REVISTA CÁTEDRA

Las competencias digitales en docentes y futuros profesionales de la Universidad Central del Ecuador

Digital competences in professors and future professionals of Universidad Central del Ecuador

Juan Cobos–Velasco
Universidad de Central del Ecuador, Quito, Ecuador
jccobos@uce.edu.ec
https://orcid.org/0000-0002-9770-3727

Lilian Mercedes Jaramillo–Naranjo
Universidad UTE, Quito, Ecuador
lilian.jaramillo@ute.edu.ec
http://orcid.org/0000-0002-0586-4292

Santiago Vinueza- Vinueza
Universidad Central del Ecuador, Quito, Ecuador
sfvinueza@uce.edu.ec
http://orcid.org/0000-0002-0818-6554

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Resumen

En la actualidad, el rol que desempeñan los docentes de educación superior se fortalece con el manejo de la conectividad, ya que para enseñar a sus estudiantes requieren del conocimiento y aplicación de herramientas tecnológicas que ofrece la web 2.0. Por lo que los docentes deben aprestarse no solo a adquirir conocimientos básicos en tecnología, sino a ser competentes para aplicar ésta en sus prácticas didácticas y, para lograrlo, su enseñanza aprendizaje inicial resulta esencial.

El objetivo de esta investigación es realizar una aproximación diagnóstica sobre las competencias digitales que poseen futuros profesionales y docentes en el ejercicio de su profesión. Para ello, de una población total de 40.000 estudiantes de la Universidad Central del Ecuador se extrajo la muestra óptima de 1.799, quienes respondieron a un cuestionario de percepción de conocimiento, aplicación y valoración de competencias digitales. Según los resultados, la mayor parte de los futuros profesionales disponen de un nivel básico de competencia digital. En el caso de los docentes se determinó que el uso de las herramientas de la web 2.0 causa dificultad en la incorporación a sus procesos de enseñanza, mientras que los estudiantes tienen un apego al uso de las mismas. La implementación de recursos tecnológicos en el proceso de enseñanza- aprendizaje, promueve un cambio significativo en instituciones de educación superior, esto permitirá formar profesionales capaces de enfrentar la sociedad actual.

Palabras clave

Competencia, digital, docentes, estudiantes, educación, TIC.

Abstract

Currently, the professor role of higher education is very important to train students in the use of the tools offered by the Web 2.0 through Information Technology and Communication-ICT. Professors must be prepared not only to acquire basic knowledge in technology, but to be competent to apply it in their teaching practices and, to achieve this, their initial learning is essential. The objective of this research is to know the digital skills of future professionals based on their perception, an important element for their subsequent exercise. For this, from a total population of 40,000 students from Universidad Central del Ecuador, the optimal sample of 1,799 was extracted, who answered a questionnaire on knowledge perception, application and assessment of digital competences. According to the results, most of the future professionals have a high level of digital competence (especially in basic digital skills), in the same way, certain significant contrasts were obtained with respect to age, in the area of basic digital skills. In the case of teachers, it was determined that the use of web 2.0 tools causes difficulty to its incorporation into the teaching process, while students have an attachment to the use of them. The implementation of technological resources in the teaching-learning process promotes a significant change in institutions of higher education, which will allow to train professionals to be capable of facing today'ssociety.

Keywords

Digital, skills, teachers, students, education, TIC.

1. Introduction

This research aims to identify the difficulties that professors and students of Universidad Central del Ecuador have in the development of the digital competencies and the incorporation of the ICT in the teaching- learning process. Higher education requires supplanting traditional methodologies with the incorporation of ICTs to address the new challenges of the 21st century.

From this approach, several have been the demands for higher education: including the incorporation of ICT; technological competence in charge of developing integral skills in students and teachers. Agenda 2030 addressed by the United Nations-UN states that "higher education has an obligation to promote not only digital competencies, but also human

competencies and not only knowledge that is closed or programmed" (Pozo and Monereo, 1999, p. 11). This involves developing learning to learn and learning to be a person, a cornerstone of 21st century education.

