

PERSPECTIVE OF THE INNOVATIVE ROLE OF VIRTUAL AND UBIQUITOUS ENVIRONMENTS

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Abstract

This research presents a theoretical approach for the use of virtual and ubiquitous environments in the didactic act; the objective is aimed at identifying the perception of undergraduate students of Foreign Languages and Natural Sciences specialties in relation to the innovative role of virtual and ubiquitous environments in the didactic act.

The document is an exploratory-descriptive type, with a non-experimental design and a case study approach; it was worked from the interpretive paradigm with a mixed approach, a Likert-type survey and a semi-structured interview were used. The study population was based on the criteria of the Educational Research Workshop I and II course. The sample consists of 59 participants, 39 women (51%) and 20 men (49%). Among the main findings, it is identified that students often use ICT for the search and selection of information and collaborative work; among the areas of opportunity, the difficulty they find in evaluating the information is duly identified. In addition, they do not have the necessary skills to exploit these tools in the didactic act and in virtual environments.

Keywords. Theoretical approach, technology; innovative role, knowledge; virtual environments.

1. Introduction

In the mid-eighties, the emergence of the Internet took place accompanied by a generalized increase in the use of Information and Communication Technologies (ICT), educational institutions and particularly universities have shown interest in incorporating these technologies in the educational contexts (Sigalés, 2004). Likewise, the study of the binomial act of education and ICT is an invariant. Similarly, at the beginning of the 90s, new trends appear in the field of education that pose transformations and require permanent academic training from teachers and students. The advancement of new technologies means that university education is also offered in the virtual mode, breaking the barriers of time and space, which promotes research on experiences and good educational practices with ICTs, considering two very important aspects such as: the methodology of virtual courses and the pedagogical design of the virtual classroom.

One of the characteristics of virtual learning environments is that it has functionalities that allow fluid and active communication between the actors in the process, promoting new roles for the teacher who becomes a guide and moderator, and for the students, with a more active role in the construction of knowledge.

Virtual platforms allow self-learning, since they contain a large amount of organized information, supportive materials, didactic resources, activities to do, forums and chats to interact with the tutor or classmates. The set of digital tools and resources that the

student accesses are intentionally organized to promote personalized and cooperative learning without the need for a physical encounter between the participants.

Through virtual environments, learning in different fields and educational levels has contributed to the increase in research on ICT. The interaction of learning and ICT in the didactic act has as its starting point the teaching-learning process in which different elements and actors enter into recreation. Learning in a virtual environment allows more flexibility and encourages greater prominence on the part of the student, thus combining the theoretical contents of the classroom with practice. That is why the permanent guidance of a tutor is required, whose role is as an advisor, facilitating and energizing the teaching process.

Virtual environments have had a positive impact on the development of students' skills. However, it is necessary to strengthen the interaction with the students and the content feedback process. According to Maraza (2016), a virtual environment aims to "develop dynamic methods for the search and identification of the best learning style of a student" (p. 21). Along the same lines, Silva (2017) points out that a virtual learning environment is a computer application designed to facilitate pedagogical communication between the participants in an educational process, be it completely at a distance, face-to-face, or of a mixed nature that combines both modalities in various proportions.

From the perspective of Silvero (2014), virtual learning environments are closely linked to Information and Communication Technologies (ICT), which have been progressively incorporated into all areas of life. The educational field is not alien to this process, for this reason it is suggested to integrate new technological tools in the daily training work from a didactic point of view in order to improve the virtual learning process.

In a virtual context, the student acquires a series of tools with which he can learn independently. Likewise, the technological tools available are intended to facilitate communication, management and distribution of information, adding to education, new possibilities for learning.

The didactic act is the moment in which the relationship of acquisition and process of the information with the students, the mediational, the contextual and the strategies acquire a pedagogical meaning (Ferández, 1997). The access and management of ICT resources are attributes of the educational technological phenomenon, therefore, the way in which they are used and the abilities of the students when using them play an important role in determining whether they are a benefit, beyond entertainment.

That is why, the set of abilities and skills that make up this phenomenon in the educational act, are very important for the student so as to develop in different educational environments, such is the case of ICT in the virtual learning environment, since they have become indispensable tools for learning. For this purpose, Ramírez, Morales and Olguín (2015) carried out an analysis of digital knowledge at a higher level based on the digital competences or skills proposed by organizations such as OECD, UNESCO, the European Computer Driving License Foundation (ECDL Foundation) and International Society for Technology in Education (ISTE) in order to establish standards of digital skills that promote the development of the individual and their insertion in the workplace, social and educational.

