence, absence, and distance. Online education tools have become sophisticated as new technologies emerge, and through static content platforms, new e-learning environments allow conferences, audiovisual content hosting, and interactive, and also the use of time management tools and study planning.

The media convergence and the emergence of mobile computers created new possibilities for e-learning, resulting in a new paradigm of virtual learning: M-Learning or mobile learning. This adds mobility to online education practices: the student decides, beyond the time and time of study, the location where the content will be accessed. In spite of being used in the new computational tools, these paradigms belong to the field of the formal education, to the extent that they have as main objective a pre-defined system learning process

The technological revolution and the popularization of digital mobile devices promoted a change in the behavior of informational consumption. Multimedia and multitasking devices invaded the daily life of the users and the new interaction habits reflected in the dynamics of social practices. The hybrid, instantaneous, decentralized and fragmented communication —characteristic of cyberspace— with hypermobility went on to invade cities, inaugurating new forms of relationship and social dynamics. In this context, the lack of traditional teaching is accentuated and emphasises the need for a reformulation of educational practices.

In the media field, a few years ago researchers argued that ICT should be incorporated into teaching, to the extent that they present functionalities that can enhance learning processes, as well as are more aligned with the new cognitive profile, mainly of children and young people. María Luiza Belloni, one of the forerunners in the integration study of ICT to the school environment argues that this movement is necessary for an improvement in quality, and above all for a democratization of teaching. The author argues that the aggregation of these technologies can promote an education for citizenship:

The school must integrate information and communication technologies because they are already present and are influential in all spheres of social life, going to school, especially to public school, acting to compensate for the terrible social and regional inequalities that unequal access to these machines are generating (Belloni, 2009, p. 10).

In practice, structural issues complete the process of integrating ICT. Economic difficulties, the lack of public policies to train educators, as well as the need to reformulate teaching methodologies and dynamics seem to make an utopy of a complete change in that system; even more if considering the public education system where the incipient digital inclusion delays the important phases required by the dynamics of digital culture. Because the culture of convergence is a double-hand way, it requires the subject connected technologically and mentally.

The dominance of media skills, in terms of language, allows the citizen to critically analyze the messages he/she receives and also make his/her communication effectively. In the hyperconnected and fluid environment, language is the instance that favors the correlation with the modes of production of what is seen in the product's interface, such as: a social network, a site, an application. It is also through language that the aesthetic competence of the individual and the sensitivity to recognize the aesthetic quality of a production are triggered. Thus, language enhances the cognition process to the extent that it stimulates the connection with other competencies.

Against the difficulties of collective education, the more personalized and individualized learning modalities grow, as digital teaching applications and platforms become popular in virtual environments. E-Learning, M-learning, self-learning and ubiquitous learning models are derived from new practices in hypermobility and pose new challenges for content producers and educators. The idea is to detail these typologies.

The ubiquitous learning derives from this new hyperconnected environment and —although it incorporates characteristics of M-learning— it is not a constituent of an educational plan, it is totally informal, "spontaneous, contingent, chaotic and fragmentary" (Santaella, 2013, p. 303). From the emergence of radio and television, with reports and informational programs, the media became sources of informal education. With computers, that kind of education happened to occupy the day-to-day of users, who can easily access to news, literature, tutorials and videos. With mobile devices,

access to digital content has become more available, anyone who carries one of these devices can access virtual collections, search and get all type of information. However, Santaella argues that this model does not replace the other types of learning and that it must act in conjunction with the previous models. As well as the media that form a network called "Media Ecology" —in which new media and traditional ones are integrated— this hybrid potential of ecology is also shown in the new education practices that derive from the media.

Geekie Games: The new learning modalities

The popularization of mobile devices, mainly smartphones, originated one of the most promising segments of the technology industry: the application[1] development. However, few initiatives, especially free, explore the potential of these programs in teaching practices. Many games, quizzes and hobbies use, informally and spontaneously, learning processes, i.e. stimulating learning practices ubiquitously, but most of them are still related to entertainment productions.

In Brazil can be highlighted Geekie games, an application developed by the Leman Foundation in partnership with other private sector institutions and with the support of the Ministry of Education. The application has as an objective to help the candidates in the studies for the ENEM (*Exame National do Ensino Médio*) and is available in online stores of mobile devices with the Android system. The user can access the simulators, video-animated classes, tutorials, images and exercises specific to each discipline. When downloading the software, the user makes his/her cadastre and selects the course to be followed (Figure 1a). In our access we counted 607 options, between technical courses, baccalaureates and degrees. After choosing the course and weekly dedication time, a curriculum is prepared according to the candidate's needs (Figure 1b and 1c). For each thematic proposal there is an analysis of the repertoire on the subject, the initial X-ray, the class and the final check (an exercise to evaluate and revise the content).