Thus, in order to enhance the development of digital competencies and strengthen the UN's stated agenda 2030, the autonomous and collaborative development of teachers and students is necessary. Students require to learn how to make decisions and solve problems in conditions of conflict and uncertainty in their daily context. Professors need to develop learning processes in order to transform cognitive knowledge into practical and lasting know-how.

In relation to the above, "the knowledge society, information technologies, multimedia and telecommunications will provide their profession new meanings and roles" (Latapí, 2003, p. 15). In this framework of new demands for future professionals, higher educational institutions have the need to incorporate ICT in different educational scenarios to improve future training processes, involving changes in educational models that conform to career redesigns, changes that are feasible and provide methodological possibilities for teaching-learning systems.

Under this perspective of change, teachers and students face outdated institutional plans, traditional methodologies and linear thoughts of teachers who are reluctant to use technology. The present study aims to analyze the perception of professors and students about digital competence.

For that purpose, a questionnaire of digital competencies for professors was designed, validated and administered in which the use of educational platforms was evaluated. The findings allow to observe some strengths and lack of training of current curricula and restate new strategies for their correct development. The research questions that guide the study are:

- What is the level of digital skills that the teacher manages to enhance the use of the virtual platform of Universidad Central del Ecuador?
- How often does the professor of Universidad Central del Ecuador use technology?
- Which Web Tools 2.0 allow to reinforce learning and its implementation in the university educational platform?
- What structural and functional elements of the virtual platform will improve the teaching and strengthen the autonomous work of the students?
- What is the level of knowledge about ICT reported by professors of Universidad Central del Ecuador?

The questions raised will be developed throughout the quantitative research, whose context is focused on the teachers and students of Universidad Central del Ecuador. The population under study was composed of 1 197 professors, and 300 professors were taken as an optimum sample; the student population was 40 000 students, and 1 799 were taken as an optimal sample.

To answer each question, it is advisable to locate in the framework of the innovation processes, determining the relation technology-education: "Technological innovation, tendency to the universalization and globalization, changes in the social relations and new conceptions of the technology-society and technology-education relations" (Cabero, Martínez and Salinas, 2003, p. 30). With this assessment, it can be determined that it should not be excluded from the demand of new ICT by two very important areas: the first, the media shape a new society where the educational system has to serve; the second, the

educational system will always use the media in social communication, and nowadays it happens because of the use of telecommunication networks.

While education should not be excluded from the advancement of technology, it is essential that the learning and knowledge obtained is transferred to the transformation of pedagogical methods and techniques. Thus, the educational objectives must be well defined and cleared for the student to adapt to the new changing and globalizing society.

The article is structured in five parts: the first part presents generalities about what educational change means and how ICT becomes the digital material to improve autonomous and collaborative strengthened learning from WEB 2.0. The second part presents several scientific considerations on the basis of theories of several authors that strengthen the use of ICT in modern educational scenarios, with the possibility of educating professors who align with the paradigm of connectivity and technological languages. The third part studies concepts related to the development of ICT competencies for digital literacy. The fourth part presents data collection instruments and their results. The fifth part analyses the results obtained and the conclusions.

2. Overview of the context in the educational change

In the research carried out by Sabater (1997), on the new teaching roles and the new media as powerful information distributors, is indicated that a change in the teaching functions is required, i.e., the transfer of the explanatory contents. Therefore, nowadays professors find it difficult to compete with these new supports in their explanatory extension, since the role of the professor goes beyond. The idea that the professor is a source of information is a half-reality " they are a source of training, not information" (Savater, 1997, p. 45). Alonso (2001) also points out "people can be informed by pushing a button, but they cannot be educated by pushing a button" (p. 57). The new information society expects that the professor will learn to transmit new knowledge in a different way, i.e., society hopes that the new media will give the tools that would help to forget old methods that are used in the teaching-learning processes.

Under the perspective of professors' change, the authors assume that teachers are not able to cope with the change or are simply full of prejudices. Technology is overwhelming, especially for professors who belong to a traditionalist school. The new society aspires for rofessors, especially in higher education, to become mediators capable of adapting and accepting new developments that arise with the incorporation of ICTs.

