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**APPLICATION OF VIRTUAL ENVIRONMENTS IN UNIVERSITY**  
**TRAINING**

Mercedes Angélica García Pazmiño (a)\*

\*Corresponding author

(a) Central University of Ecuador, Av. Universitaria, Quito, Ecuador, magarciap1@uce.edu.ec

**Abstract**

The application of virtual strategies, the use of ICTs and social networks in teaching practice, proposes methodological innovation in education. The environments virtual are based on interactivity, versatility, processing speed in a cyber-environment that allows direct interaction between students and teachers. The study it was based on Vygotsky's constructivism; cognition is a social product, teaching - learning an active process. Interdisciplinary approach, relates the nodes problems and integrates inquiry, conceptualization, application and solution. Behold principles: innovation, innovativity, intelligibility and replicability. The design is quantitative, descriptive, Transversal. An online survey was applied through SurveyMonkey 450 students from a public higher education institution in Quito, Ecuador. The objective was to know the use of virtual tools in the process of teaching-learning in virtual environments. It was revealed that 68% of teachers do not apply ICTs to address the curricular units, 32% yes; 7:10 students consider. The use of digital tools is essential. The virtual scaffolding applied in your order: blogs, google drive, metasearch engines, plotters; Wetransfer, Kahoot, QR Code, surveyMonkey, plagiarum, rubiestar, mendely, zotero. It is concluded that the guided use in virtual environments with thoughtful and ethical criteria, it will improve the quality of higher education.

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## 1. Introduction

Digital technologies applied to curricular training and development constitute a key element in the higher education system, through which the student acquires competences and capacities, establish significant contact with multicultures, mobility virtual, real-time discussion, information management, collective construction of the knowledge; ability of social interrelation, learning of cooperative groups; in this process the teacher adopts new roles, becomes a facilitator, designer and coordinator from multiple sources and virtual environments.

In this sense, the Information and Communication Technologies (ICT), pose a new concept of learning, in which cognitive factors are internalized, metacognitive, motivational and sociocultural; based on symbolic procedures, with the added value of novelty and social appreciation; therefore, it becomes a versatile mediator of meaningful learning (Borroso & Cabero, 2013).

Likewise, in the cybernetic context in virtual scaffolding interactions are developed dialogues, constructive inquiry, emerging competitive discourses, contradictions, negotiations and concretions; interactive navigation, application tools virtual, also includes monitoring the process; and finally the dissemination – evaluation with self-control.

This is the era of the emerging reality of this virtual learning style, which creates a opportunity for educators to open a dialogue on shared responsibility to create and sustain a virtual learning society; it also creates a resource for support situated learning as students generate knowledge and skills necessary to deal with real and immediate situations they have to be addressed through the execution of the curriculum. Recognize this and learn to navigate between network interactions, fosters critical thinking, multimedia experience and a propositional trend toward research.

The use of online programs are tools to support teaching and learning, which in themselves they are an educational innovation; the diffusion of innovations is a meta-theory in turn made up of components, such as innovation-decision; innovativity individual; and the perceived attributes (Yates, 2001); foundations of the principles of virtual environments.

The impact of technology on education over time and the search for new innovative learning options, which is characterized by teaching expository, virtual, receptive and meaningful learning, based on digital tools and a variety of interconnected and multimedia information found on the network; he knowledge and application of these to the service and development of science, generates in the student digital skills; the student must appropriate, for the integration of knowledge and apply it as required by your chair; however, teachers and students should adopt a role characterized by a critical, reflective, creative and ethical sense.

According, Vygotsky (2001) learning through virtual environments is theoretically based on the Lev Vygotsky's Social Constructivism, who postulated that social interaction intervenes in the cognitive development of the individual; that is, cognition is a product. In this sense, the constructivist teaching and learning model is a process active. With this approach Lev Vygotsky's Sociocultural Theory, they proposed the Theory of Activity (CHAT) that concentrated the Unit of Analysis on human activity in a particular context (Gavin, 2013). This had three instances: in the first they highlighted the concept of mediation to explain the relationship between consciousness and behavior; and expressed in the subject-

object-artifact triad of mediation. The second generation CHAT, took into account the cognitive process in the cultural historical contour, according to Daniels (2004) went beyond the individual, included him in the community and the division of tasks, offering a systemic approach; by integrating the concept of collective activity and complex interactions that arise between the individual or group of individuals and their community, where the object of the activity is the final product that is sought. Likewise, Cabero (2001) described tools as everything that the subject uses to transform the object and argued that these can be physical (computers and / or programs, texts, others) or mental models (dialectics, conceptual maps, among others); they are the mediation artifacts.

