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IMPLEMENTATION AND USE OF ICT. MOBILE DEVICES IN EDUCATION IN ARTS. A STATE OF AFFAIRS

IMPLEMENTACIÓN Y USO DE LAS TIC. DISPOSITIVOS MÓVILES EN EDUCACIÓN EN ARTES. UN ESTADO DE LA CUESTIÓN

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ABSTRACT

This article is a synthetic contribution of theoretical aspects related to the influence of technological changes in current education, from the perspective of mobile phone and art education. Consideration is given to ICT as a means for learning and teaching resources, focusing on the search for pedagogical solutions and not exclusively technological ones. We host the concept of digital competence from the domain, rather, of the ideas that can make pedagogical contributions, than from the possibility of working only through technology. As a didactic contribution, a model of multimedia technological implementation in the classroom is offered through QR codes and portable devices, an exponent of a mobile and ubiquitous education coherent with the social and cultural reality in which we live.

KEY WORDS: ICT and education – constructivism – mobile devices – ubiquitous education – QR codes.

RESUMEN

El presente artículo constituye una aportación sintética de aspectos teóricos relativos a la influencia de los cambios tecnológicos en la educación actual, desde la perspectiva del ámbito del teléfono móvil y de la educación en arte. Se exponen consideraciones referidas a las TIC como medio para el aprendizaje y recurso didáctico, incidiendo en la búsqueda de soluciones pedagógicas y no exclusivamente tecnológicas. Albergamos el concepto de competencia digital desde el dominio, más bien, de las ideas que puedan realizar contribuciones pedagógicas, que desde la posibilidad de trabajar solo mediante la tecnología. Como aportación didáctica se

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ofrece un modelo de implementación tecnológica multimedia en el aula a través de códigos QR y dispositivos portables, exponente de una educación móvil y ubicua coherente con la realidad social y cultural en que vivimos.

PALABRAS CLAVE: TIC y educación – constructivismo – dispositivos móviles, educación ubicua – códigos QR.

IMPLEMENTAÇÃO E USO DAS T.I.C. DISPOSITIVOS MOVEIS EM EDUCAÇÃO EM ARTES. UM ESTADO DA QUESTÃO

RESUME

O presente artigo constitui uma aportação sintética de aspectos teóricos relativos a influência das mudanças tecnológicas na educação atual, desde a perspectiva do âmbito do telefone móvel e da educação em arte. Se expõe considerações referidas a as T.I.C. como meio para a aprendizagem e recurso didático, incidindo na busca de soluções pedagógicas e não exclusivamente tecnológicas. Albergamos o conceito de habilidades digitais desde o domínio, mais bem, das ideias que posam realizar contribuições pedagógicas, que desde a possibilidade de trabalhar só mediante a tecnologia. Como aportação didática se oferece um modelo de implementação tecnológica multimídia na aula através de códigos QR e dispositivos portáteis, exponente de uma educação móvel e omnipresente coerente com a realidade social e cultural em que vivemos.

PALAVRAS CHAVE: TIC e educação – construtivismo – dispositivos moveis – educação omnipresente – códigos QR.

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1. INTRODUCTION

ICT have n an approach based on treatment of and access to information. Although one of the outstanding social functions is the production and distribution of knowledge, the concepts "information" and "communication" do not refer directly to the educational aspect but rather to the technological one. Even so, technological change is closely linked to the learning processes and by extension to those of cultural transmission. It is for this reason that a broader perspective is required, which embraces the educational approach. Researchers of this field, among whom Litwin, E. (2009) stand out, note that in educational technology the didactic sense must prevail over technology. ICT in the educational field can be considered to be:

- learning contents
- working instruments
- communication and expression means
- teaching or pedagogical means
- communication means
- objects of learning/reflection.

2. TECHNOLOGIES AND EDUCATION

Compiling the classification in a simple way, we find a double consideration of ICT in the educational field: as means and as resources. Technology as a means impinges on "learning with", ie use it as a tool, an instrument to support the teaching-learning activities. On the other hand, a use can be made to learn "around" and "for". It is about working competences and skills of reading, analyzing, interpreting and producing information, from a critical, ethical and reflexive perspective. "The two possibilities are not exclusive but complementary. Both are necessary for proper digital educational literacy", this will enable, as Saura (2011, p. 80) says, an educational use of ICT that: [...] progressively modifies the perception and representation of reality, while transforming the ways of relating to knowledge and accessing knowledge (Saura, 2005). The use of ICT entails new forms of information exchange, new systems and interfaces for the storage and retrieval of information, but also opens up the possibility of experimenting with new forms of inquiry and discursive production of reality.