Currently, ICTs have been called the information and transformation society. The transformation not only in the political and social field, but also in the education. In the analysis of the work of Duderstand (1997) can be observed four significant arguments for a better understanding of the new social change:

1. Knowledge is essential and of great importance to establish safety, wellbeing and quality of life; in the face of these aspects it is pursued to obtain institutional responses of different kinds.
2. Incorporating ICT in the teaching-learning process through educational innovation programs in the different institutions of higher education.
3. Once the technologies begin to be considered in the organization chart and in the management bodies of the universities, they must transform the university structures.
4. Relationship with the use of the communicative possibilities of ICT in university teaching through motivational and innovative experiences of all kinds.

All these elements are aimed at creating new teaching-learning processes. It is also important in this process to develop different observation levels to emotional and intellectual skills. In a vertiginous and unchanging world of change, the predisposition and commitment of students is essential; "students' flexibility to enter a working world that will demand lifelong learning; and the necessary competencies for this continuous learning process" (Salinas, 1997, p. 3).

Learning is understood to depend on the environment in which the student is located. For example, if it is needed to develop a Web page, the student must have the necessary tools for its development. The resources used in teaching are the main curricular components that, because of their symbolic procedures and strategies, help the progress of cognitive skills in people. Capturing and understanding the information by the student allows the creation of special environments in which the learning scenarios are encouraged, including two main components: the first is the physical component as the hardware. The second is the intangible component or software system, proceeding these two aspects to a specific context of educational communication, with the main purpose of providing learning (Cabero et al., 1999, p. 53).

Similarly, the environment in which the professor works by using technology changes, i.e., the teacher becomes an active guide encouraging students to use digital resources. The tools are essential for investigating and transforming new knowledge and skills; becoming a manager of the generation of new learning resources, strengthening its role as a guide and mediator (Salinas, 1998, p. 5-15).

3. Changes in Higher Education and ICT

3.1 Use of media and technology in Education

When the student uses multimedia materials, he or she can observe, explore, experiment and, as a result, is the one who on his/her own initiative realizes his/her errors, for example, when interacting with a simulation. According to the analysis of the curricular materials of Parcerisa (1996), the media and information technologies are established as follow:

- Innovative: materials are incorporated into the teaching that allow to make structural and innovative changes, since in various educational institutions the materials used are not of great innovation, but rather are routine in the teaching-learning process, the situations are provoked by the lack of knowledge, ability to correct the management, little authentic conviction by the technological means of the information, etc.
- Motivating: Strategies are established in which the interest and attention of the students become meaningful and mainly suggestive activities, since the inappropriate use of these means causes a demotivation in the students; thus, in the classroom, the use of these means has more to do with the time lost than with the establishment of truly meaningful planning.
- Configurator and mediator: the resources that the student uses for the self-learning determine the type of mental activity they develop, the advantage that is acquired is to generate new knowledge, which can be combined to become meaningful learning.
- Controladora: la información y los contenidos que se van a enseñar, si bien es cierto
- Controller: The information and content to be taught, although it is true that they are on the web is sometimes erroneous or is permanently volatile, open or dynamic, the main reason why the skills that students develop are not relevant or sufficient. One way to stimulate the learning process is by means of the playful aspect as it is possible to make games with contents that have are relevant for those who play.

- Solicitor: there are new ways to use information that require new intellectual skills, which are not yet implemented in schools since the resources used act as a methodological guide.
- Formative: The material used in learning sometimes relapses. The media, more than transmitting content, transmits visions of the world, so that sometimes the messages are easier to interpret and others are indirect, i.e., difficult to understand. The media pushes critical analysis and reflection, reason for which the professor must carefully select the ones to be used.

The media are used as tools to encourage motivation, because the more dynamic is the way to present higher the attention of the student. The media sometimes help the students to develop the thought, express their feelings, emotions, among others. The didactic means allow the student to realize and clarify abstract concepts.