In the third generation of Activity Theory, multiple systems of exercise; include emotional aspects, contradictions and sense of action attending to the interactions between the activity systems; these are part of a network that in their entirety constitute human society. According to Cabero (2003), the diversity of activity systems is part of the historical process of job diversification and division of tasks in the collective, giving way to contradictions. When they rise at the level of consciousness they become the main engine of change and development among activity systems (Engeström & Glăveanu, 2012). In the same way Nussbaumer (2012) contributed by exposing that the third generation CHAT manages tensions and contradictions that promote collective learning through change. Postulates coinciding with Delgado (2001).

On this basis of activity theory and its dynamic relationships (Burbules et al., 2006) digital tools were established for constructivist learning, in which problem solving and innovation require of trading shares; without ruling out contradictions as a source of change collective and development; of course applying the interrelation (scaffolding), tools cognitive, collaborative and conversation (use of technologies that facilitate dialogue) and link the interactions between the components of an activity system are transformed each other to achieve the expected result that is effective student learning; in this sense advances towards the cities of knowledge (Bindé, 2005). With these premises, the general objective of the study is to determine the environments courses applied by university teachers and that favor collective construction of knowledge, promoting pedagogical innovation and socio-educational transformation in the university academic context to develop skills and interact in the shared virtual environment, during the teaching-learning process.

### **1.1. The learning models based on virtual strategies**

The significance of the model was framed in the need for comprehensive training of the university teaching staff, according to current technological development, that responds to the educational, intellectual and social interests of the students, oriented to approaches collaborative, creative and constructive interdisciplinary learning; based on critical reflection, cooperation between equals and ethical values, for conflict resolution and transformative proposals, framed in projects of investigation; same that are consistent with the learning models based on virtual strategies.

## **1.2. The impact of online technology on education**

The impact of online technology on education is undeniable; it has been consolidating through time as a teaching strategy; in such virtue the educational institutions superior has a virtual platform, it enables the same ones that facilitate the Implementation of virtual environments is replicable in any area of knowledge. The students learn and apply concepts, virtual tools, that allow appropriate the curricular content; in the same way, foundations that support the Model as an innovative experience that will help to solve that current didactic need, so the pedagogical impact is significant. In the same way its importance also lies in the economy of resources, which returns it to virtual environments sustainable Virtual learning strategies include virtual scaffolding, such as videomatics, teletext, videotext, hypertext, practice software, software exploration-simulation, educational games, digital teaching tools, blogs, self-assessment, hetero-assessment, digital psychometry, online psychotherapy, presentations automated, among others, that must be known by students (McLoughlin et al., 2007).

In the same way, Cabero and Marín (2014), refer in their study on the educational possibilities of social networks and group work, that the training of students can be fed through this type of resources, since it empowers, among other aspects, socialization, the search for specific information, as well as social software tools, which induce students to generate positive attitudes.

Homework value is determined by allowing students to choose one aspect of the problem that connects with your interests and in turn allows you to link the contents and skills with the curriculum. The goals of content mastery are cooperation, motivation and cognition, during the development of curricular units; the interaction dialogic, constructive inquiry and negotiation: through collaborative work, decision making; all these principles must be practiced with social responsibility, criticality, reflection, creativity and ethics, giving way to emerging technologies to change the paradigm in the teaching-learning process (Márquez, 2017). In sum, it develops didactic-digital competences; that is, it investigates, conceptualizes, apply, raise awareness, incorporate, solve with authentic perspective and guided by constructivist theoretical foundations and multimedia experiences. And this with the focus interdisciplinary that relates to meaningful real world situations or problems critical and reflective of the curriculum.

## **2. Problem Statement**

Digital technologies and virtual environments for educational purposes generate new multisensory learning experiences; as well as other dimensions and perspectives in the virtual scaffolding and this induces a methodological change, which is a paradigm shift in education; In this context, the problem lies in the fact that not all teachers apply virtual environments in the training of university students, despite having a moodle platform.