Science and technology have been essential in the construction of the modern world, they are also a fundamental part of contemporary digital culture. We start from the pedagogical foundation based on contemporary currents such as constructivism and connectivism, which aim to achieve meaningful learning to design the academic act, which constitutes an accessible virtual platform that offers contents, activities, forums and the opportunity to create interactives groups that have common goals. Therefore, strategies and methodologies are analyzed in order to optimize their potential and lead to the achievement of significant learning.

2.- Strategies of the didactic act and ICTs

The didactic act defines the teacher's performance in facilitating student learning. Its nature is communicative and complex. To understand the phenomenon of the didactic act in the context of the 21st century, it is necessary to understand what learning means and what are the theoretical positions raised in the different approaches. Therefore, Gagné affirms that learning is "in a change of disposition or human capacity". In this way, the didactic act is presented as a complex process in which the teacher, the students, the objectives, the teaching-learning process and the didactic strategies are present.

Marqués (2001) defines the didactic act as the teacher's performance to facilitate student learning. It is a performance whose nature is essentially communicative. The aforementioned author ensures that students can perform convenient cognitive operations, interacting with educational resources at their fingertips. It is the educational interventions carried out by the teacher and the proposal of teaching activities, their monitoring and development that facilitate learning that constitute the didactic act.

Consequently, Schunk asserts that learning involves acquiring and modifying knowledge, strategies, skills, beliefs and attitudes. Bigge in his "**Learning Theory for Teachers**" says that learning involves a "dynamic process within which the world of understanding encompasses a continually expanding psychological world"; like Driscoll, he defines learning as a persistent change in human performance, which must originate as a result of the learner's experience and their interaction with the world in the development of the educational act.

To carry out the didactic act, strategies are required to carry out the procedure or work modality. The new virtual learning environments allow the use of different teaching techniques. According to Pérez García (2000) it is necessary: 1. Strategies for the individualization of teaching, 2. Strategies for group teaching, focused on the presentation of information and collaboration, 3. Strategies focused on collaborative work. The development of the options presented places the techniques, such as those that allow the development of the teaching-learning process according to the individual characteristics of each subject progressively. According to the study, the interaction in the didactic act occurs between teacher and student through support for the development

of the construction of new knowledge. In the same way, the interaction of the student as a learner is developed together with their peers through the use of interactive materials and autonomous work.

Therefore, the communicative activity should be directed to achieve the highest degree of autonomy and competence of the student. The presence of the teacher is not only justified in distance learning, but it seems essential for its achievement. (Garrison and Anderson, 2003). The constructivist perspective of the teaching and learning processes applied to education with ICTs can serve as a theoretical basis. From these perspectives, the teaching and learning processes are configured in the interaction that would produce the construction of shared meanings between teacher and student in the didactic act.

3.- Characteristics of the didactic act and ICT in the educational effects.

Characteristics of ICT	Components of the didactic act	Educational effects
Concentration and motivation	Independent learning	Students assume their responsibilities
Feedback	Metacognition	Contrast data with critical and logical sense.
They transform information.	Meta-literacy	Understand other realities
They collect and organize the data.	Research	They learn through research.
They provide communication.	Teamwork	Communicate their findings
They concretize ideas through multimedia.	Material production as a result of learning.	They show creativity in preparing tasks.

SOURCE: Self made

2.1.- The configuration of virtual environments

A virtual learning environment is the set of interaction environments, synchronous and asynchronous, where a teaching-learning curricular program is carried out through a learning management system. They are presented as open spaces in which the learning processes are carried out at the pace of the students with asynchronous communication, without rigidly pre-established study times.

What is significant about open learning in virtual environments is that it focuses on the student, therefore, decision-making about learning rests with the learner. In the words of Luhmann (1993), virtual environments provoke a reaction of interest in the student, motivating and providing him with scenarios that facilitate and develop the ability to “learn to learn”.

In the same way, virtual environments facilitate the diversification of teaching modalities at different educational levels and are configured as communication spaces that allow the exchange of information that make possible, depending on their use, the creation of a teaching-learning context in which facilitates the participation of the teacher and students, in a framework of dynamic interaction through the various languages that the technological environment allows. Besides, the teaching and learning processes in technological environments must take as the center of attention the constructive activity of the student as a system of interactions in which the mediation of the teacher, the content, the other students and the context determine the quality of such processes.

Current conceptions of technology-supported learning environments assume the use of different means of communication through the computer to facilitate collaboration between student communities. (Scardamalia, Bereiter and Lamon, 1994). Constructive learning environments should allow access to shared information while in return, sharing knowledge development tools to help students jointly develop knowledge.

The possibilities of ICT in teaching rest, both in the degree of sophistication and in the technical potentialities, also in the learning model that inspires it, in the teacher-student relationship (Salinas, 1998).