In any case, we consider it necessary to express a position regarding technologies in and of education, and that is shared by the scientific community: we must bear in mind that educational technologies are not the remedy to the problems we find in the educational system. We agree with Cobo Romaní (2009) about the fact that incorporating ICT in classrooms will not democratize access to the knowledge society paradigm or modernize educational spaces. That is why we do not have to oversize or mythicize. However, today's society demands new types of competences in students and other types of competences in the citizenry. Even authors like Cabero (2016) defend that this knowledge society is already surpassed and that we are really immersed in the Conceptual Era. We agree with Cabero (2007) about the fact that the educational incorporation of technologies, with the needs, risks and opportunities offered, involves establishing guidelines for their use, exploring incorporation strategies, obtaining pedagogical and non-technological solutions. In the words of Escudero (1995, p. 406) a new educational approach is imperative where "the educational criteria and principles are the substantive, and the means only the adjective". The new technologies decisively play an irreplaceable role in education and have to be understood as "tools for thinking". Always with an appropriate methodological approach. In this regard, the thought of Gilster (1997) about digital literacy having more to do with the domain of ideas than with the keys is enlightening.

We have introduced an indispensable concept in the way we are: digital literacy. It implies knowing, understanding and mastering the basic aspects of ICT from

different aspects: technological, social and communicative. Achieving this milestone will be possible by introducing in the educational curricula a series of digital competences that, far from referring exclusively to the manipulation of technological devices or falling into a lacking accumulation of information, are related to capacities such as research, administration, creation and exploitation of Information and knowledge. Thus offering students new opportunities to add value in the teaching learning strategies and processes. Cobo (2009), following the study carried out around the role and concept of ICT today, concludes five competences that he considers complementary to consolidate digital literacy:

1. e-Awareness: user understanding of the beneficiary or harmful role of ICT in the information society.
2. Technological Literacy: ability to interact with hardware and software in applications related to productivity, communication or management in different situations, work and/or study.
3. Informational literacy: ability to understand, evaluate and interpret information from different sources. To read with meaning, to make a critical understanding, when analyzing, weighing, connecting and integrating different information, data and knowledge.
4. Digital Literacy: ability to generate new information or knowledge through a strategic use of ICT. Ability to get relevant information, produce and manage new knowledge. It also means understanding that information management and exchange can be enriched through collaboration, co-creation and exchange networks.
5. Media literacy: understand how the traditional media migrate to new electronic support. To understand how they work, organize and evolve into new formats, platforms and models.

Ultimately, incorporating technologies in education passes by incorporating a new educational paradigm, not by adapting old ones. Pedagogies for new technologies are missing. Change is present in the related literature but the same does not occur in educational practice. ICT require a methodological renewal that is not as real as you think. The pace of educational innovations is not comparable to that of technological and social evolution. Different studies show in the new generations the lack of competences in academic uses compared to a habitual playful and social use. ICT influence the socialization process of young people, creating new communicative dimensions. One of the turning points may lie in using that proximity to the entertainment aspect, as noted by Huerta and Morant:

> If we bring closer to the classroom what is already common among younger people in their communicative and technological leisure environment, then it will be much easier to consider collaborative learning environments, those learning communities in which research and collaborative construction of knowledge would be the fundamental basis. (Huerta y Morant, 2010, p. 228).

Teachers are key factors in the transformation. It is not only about having ICT resources but knowing them, assessing how they can fit into our methodologies and schedules. Questions arise for teacher self-reflection around the introduction of ICT

in the classroom, GoConqr, 2016 (retrieved on November 3, 2016 at https://www.goconqr.com/en/info/):

- Does it facilitate the teaching-learning process?
- Does it bring new possibilities or improve the efficiency of processes that we are already using?
- Does it have a place in the didactic designs we are already using?
- Are we aware of the possible risks?
- Does it fit the style of our students?
- Do we know how to use it correctly?
- Is there any way to take advantage of its full potential?