## **3. Research Questions**

What are the most used virtual tools in the teaching-learning process in university students?

Are didactic-digital skills being developed in the teaching process of university students?

#### **4. Purpose of the Study**

The general objective of the study was analyze the application of EV during the university training process. The specific objectives of the research were: To determine the importance of pedagogical innovation and socio-educational transformation in the university academic context. Identify the most frequent virtual environments applied by university teachers in the collective construction of knowledge, and know the causes of the non-use of virtual environments.

#### **5. Research Methods**

The type of study corresponds to the quantitative paradigm of a transversal nature, because using virtual instruments and procedures, the data was collected and analyzed; and the variables were dimensioned simultaneously at a certain moment, making a cut in time (Hernández & Mendoza, 2018).

The study was conducted between April 2018 and August 2019 in a public university of Ecuador. Interview techniques were applied to a propositional sample of 450 participating students from 22 faculties

who met the selection criteria, any age and sex, belonging to various faculties and careers, who voluntarily participated in the investigation and signed the Informed Consent. The study complied with all the ethical standards contemplated for a study with minimal risk.

The study is innovative because it will allow individual innovation, intenable, implementation and replicability. The innovation establishes that "... an individual (or another decision unit) goes from a first knowledge of innovation, to the formation of an attitude towards it; thence to an adoption or rejection; to an implementation of the new idea, and confirmation of that decision. In relation to innovation, there are the differences individual, so each user has a different speed with which he adopts an innovation; so there are also the pioneers who guide the use of innovation. In addition, it will allow tryability the degree to which an innovation can be experienced on a limited; that is, trying to use innovation. In turn, the implementation establishes the degree of adoption of the innovation and establishes a relative advantage of this object or idea; it is influenced by psychosocial factors, cultural, convenience, experience and satisfaction. So you can perceive this object as a need and when it is internalized and made aware; becomes compatible with the values of the subject. Finally, the study will be replicable in any subject, with adaptations relevant; without requiring substantial modifications in all its multimedia phases, to induce the generation of innovative knowledge through the application of strategies virtual and technological tools available in virtual environments to develop student cyber skills.

##### **5.1. Population**

Study sample type of is probabilistic (finite population formula) random, stratified. The population was made up of 450 students enrolled in all careers of a public higher education institution, located in the city of Quito, Ecuador. Kind of probability sample (application of the formula for finite populations), random (all students have the same possibility of being chosen) stratified (by strata according to number of students per career).

## 5.2. Instruments

The survey designed by the author was applied, with 10 questions between closed, Likert scale to learn from university students about the use of digital technologies in virtual environments in teaching and learning. The application procedure was via online, with the SurveyMonkey program. Know the virtual scaffolding that integrates the virtual components, with real problems, in the research process, motivation, experience for meaningful learning on the virtual platform.

## 6. Findings

From the application of a survey to 450 students enrolled in an institution of public higher education, in order to learn about the use of tools in teaching and learning in virtual environments the following data: Regarding gender, there is a slight prevalence of the number of men (53%) over than women (47%). Table 1.

**Table 1.** Distribution of the sample by gender

Gender	Frequency	Percentage
Mens	240	53
Women	210	47
Total	450	100

It was revealed that 68% of their teachers do not apply ICTs to address the Units Curricular and 32% if they do; that is, in a ratio of 7: 3 (Table 2).

**Table 2.** Use of virtual environments by university professors

Use of virtual environment		Frequency	Percentage
Teachers who do not use virtual environments.	No	306	68
Teachers who do not use virtual environments.	Yes	144	32
	Total	450	10

Likewise, the majority of students (74%) consider that in all chairs it is fundamental and complementary the use of digital tools and a minimum percentage they believe that it is one more option within the teaching-learning process (16%), since will allow developing skills and abilities to operate in cyberspace already in the professional practice, because it is the world trend (Table 3).

**Table 3.** Students believe that the use of virtual environments is important

		Frequency	Percentage
Students believe that if it is important	Yes	344	74
Students believe that it is not very important	No	116	16
	Total	450	10

The virtual scaffolding most applied by teachers are in their order: blogs, google drive, metasearch, graphing tools like Cognifit, Mindomo, text2, mind42, wissemapping, mindmap, mindOmo Powtoon, creately, gliffy; in a lower percentage Wetransfer, Kahoot, QR code, anti-plagiarism programs such as plagiarum or others to make rubrics (rubiestar), and Mendely or Zotero to make citations and bibliographic references, among others, as reflected in Table 4.