3.2 The professor and the use of media and technology

With the implementation of technologies in the training of the future professionals, professors must be properly prepared and trained in the management and execution of the new methodologies to guide the students in the development of their activities. Professors should not only focus on communicating knowledge, but also on forming students with values, those who acquire a creative personality, independent, able to search, analyze and structure information.

Antonio Bautista (2004) states that the use that the professor gives to the media in their practices makes the difference between theories of the curriculum: technical, practical or interpretive and critical. The technique uses transmitters/players and both the teacher and the student repeat the information found in texts, Internet, among others. Practical/situational uses use the means to reach an analysis and understand the information. Critique allows representations, problem solving, information analysis and learning to use representation systems that are basic and necessary to interpret, understand and relate to the social, physical and cultural context (Bautista, 2004, p. 56-57).

> It is considered that the critical use of the media should be understood as the use that the professors do, those who assume the function of critical and transformative intellectuals. This type of use contemplates resources as research tools, and their use implies an analysis (Bautista, 2004, p. 52).

Based on the proposed analysis, the author expresses that the means used in the teaching-learning process must be appropriate. The teacher must be constantly updating the new technological tools. Existing studies around the use of the media indicate that there is a certain tendency for the use of these to revolve around two fundamental objectives: the motivation of the students and the transmission of information (Cabero, 2003). In this way other possibilities are limited, for example, the use of the means for the training and the improvement of the professor, the creation and modification of attitudes, or the evaluation of the students (Cabero et al., 2003).

3.3 Training of professors in the new technologies

The above-mentioned areas should be considered as basic and should be in constant review and broadening of knowledge. It is worth mentioning that technological competition will never cease to innovate and show innovative virtual advances that allow a better education.

Under the criteria analyzed, it is important to rescue that the training plans of the professors in aspects such as the media and new technologies, should not always be done with

technical and aesthetic foundation. Emphasis should be placed on helping teachers in the curricular integration of media and teaching tools used in pedagogical mediation.

4. Considerations for the incorporation of ICT in Higher Education

Cabero (2003), states that technology should be of easy access for professors and students, because it is not enough to create "computer rooms", but change the concept to "technology to the classroom", so that the technology is available to professors when they wish to incorporate it into the teaching practice, and it would be the professor who decides it use in the classroom based on methodological criteria (Cabero,2003, p. 45).

In this sense, as well as in times of traditional education, the blackboard was a required and essential resource in the formation of an individual; nowadays, technological resources are also indispensable and necessary in the educational formation. The professor, in addition to showing his/her virtues as a professor in the classroom, must have knowledge in ICT tools for interactive learning. The incorporation of ICT in the educational field of universities is really important, since it will save time and gain in reliability. The implementation of technological resources in the teaching process promotes a change in institutions of higher education that will allow to train professionals able to confront the current society.

4.1 Digital literacy

In order to achieve a correct and efficient implementation of technological resources, the professor must present attitudes and skills favorable to the use of ICTs. The Ministry of Education, Culture and Sport of Spain-MECD and the Organization for Economic Cooperation and Development-OECD (2003) refer to a sophisticated repertoire of competencies that pervade the workplace, community and social life; these include the skills needed to manage information and the ability to assess the relevance and reliability of what is being lookedfor on the Internet (MECD and OECD, 2003, p. 4). Under this analysis, it must be overcome the concept of the simple knowledge of knowing how to manage a computer, as it has traditionally been understood and is still understood by certain sectors. To overcome these gaps, it is necessary to train the professors.

4.2 Professor training

There is an extensive and very valuable research that dates from the emergence of online education. Excerpt from what was commented by Cabeo, Duarte and Barroso (1999-2001), will be presented:

> ... I am going to refer the interested reader, I will say that for me this training must overcome the instrumental vision that we often have, and has to acquire other dimensions: instrumental, semi oenological/aesthetic, curricular, pragmatic, psychological, producer/designer, selection/evaluator, critic, organizational, attitudinal and researcher (p. 68).