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1 Despite the economic situation, Brazil has generated approximately 25 billion dollars in 2015. The Ministry of Science, Technology and innovation foresees to surpass in 2017 70 billion. With all the potential for consumption, hundreds of apps are available daily on the distribution platforms for the most diverse purposes.

Figure 1
Geekie Games initial interfaces

(a)   (b)   (c)

Source: own elaboration

The individual character of the tool can be seen, as it offers the users the possibility to select a more personalized content, aligned to their demands. Each class has approximately 20 slides. They are divided into the four major knowledge areas demanded in the ENEM: mathematics and its technologies; human sciences and its technologies; languages and codes; science of nature and its technologies. Normally, video classes have the teacher's audio followed by the illustration of a board that is changing as the explanation occurs. Digitized texts and images are also displayed. In the exercises integrated to the classes, when selecting the answer, either correct or not, the program marks and justifies the appropriate answer.

It shows that different senses are stimulated while browsing: beyond the view, traditionally used in readings, the learners mobilize the ear and touch. The different elements that make up the interface of the application activate in a high level the perception of the users.

With the "touch screen" the physical relationship between technology and individual is narrowed. In the same way, the navigation path or the fruition mode of the message are individualized. In the interaction, the sensory touch and the experience of material management bring a new form of cognitive processing that extrapolates mental operations. The user, for example, in order to identify some element of an image can increase or decrease it, pause the video, drag and pass the slide and, with respect to the exercises, can effectively modify that content.

McLuhan's ideas comprised the media as extensions of the human and were one of the forerunners of the touch screen study; however, Palacios and Cunha (2012) argue that tactile generates a high sensory involvement, contrary to sense anesthesia promoted by centuries of living in the "Gutenberg Galaxy" (McLuhan, 1972).

The return of physical involvement with the media, propitiated by the new technologies in the haptics interfaces, has its boom in cognitive transformations, as well as in distributed cognition (process that takes into account the relationship with the environment, the social interactions and with computer systems). Neural stimuli materialize in touch. When browsing in touch screens, many decisions are made intuitively and instantly to the touch of our fingers. This functionality, as well as many others in the course of human evolution, has been naturalized by our bodies and minds with communicative efficacy.

Rather than replacing the cursor and mouse function, the tactile simulates the way people handle physical objects in the daily life. It is established a relationship of more intimacy and involvement with the content, approaching the user, which changes his/her way of interacting. The individual, through the touch, seeks to know more about the content and therefore its tactile competence become wider, either by manipulating image, text, video etc.

These multiple stimuli demand new user skills. They need to organize the information they receive and distribute the attention for the various tasks they perform at the same time. These competencies are mainly stimulated outside the learning environment. By managing a profile on Facebook, creating a forum, sending an email, accessing online documents, sending traffic information to Waze, etc., users acquire more operational and mental skills that make them more and more capable of interacting with the new and concomitant media, and spontaneously they increase their cultural repertoires.

According to Ferrés (2012), the competence that the individual possesses to understand the messages in their complexity of codes and the multimodalities of the digital environment are involved in some dimensions such as the technology, the language, the ideology and the values, the processes of interaction, production and diffusion, and also in the aesthetic dimension. Undoubtly, the technological competence (Ferrés 2012), that is, the understanding of the functioning of the communication tools in order to understand how the messages are elaborated and the ability to use them, is powered when the tactility has the function of passing from a flow to other information through the screen.