To simulate virtual classrooms, we resort to the use of commercial and paid platforms or LMS (Learning Management System), such as: Moodle, AVA, Sakai, AVI, Blackboard, among others. These platforms and LMS were created during the decade of the 90s for educational purposes and as new teaching-learning proposals due to situations of not being present in the classroom caused by the pandemic.

2.2.- The didactic act knowledge and the teaching exercise in virtual environments.

The researchers, Ramírez, Morales and Olgún (2015) analyzed digital knowledge at a higher level based on digital skills proposed by organizations such as OECD, UNESCO, the European Computer Driving License Foundation (ECDL Foundation) and the International Society for Technology in Education (ISTE) in order to establish standards of digital competences that allow promoting the development of the individual and their insertion in the work, social and educational spheres.

There are three skills related to ICT: a. Develop skills in the use of information and communication technologies; b. Promote skills to search, process and analyze information from various sources; and c. Develop the ability to learn and update permanently.

Online learning is an example of how people, individually or in groups, participate in learning experiences from different places through the Internet. Spencer (2004) describes some positive aspects of the use of technology, for example, ideas and discussions can continue beyond the time students spend in the classroom, while dialogic participation is stimulated through new options.

The action of the university teacher at present is understood as the management to facilitate learning towards the complementarity of an educational environment, in the context that we call virtual learning environment (VLE). Currently, according to Mestre, Fonseca and Valdez, (2007):

The use of ICT in education led us to modify the teaching methodologies in the synchronous-face-to-face framework and in the asynchronous-virtual framework. The use of technology in educational processes must be analyzed to be applied in virtual learning that today invades our academic environments.

Therefore, the university teacher must have the skills to handle everything related to the internet and virtual environments, which leads to support new ways of teaching-learning, since technological competences must be used as means and resources so that they can be applied in the context of learning. This means that ICT requires participatory educational models, expanding the conjunctures of research, communication and knowledge. In addition, collaborative learning will be useful to epistemologically strengthen the use of virtual environments.

Undoubtedly, the challenges facing the university are to achieve the link between the training and the development of the student in the university context, who must face the demand for new knowledge, skills and new ways of learning.

2.3.- Epistemic approach and the learning theories that support the use of Virtual Environments in the didactic act.

Throughout history, different technologies have always changed the society where they are implanted (Cabero et al, 2007:1). Currently, Information and Communication Technologies (ICT) are also becoming one of the most effective agents of social change due to its incidence in today's university. Faced with this situation, the educational world cannot be left out either. In education, ICT can provide a teaching and learning environment for the student as well as for the teacher. According to Cabero (2011) they configure new environments, scenarios for training with different characteristics:

- ✓ They expand the information offer and tutoring
- ✓ Eliminate temporary space barriers.
- ✓ They facilitate collaborative work and self-learning.
- ✓ They enhance interactivity and flexibility in the learning process.

Among the learning theories that support the use of virtual environments in education we find: socio-critical pedagogy, constructivism, connectivism and Social Pedagogy, a more transformative pedagogy. Above all, training must aim to train people willing to work for a profound change of an innovative nature that modify a social reality, through dialogue and participation.

According to Giroux, (1990), "we are close to clearly drawing the content of Critical or Socio-critical Pedagogy" (p. 145). Critical Pedagogy represents a very diverse and complex body of knowledge whose purpose is to understand and transform the school- social reality with an education from the critical-reflective perspective for the search in the construction of new axiological meanings with new proposals for the contents, didactic resources. Also, the emancipatory rationality that a Socio-critical Pedagogy demands.

In that order of ideas, Constructivism according to De La Torre, (2007), "implies a process of ordering components to build knowledge" (p. 49); similarly (Norman, (2008) maintains that constructivism is defined as "a set of psychological theories that conceive cognitive processes as active constructions as the result of the subject's interaction with the environment, others and with himself" (p.138).

After a series of reflections, the constructivist approach is communication and interaction in search of achieving cognitive results, through theoretical-practical interaction. It can be deduced that the current of the constructivist approach deals with the content of teaching and learning, according to Bruner (1980a).

Consequently, George Siemens in his "**Learning Theory for the Digital Age**" (2004) indicates that a central principle of most learning theories is that learning occurs within a person. On the other hand, Giesbrecht (2007) indicates that Connectivism is presented as a pedagogical proposal that provides the ability to connect through social networks, or collaborative tools. Siemens (2003) indicates that in this context the role of the educator is to create learning ecologies. During the last decades, one of the most influential aspects in education has been technological advance, which has facilitated the development of a new scenario for the pedagogical experiences of the didactic act as the starting point of connectivism. This cycle of knowledge development allows students to stay updated in the field in which they have formed connections (Rodríguez and Molero, 2009).