This significant contribution allows analyzing that not only the instrumental education is necessary, but also it is essential the education in values, paradigm of formation in person. This will harmonize values such as: commitment, responsibility, autonomy to incorporate in planning, design, and evaluation, strategies that promote innovative knowledge in comprehensive training among professors and students.

4.3 Digital competencies

In order to develop learning activities and to work successfully in an increasingly demanding and innovative society aligned to knowledge-based, updated know-how,

students and teachers must effectively master digital technology. Within the learning process ICT can contribute to the development of skills such as: experts in the use of information technologies; search engines, analyzers and information evaluators; troubleshooters; creative and innovative productivity tools; communicators, collaborators, and most importantly informed citizens, responsible and able to contribute to the society.

Currently, a professor needs to be able to offer students learning opportunities that support ICT. He/she should know how to use them and know how they can contribute to the student learning. In order to develop capacities in the students, it is necessary that the current education curriculum strengthen the professional competencies of a professor. Professors need to be trained to teach students the benefits of using ICT, so that these types of resources are effectively integrated into the subjects. According to UNESCO (2008) regarding ICT competencies, the following competencies are determined on a personal basis:

- To know the basic operation of hardware and software, as well as productivity applications, an Internet browser, a communication program, a multimedia presenter and management applications.
- To know a variety of specific applications and tools, which should be able to use them with flexibility in different situations based on problems and projects. Professors should be able to use resource networks to help students collaborate, access information and communicate with external experts in order to analyze and resolve selected problems. Professors should also be able to use ICT to create and monitor class projects performed individually or by groups of students.
- To have the ability to design ICT-based knowledge communities, and also to know how to use these technologies to support the development of students' skills in terms of knowledge creation and lifelong and reflective learning.

4.4 Professors´competencies of the 21st century

García Vallinas (2007) state about the competencies of the 21st century:

> The skills necessary to develop in the broad, plural, dynamic and uncertain labor market are valued precisely by the flexibility or adaptation capacity of the worker to diverse working environments; but also, beyond the changing demands of the labor market, the needs and formative requirements of people are important, to transcend the specific or specialized training for certain jobs, providing them with a more general training that attends to the personal fulfillment like citizens or to train them to decide on the course and direction of their own lives (p. 1).

Therefore, it can be determined that a teacher governed by the changes of the current society must implement the various technological resources at the time of teaching their knowledge and encourage their students to practice self-learning. Developing in them capacities such as analysis, reflection and understanding of information requires training competencies. In this regard, Gonzales (2012) indicates some of the capacities that must be developed in the current education:

- To create and edit videos as educational resources for teaching;
- To use blogs and wikis to generate online learning platforms targeting their students;
- To take advantage of Web images for their use in the classroom;

- To use social networks within the learning process as means to connect with colleagues and students that allow them to grow professionally;
- To compile e-portfolios for their own development;
- To have a thorough knowledge of the types of online security, use of software or applications that allow the detection of plagiarism in the work of the students;
- To create videos with screenshots and video-tutorials;
- To collect Web content suitable for the classroom learning;
- To use and provide students with the necessary task management tools to organize their work and plan their learning in an optimal way;
- To understand the issues related to copyright and honest use of materials;
- To use digital tools to create evaluation questionnaires;
- To use collaborative tools for the construction and editing of texts;
- To find and evaluate web content;
- To use mobile devices (tablets or smartphones;
- To identify safe online learning resources for students;
- To know the use of YouTube and its potential in the classroom, use annotation tools and share the content with the students;
- To share the Web pages and sources of resources presented in the class;
- To use graphic organizers, online and printable;
- To use tools to create and share tutorials with movie screen capture recording;
- To create online workgroup or team tools that use messaging;
- To search efficiently on the Internet using the minimum time possible;
- To carry out research work using digital tools;
- To use tools to share files and documents with students.

However, it is important to refer to some key competencies such as: managing and knowing how to use templates and spreadsheets; to know and to teach methods of digital research like the competencies in the management of information-CMI. In addition, it is necessary to know and manage digital graphic editing tools; to reflect and teach their students the practical, critical and ethical uses of the network; to know and manage virtual classrooms; to use digital forums with students. Nowadays, it is necessity to know about ICT, because every professional needs to develop effectiveness in their profession. The analysis on the use of ICT at Universidad Central del Ecuador is detailed below.