In short, making use of information and communication technologies in their different categories; paying attention to the bottom and not only to the form. The appropriate application of ICT in educational environments will make it possible to talk about LKT, learning and knowledge technologies. LKT teachers will integrate ICT in the classroom with the demand for a change in methodology aimed at building knowledge and collaborative learning.

3. TIC AND COLLABORATIVE LEARNING

The need for a methodological renewal is shared with Area, Gros and Garcia-Quismondo (2008) that any learning activity that can be carried out through ICT should be designed from the theories that have inspired the pedagogical knowledge of the twentieth century. From the "New School", through the emblematic contributions of Piaget (constructivism), Vigostky (sociocultural learning theory), Freire (literacy theory) and Dewey (experimental education or meaningful learning), among others. Now, at a historical moment where digital media grow as everyday forms of expression, all within a context dominated by the Internet, we must contemplate the respective adaptations that will validate these theories with the social, cultural and technological characteristics of the 21st century.

Why do we opt for constructivism when working on educational technology within the Visual Arts? In the first place and with the intention of making a conceptual clarification, we express our assent with Coll (1999) by affirming that the constructivist conception, far from being considered a theory, is actually an explanatory framework that welcomes several perspectives around how learning is built. This current emerged in the 1970s following the cognitive revolution that faced behavioral and association psychology. The different constructivist aspects share a series of principles that argue our decision:

- Learning is an active process.
- Learning implies conceptual changes that modify the previous concepts.
- Learning is subjective and personal.
- Learning is influenced by context.
- Learning is social.
- Learning is affective.
- Learning is influenced by the development of the subject.
- It enables meaningful learning.

Positioning ourselves from this perspective, the pedagogical approaches can be multiple to the technological learning environments. In recent years, user-centered proposals that use technology as a mediator in teaching have proliferated: problem-solving-based learning, collaborative learning, scenario-centered learning, constructivist learning environments, located learning, learning communities, etc. (Gros and Romañá, 2004). On the one hand, and according to Alava (2002), technological devices may be able to favor new foundations that set in motion old proposals for pedagogical change, overcoming the old and traditional model and not only incorporating the new. On the other hand, within the Information Society, students are acquiring needs and interests that have to find an answer in the educational system. Paradoxically, schools are no longer the main sources of knowledge, instead, knowledge is decentralized, we get huge amounts of information from various and faraway fields, as well as stimulants. The amount of information that millions of young people access daily from their mobile terminals is not negligible at all. More and more learning takes place in informal dimensions circumscribed in leisure spaces. The consequence is that new scenarios are set up for training. The networks and multimedia technologies admit a more flexible education that goes from traditional situations, mostly face-to-face, and framed within formal education, to non-face-to-face education that can have a double aspect, formal and informal. The time variable must also be added to the space variable. The sum of these factors results in ubiquity in instruction that, seen in the long term, would facilitate continued learning throughout life. The Horizon Report itself (2010) reveals that technology is not only a means to train students, but it also becomes a method of communication, and relationship, as well as a ubiquitous and transparent part of their life. We state with certainty that the most identifying element of technological present time is the social character, the collaborative networks. ICT allow greater interaction and communication among people, they are no longer considered individual working tools, instead they are presented as the ideal support for group learning. We think only of the power of the Internet in establishing connections among people. To give a very clarifying example, we talk about social networks (social software), among the most popular we have Facebook, LinkedIn, Google+, Twitter, Pinterest, Instagram, Flickr, Vimeo. The effectiveness of these online networks is reinforced to operate in three areas:

- Communication (they help to share knowledge).
- Community (they help to find and integrate communities).
- Cooperation (they help to carry out matters together with other people).

With all what we have stated, it is clear that technologies favor the constructivist learning pathway since, with them, students have the opportunity to redefine the basis of personal knowledge. It will be the ideal method that will combine technologies and education. Learning to learn and the application of learning to reality are encouraged. The subject has an active role in the construction of knowledge, self- managing learning itself (Mascarell, 2013). In virtual environments (collaborative computer-aided learning, in online learning) this fact is exacerbated since, as Gros and Romañá states:

> In a virtual learning environment, students can also be designers and content producers. In this sense, the role is much more participatory and active since it can contribute with its contributions, increase the knowledge base, strengthen links, etc. In short, knowledge is much more dynamic and changing. (Gros y Romañá, 2004, p. 7).