**Table 4.** Virtual scaffolding used in the teaching-learning process

Use of virtual environment	Frequency	Percentage
Google Drive	32	7
SurveyMonkey	24	5
Blogs	58	13
Rubistar	25	6
Webquest creator	15	3
metabuscadores	65	14
Mendelye/Zotero	23	5
NetMeeting	3	1
Dropbox	27	6
kahoot	21	5
Cognifit	31	7
Mindomo, text2, mind42, wissemapping, mindmap, mindOmo, Powtoon, creately, gliffy, examtime, rcampus, edraw, visio.	51	11
Wetransfer	7	2
Códigos QR	26	6
Plagiarum	18	4
Others	24	5
Total	450	100

However, the main reasons why they could be an obstacle to the implementation of this new methodology, indicated in priority order half of the surveyed as the lack of knowledge of teachers on the subject of technologies digital (46%); inadequate internet access (33%); lack of socialization of the virtual platforms (15%); lack of financial resources (4%) and other causes (1%) such as can be seen in Table 5.

**Table 5.** Causes for not using virtual environments

Causes	Frequency	Percentage
Lack of knowledge	205	46
Access inadequate of Internet	150	33
Lack of socialization of the platforms virtual	69	15
Lack of resources economic twenty	20	4
Others	6	1
Total	450	100

All the students (100%) with the criteria of agreement and strongly agree, believe that the application of virtual environments will improve the teaching-learning processes in higher

education; highlighting that the guided use of virtual tools they will facilitate the understanding of the contents of the Curricular Units; However, all consider that the implementation of these requires a reflective criterion and all ethical.

## 7. Conclusion

Digital technologies and virtual environments for educational purposes generate new multisensory learning experiences, as well as other dimensions and perspectives in teaching processes in higher education. The renewal of the didactic model of teacher raised in virtual environments involves a paradigm shift in education, a methodological change in the role of the university teacher; is an innovative proposal, for collaborative and interactive work between students and teachers; In addition, it facilitates feedback and evaluation; that is, it meets the constructivist scientific basis that support. And it is coincident with the proposal of Nitrello (2005) who maintains that the Information and Communication Technologies promote a profound change in the educational paradigms. This postulate is also corroborated by Casamayor (2010) who states that the learning process uses dynamic programming and is more efficient with practice in virtual environments.

Likewise, Cabero-Almenara and Vázquez-Martínez (2014) created two environments for the training of university teachers, under the 2.0 architecture. 57 participated Educational Technology experts from different Latin American countries, the results obtained allowed us to affirm that both environments are favorably valued, and recommended for teacher training. Also, intervention through virtual strategies and tools favored collective construction of knowledge, promoting pedagogical innovation and socio-educational transformation in the shared virtual environment, during the process teaching - learning in the development of the curriculum. Conclusion similar to Ying's study in this sense it is a pragmatic method of teaching - innovative, creative learning, collaborative, motivating and modern, which is at the service of the sciences and allows the of the curriculum, virtual mobility and multicultural contact, for the development of cognitive skills in students, through the use of virtual platforms, between the most applied indicated: blogs, google drive, metasearch engines and plotters.

The project has a pedagogical, methodological and innovative impact; ecological and sustainable in the sense that it saves resources; contributes to environmental preservation and optimization of time and resources; and what Vilaverde (2020) propose, an inclusion of all students in Higher Education, based on pedagogical models that favor the learning process as Just-In-Time Teaching ; in peer instruction and Flip Teaching ; in the flexibility of the barriers of materials, schedules and spaces; developing autonomy of the student body and teacher-student interaction in the framework of online teaching. The study concluded that learning in virtual environments facilitates the teaching process learning, through the organization and development of educational activities around the cyberspace, through cooperative learning, towards building your own didactic competence. Coinciding with Sales (2001), who maintains that the new virtual environments for the development of cooperative learning as a principle methodological in the face of diversity; also argues the reformulation of roles and tasks basic of educators, whose main function is to facilitate learning, proposing motivating experiences and organizing tasks collaborative



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