The questionnaires presented show the number of participants. The questionnaire was answered voluntarily by 300 teachers from 2015-2016 and similarly by 1 799 students.

Gender	Frequency	Percentage	Valid percentage	Accumulated percentage
Masculine	204	68.0	123	68.0
Femenine	96	32.0	32.0	100
Total	300	100.0	100.0	

Table 1. Frequency and percentages according to the gender of professor of the UCE

Gender	Frequency	Percentaje	Valid percentage	Accumulated percentage
Masculine	824	45.8	45.9	45.9
Femenine	970	53.9	54.1	100.0
Total	1 794	99.7	100.0	
Lost	5	0.3		

Gender	Frequency	Percentaje	Valid percentage	Accumulated percentage
Total	1 799	100		

Table 2. Frequency and percentages according to the gender of the students of the UCE

5. Instrument and data analysis

The questionnaire of instrumental skills in the use of ICT (professors) was elaborated based on the competencies and ICT standards of UNESCO, which was validated by the international panel of research in educational technology-PI2TE mentioned in the conceptual framework, and grouped into 3 dimensions. The first dimension has to do with instrumental skills in the use of ICT, which has 9 items; the second dimension has to do with didactic – methodological skills in the use of ICT, which in turn is comprised of 11 items, and finally, the importance on the use of ICT in the teaching practice, such dimensions have 11 items. The 3 dimensions of this first instrument have been broken down into a total of 31 items that are part of this questionnaire, and are answered by a five-point continuous scale according to Likert scale, being: totally agree, agree (2), undecided (3), disagreement (4) and totally disagree (5) with a student sample (alpha = 0.85). The data were organized, codified and analyzed using the statistical package SPSS version 22.0.

The survey on the educational Platform-Web 2.0 for professors and students was elaborated based on the use perception of the Sakai platform that works in the UCE, the same that was validated by PI2TE mentioned in the conceptual framework, and that is composed by 22 questions that are formed by the dimensions of gender, demography, valuation of the virtual platform, use of tools of the Web 2.0 and networks. The data were organized, codified and analyzed using the statistical package SPSS version 22.0.

6. Results

PARTE 1												
	Educative software (Learning)			**Source of information (Update of knowledge)**			**Indicator of virtual spaces (Teaching formation)**			**TOTAL**		
Data	**Respondents C**	**% of the total IC**	**% accumulated IC**	**Respondents C**	**% of the total IC**	**% ccumulated I**	**Respondent**	**% of the total IC**	**% accumulated IC**	**Respondents C**	**% of the total IC**	**% accumulated IC**
Totally	104	34.78%	34.78%	85	28.50 %	28.50%	70	23.24 %	23.24%	86	28.84%	28.84%
Partly	96	32.11%	66.89%	103	34.61 %	63.11%	87	29.10 %	52.34%	95	31.94%	60.78%
In a regular basis	68	22.58%	89.46%	72	24.21 %	87.32%	87	29.10 %	81.44%	76	25.29%	86.08%
Not too much	26	8.70%	98.16%	32	10.80 %	98.12%	48	15.89 %	97.32%	35	11.79%	97.87%
None	6	1.84%	**100.00%**	6	1.88%	100.00%	8	2.68%	100.00%	6	2.13%	100.00%
TOTAL	**299**	**100.00 %**		**299**	**100.0 0%**		**299**	**100,0 0%**		**299**	**100.00 %**	

Table 3. Univariate factor analysis of instrumental skills in the use of ICT (professors)

From the information obtained of 299 key informants representing the 66.89% accumulated between the "totally" and "partly" indicators with respect to the use of software to promote learning in the teaching processes, and based on a survey held in Argentina, Chile, Costa Rica and Mexico, it was shown that more than 60% of professors use technological tools (Informe en Tendencias Sociales Educativas, 2014, p. 180).