Figure 1: *Students of the Faculty of Teaching in the 3rd year of Infant Education Degree at the University of Valencia. They exhibit an educational activity in arts aided by mobile devices and QR codes.*
Source: Own elaboration.

But we not only have to pay attention to the students but also understand that the methodology we are committed to receives under its umbrella a series of determinants that function as a gear, configuring a system. We consider it appropriate to highlight the following (Area, Gros and García-Quismondo, 2008):

- STUDENTS: Train students to reconstruct and signify the information they receive and use it critically and ethically.
- CONTENTS: Propose significant projects to which students articulate the work schedules through different modalities and technological resources.
- FACULTY: Take on the new role of the docent in the classroom.

Within this triangle, in which each vertex has the same importance as the others, it might be possible to think that, with the ICT, the role of the teacher is minimized, but, conversely, it is amplified. The role of the teacher is decisive. Far from being a transmitter of information, as is the case with traditional models, the educator will be the mediator between knowledge and the student, an active agent, organizing and supervising the activities. We agree with Alonso in that "The success of collaborative work depends to a large extent on the teaching staff's approach when designing

activities that are prone to it, and when tutoring it, that is why it seems important to train the teaching students properly for it". (Alonso, 2011, p. 40).

To achieve this milestone, teachers will have to meet three conditions: have a technological knowledge base, show a positive attitude towards technologies and educational innovation and, finally, recognize the pedagogical potential of ICT (Tejedor and García-Valcárcel, 2006). Authors such as Ertmer (2005) affirm that the final decision to introduce technology in classrooms and decide on the use strategies that will be put into play depends mainly on teachers, the beliefs they hold being a fundamental factor. Therefore, as teachers, we need to value the new learning environments, including those involving the integration of the mobile devices, as a bet for present and future. They are one reality in the lives of students and not only students demand them, but also many teachers claim them as an educational resource given their motivating character and the great versatility they offer (Mascarell, 2017).

At this point, we cannot fail to remember the well-known Web 2.0. , in which the options of collaboration, together with those of action, become protagonists. It is an open, social, democratic and participatory social network as opposed to the traditional web we know as Web 1.0. Web 2.0 allows us to work by collaborating online, it implies user interaction. It is made to co-create, to co-participate. These new possibilities are made effective through resources that set in motion the principles of social constructivism, turning technologies into collaborative-learning-revitalizing agents, according to the argument of López Gil (2011). It is essential to take advantage of these contingencies of virtual group connection. In our case, through options such as Facebook, encouraging continued education that can be incorporated in a "natural" way thanks to the mobile phone. Currently, the dynamic applications of Web 2.0 and 3.0 are almost endless. Trying to list them all would be an unapproachable task, not only because of the quantity but also because of the acceleration of the changes that occur in the nomenclatures. Even so, it is appropriate to show some of the most common ones. We have ordered them not by importance but alphabetically:

Blogs and tools of blogging (website): Personal log of author which is frequently updated.

Digital cameras: Cameras that generate and store images through pixels and a digital sensor.

Clickers: Interactive voting controls.

QR codes: It is an evolution of the well-known barcodes. Its name comes from the English Quick Response Code, it is a quick response access code to a URL. By reading a Smartphone we can access multimedia information instantly.

Email: This is an electronic communication network service that allows users to send and receive electronic messages or digital letters. It is necessary to be simultaneously connected to a server or Internet service provider.

Crowdsourcing: Tendency to promote collaboration through the masses through ICT. Through Web 2.0 it is oriented to facilitate interaction and collaboration among users.

Shared documents (Google docs.): Word processor located in the cloud (Internet server) that allows you to share the edition with guest users.

Tools for creating avatars: Online resources or apps that facilitate the creation of graphic images that represent us as a self-portrait.

Augmented reality tools: Technology that allows greater perception, interaction and learning. Mix of real images with virtual ones.

Forums web apps: Space for online discussion about a subject that generates a pecking-order communication thread.

Moodle (Module Object-Oriented Dynamic Learning Environment): informal communication channel between teachers and students.