- ✓ Siemens (2004) has defined the following principles of Connectivism.
- ✓ Learning and knowledge are found in the diversity of opinions.
- ✓ Learning is a process of specialized connection of nodes or sources of information.
- ✓ The ability to know more is more important than what is currently known.
- ✓ Nurturing and maintaining connections is necessary to facilitate continuous learning.
- ✓ The ability to identify connections between areas, ideas and concepts is essential.
- ✓ Decision making is a learning process in itself.
- ✓ Selecting what to learn and the meaning of incoming information is seen through the lens of a changing reality.

The methodology for the development of online programs arises as a necessity in the constant search for academic quality and continuous improvement of virtual programs. The methodology of a virtual classroom is based on the foundations of Constructivism and Connectivism, in which the teacher is neither the center of the learning process, nor is the content to achieve meaningful learning.

Constructivism presents diversified learning scenarios and makes use of all the means and resources of Web 2.0. The educational content is developed in three dimensions: Conceptual (knowing how to know), procedural (knowing how to do) and attitudinal (knowing how to be). The teacher becomes a mediator between the student and digital knowledge, the same one that proposes learning situations that generate cognitive challenges. Both the teacher and the student fulfill different functions in virtual education, but both have a meeting point in meaningful learning.

Likewise, epistemological tendencies such as organized knowledge, concepts and relationships explain reflection and action around the principles that regulate ICT. The epistemological conception designs procedures, which generate theories that mobilize information. In this regard, Lúquez and Reyes (2003), propose the connection in which they mobilize the theoretical-procedural representation and the transformation of information to express ideas within a process that gives complexity to knowledge.

In this sense, epistemology, as a theory of knowledge, validates and legitimizes the criteria that constructs and explains that knowledge. In this way, the relationship between science and technology is modeled and in the same way laws or theories are conceived as logical deductions of the facts in the organizational field of ICT.

By capitalizing on this information, the didactic act is present in the discursive manifestations that the pedagogical and technological textuality adopts, which is why its definition as a category of analysis has at least three aspects: the meta-theoretical, the theoretical and the discursive base. In this sense, the didactic act is the first thing that emerges into view as a set of partial, fragmentary, sometimes contradictory scenes that are presented, intentionally or not in the theoretical textualities examined, representing a concrete formative scene between certain actors, typically between a teacher and students.

Theoretically, it is the formulation of a model formative scene, the epitome of a prototypical experience, linked to a project in a specific social and historical context, which classic expressions are two: the reference to the didactic act through the teaching-learning formula, and through the teacher-student-knowledge triad. As regards the metatheoretical it is presented in two different fields or levels. In relation to the interpretive task of the researcher, it is a void space, a movement with advantages and disadvantages.

Category	Subcategories
Advantages and disadvantages in the use of ICT in the didactic act	Access to technological infrastructure (digital equipment and software)
	Training to use ICT in virtual environments.
	Volume of available information.
	Quality of information in social media.

SOURCE: self-made

2.4.- Methodological process: Sample selection

An intentional sampling was carried out with undergraduate students of the specialty of Foreign Languages and Natural Sciences. The selection of the individuals who participated was direct and intentional (Cantoni, 2009) and was based on the fundamental criteria of the Educational Research Workshop I and II course. The sample is made up of 49 enrolled participants: 39 women (51%) and 20 men (49%), with an age range between 22 and 25 years.

Gathering strategies information

The research is exploratory-descriptive, with a non-experimental design and with a case study approach, it was worked from the interpretive paradigm with a mixed approach where a Likert-type survey and a semi-structured interview were used through the application of Google Drive forms.

Preparation and validation of the instrument

The questionnaire was designed with a Likert-type scale, the instrument was validated by experts. The questionnaire consisted of a section of data on the use of technologies in the didactic act of research activities according to the established categories.

Methodology

It was developed from the interpretive paradigm, with a type of exploratory-descriptive research, since it allows to collect information, locate and define the problem, with a mixed approach where the collection of information was carried out from the use of a survey with a Likert scale, and qualitative, based on an interview that allowed categorizing the participants' conceptions about virtual environments and their link with the processes of the didactic act. The study design was non-experimental through a case study where the phenomenon was observed as it occurs in its natural context, and then analyzed.

Conclusions

The use of virtual environments in the learning process is an innovation, creation and distinction of knowledge due to the constant social and technological change that societies appreciate. For this, various approaches or theories of learning are presented.

Thanks to the evolution of ICT, the way of thinking about education in virtuality has become more dynamic. The diversity of platforms are reasons why the way of developing the didactic act in virtual learning environments has changed as well as the way of conceiving virtuality.

Similarly, approaches focused on student learning have evolved which legitimize the way in which the person can build their own routes, methodologies and strategies to build knowledge. Likewise, it is identified that students often use virtual environments in the didactic act as an innovative link in the development of their academic activities.

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