As mentioned before, the dominance of media competencies in the language dimension allows to critically analyze the messages and communicate them effectively through the different types of available technology, since it is the language that provides the correlation between all the elements seen in the interface of a product (a social network, a website, an application like Geekie games, etc.).
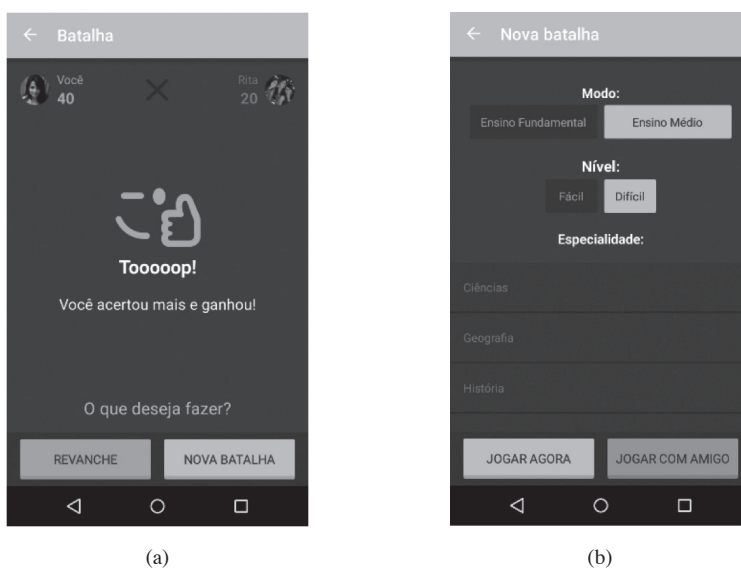
It is also believed in the dimension of the language where the individual's competence for the aesthetic dimension is expressed, because it is understood that the activated skill has to do with the sensibility that, from our point of view, recognizes the quality in the forms, the colors, in the spatial distribution of the elements, in the composition of the scene and —depending on the production language— also in the union of the scenes for the creation of a product. Thus, it is possible to say that the language potentiates the sensitive process and also emotional cognition, now reconfigured by the tactile, to the extent that it stimulates the connection with the other competencies. The language stimulates the sensitivity that guides the production process of the sense and the competence of the interaction processes with an active posture in front of the screens, to interact with the contents and to evaluate critically the emotional elements, rational and contextual message.

The greater the ability of the individual (competition) in the digital universe, bigger the understanding of ideologies, values and polyphonies that the new social ecosystem propitiates (that is, the hyperconnected environment where production and dissemination processes are the managers that articulate knowledge and allow differentiated cognition). To understand the different functions of the production and diffusion processes through which a communication product passes, means to be attentive to the possibilities of being a "prosumer".

Convergence reconfigures the processes of distribution and dissemination of culture and knowledge. This happens in our own daily life, in the present of the events, at the moment when we can access —in any place and any time— to data banks, files in the clouds, multiple screens that bring information, interactions and connections for the knowledge with various purposes. Although in a timid way, there is no denying that technological competition is the driving source of change.

In the case of Geekie games, the stimulus is for a collective and participatory consumption that occurs in the tools of interaction with the user. In the first access are already synchronized the facebook contacts of the user and it show the friends that use the application and offers the possibility to invite new friends (Figure 2a and B).

Figure 2
The collective consumption of Geekie games

(a)   (b)

Source: own elaboration

Conclusions

The apprehension of content composed by signs of different natures requires abilities to use multiple sensory stimuli, enhancing the comprehension of the message and activating competencies to flow in different dimensions with the language and the stimuli received. If there is a lack of domain in a code, for example, the user can use other resources.

In today's hypercomplex, hybridized and ubiquitous societies of participatory and collaborative culture, mobile-mediated communication is more suited to reality and the new message-consuming profile. The great change provided by ubiquitous communication is the relationship between virtual environments and physicists, with the body itself and the customizable, playful and spontaneous potential of ubiquitous practices. The Geekie Games app, for example, uses gaming and social networking resources to make content attractive and to identify consumption of educational content and entertainment media.

It is believed that the most spontaneous, emergent character of the new teaching-learning modalities should not be despised. Moreover, the new studies that propose to evaluate the communicational capacity of the users must take into account the impact of the multisensory stimuli to which these individuals interact, since much of the decisions and the cognitive processing derive, nowadays, from less rational stimuli than intuitive.

All these changes, the new media ecology, the change of the cognitive profile of the users and the new theories that arise in this panorama imply a reformulation of the educational system: a more decentralized and horizontal teaching, which threatens the traditional Cartesian system. New public policies are needed to educate educators and ensure structure so that school environments can become ubiquitous, and strategies are developed so that, in these ecologies cohabit the potentials of each medium and are created methodologies that include this increasingly hybrid panorama.

In the age of connectivity and in a connective environment there is a subject who experiences the language and who performs many tasks, where ICTs become also TAC (technologies of learning and knowledge) that brings new environment communicative practices that are different according to the desired objectives. Learning and knowledge technologies, in shaping a new educational environment, also shape the cultural experiences of people who actively participate in educational and social media platforms in a profound

way. Then, from this hyperconnected environment must emerge critical subjects with comunicative practices different from those of their parents.

There are certainly tensions between the different types of formal and informal learning in and out of schools, because ubiquitous learning also transforms the notion of time and space, and because digital platforms united with mobile devices project education to another qualitative level, through integrative, participatory and collaborative communication. Connectivity is a developing environment with new teaching structures, with the right to dialogue through technology and with a diversity of educational practices, where the media is on the agenda as well as the competencies for enjoying the benefits.

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