Podscasts: Multimedia audio file that allows subscription or download by using a program to be heard at any time.

Programs p2p (peer to peer): Programs that allow the exchange or download of information of any format among connected computers.

Virtual reality: It is a visual experience generated by means of computer technology that generates the sensation of immersion with real-looking objects. Currently we have the opportunity to watch audiovisual 360º images promoting the feeling of living the reality by means of virtuality.

Skyp: Software that allows the communication of text, voice and moving image through the Internet.

SMS: (Short Message Service), available messages among mobile phones.

Splog: Blog created for an indirect commercial purpose, create affiliated websites to increase rankings in search engines.

Think Big: This is a multimedia forum with interviews, round tables and presentations with speakers from various fields. Comparable to a *YouTube* type of ideas.

Video block: Gallery of video clips, created in a chronological order by one or several authors.

Websites of docents or students: Electronic document or information that may contain text, sound, video, images, links and other files intended to facilitate learning among teachers, students or both.

Wikis: Web space where pages can be created, modified or edited by multiple users.

Chats: English word that would be equivalent to talk. It is a method of instant communication through software between two or more people connected to the network, usually the Internet.

YouTube: Website where users have the possibility to host and share audiovisuals with all rights reserved.

For the purpose of exemplifying didactic contributions supported on portable devices, specifically mobile phones, we propose the implementation of QR codes, a resource applicable to any curricular content.

A QR code is a two-dimensional, square-shaped barcode. By scanning this code via an application specific for reading, which can be downloaded free from Google Play Store, we access a previously generated link or URL.

Scanning QR codes provides the opportunity to incorporate numerous activities related to access to quasi unlimited audiovisual and / or textual information networks located on the web. One of the most innovative contributions is that the educational space is expanded since the codes can be found both inside and outside the classroom, favoring the formative interaction with the environment of the educational center. Thus we access the possibility to work ubiquitously, anytime, anywhere.

QR codes are flexible resources with high adaptability for each teacher based on the contents about the selected center of interest. With their implementation we enrich the pedagogical experience of students thanks to the multimedia access to the concepts that have been worked on.

The structuring and organization of teaching proposals through QR codes includes many variants. One possibility is to plan the order of the activities like a treasure hunt, as if it were a contest, in order to ensure that students address each exercise or task effectively. We can work individually or in groups of students who are assigned a name or number to identify them.

In any case, in order to ensure that the students take an interest in the educational activity, we consider essential that teachers perform a thorough choice of multimedia links to QR codes. Access to information on the subject in question that is not perfectly focused would generate discouragement in participants and reduce the effectiveness of the proposal. We are firmly committed to the inclusion of images, both fixed and moving (audiovisual), that will generate attractiveness and will provide unique tasks. The objective is to promote a unique educational experience through the images as a means of learning. An aspect clearly linked to arts education.

Some examples of possible applications could be:

1. Geolocation as the activity start code.
2. Audiovisual on YouTube or Vimeo (short duration, approximately 1 minute).
3. A podcast or audio with news or recording in mp3 format.
4. 3D or 360º videos. Virtual reality glasses.
5. Augmented reality.
6. Capture images or videos to share them via the network and then discuss them in the classroom or online.
7. Creation of an activity in the Kahoot platform! A game aimed at reviewing the addressed contents or as an evaluation. Always using smartphones.

4. CONCLUSION

The current reality predisposes to the incorporation of new learning dynamics. Education cannot turn its back on the social and technological circumstances. Teachers must remain vigilant to new pedagogical ICT applicable to our system of education in order to foster stimuli in learning and review methodologies. The benefits of ICT are multiple and students often demand them since they live with them daily. The digital culture in which we live immersed urges us to incorporate them immediately, without prejudice, but being aware of making a rational and useful use, with the didactic sense prevailing over the technological one. If we, as teachers of Teaching, train our students, future teachers, in the face of sensitivity to educational innovation and its benefits, in this case with ICT and mobile devices, they will acquire greater attention to the possibility of incorporating them as resources in their future teaching practice. With this, we promote the commitment of educators to evolve in improving the quality of education. Analyze the potential returns on students learning through ICT and mobile devices is one of the important tasks that we must foster through educational research.

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