According to the data, it can be inferred that the design of strategies to eliminate barriers includes the incorporation of ICT to the curriculum, since the use of educational software allows to promote meaningful learning. The use of ICTs motivates the student to create and generate new knowledge. Under this premise and depending on the criteria expressed by professors regarding the use of educational software to promote learning with their students, it can be inferred that it is totally important. Its use will reinforce what has been learned in the classroom in an interactive way.

From the information obtained of 188 key informants, representing the 63.11% accumulated between the "totally" and "partly" indicators with respect to the source of information *updating knowledge*, and according to the report on *Social Trends of Education* of 2014, the activity that is mostly performed by professors in the computers is the writing of documents (98%), search of information (98%), preparation or creation of presentations (95%), preparation of schedules or timetables (93%), while the less performed activity is communicating with their students (46%). Taking into account these data, it is considered important that the professor uses ICT to: reinforce what has been learned in the classroom through the use of digital journals, e-books, blogs, among other tools; to look for reliable sources of information. All these elements allow professors to have access to scientific information and acquire skills that allow them to search efficiently and safely on the Internet.

From the information obtained of 157 key informants representing the 75.58% accumulated between the indicators "totally" and "partly" with respect to the source of information *training teachers,* and taking into account the report of the Economic Commission for America Latin America and the Caribbean (ECLAC) shows that the percentage of professors who have been in courses on ICT is quite high in countries like Chile (90%), Peru (82%), Colombia (61%), and Costa Rica (60%), while the percentage of professors who have taken courses on ICT is quite low in developing countries such as Nicaragua (17%), Paraguay (10%) or Guatemala (6%). It can be inferred that the professor update as a fundamental part in the educational and student education development allows the teacher to publish and share information on the web. The objective is to work collectively with other professors so as to unify knowledge in order to increase the general intelligence for abetter teacher training. Table 4 shows the level of importance that students give to the use of the virtual platform.

Importance on the use of the platform				Value of the platform			Use and learning of online teaching			Ethics			Use of the Web 2.0			TOTAL, Interviews		
Data	**Respondents C**	**% of the total IC**	**% Accumulated IC**	**Respondents C**	**% of the total IC**	**% Accumulated IC**	**Respondentss C**	**% of the total IC**	**% Accumulated IC**	**Respondentss C**	**% of the total IC**	**% Accumulated IC**	**Respondentss C**	**% of the total IC**	**% Accumulated IC**	**Respondentss C**	**% of the total IC**	**% Accumulated IC**
Never	87	4.82%	4.82%	139	7.73%	7.73%	281	15.60%	15.60%	45	2.50%	2.50%	45	2.50%	250%	119	6.63%	6.63%
Ocasionally	173	9.59%	14.41%	336	18.69%	26.42%	181	10.04%	25.63%	108	5.99%	8.49%	108	5.99%	8.49%	181	10.06%	16.69%
Sometimes	390	21.66%	36.08%	551	30.65%	57.07%	271	15.05%	40.68%	289	16.04%	24.53%	289	16.04%	24.53%	358	19.89%	36.58%
Almost always	629	34.95%	71.03%	475	26.41%	83.48%	210	11.70%	52.38%	475	26.39%	50.91%	475	26.39%	50.91%	453	25.17%	61.74%
Always	493	27.39%	98.42%	183	10.19%	93.67%	184	10.23%	62.60%	737	40.97%	91.88%	737	40.97%	91.88%	467	25.95%	87.69%
9	29	1.58%	**100.00%**	114	6.33%	**100.00%**	673	37.40%	100.00%	146	8.12%	**100.00%**	146	8.12%	**100.00%**	221	12.31%	100.00%
TOTAL	**1799**	**100.00%**		**1799**	**100.00%**		**1799**	**100.00%**		**1799**	**100.00%**		**1799**	**100.00%**		**1799**	**100.00%**	

Table 4. Univariate factor analysis of the Educational Platform-Web 2.0 UCE (students)

Based on the results obtained from 1 122 key informants representing 62.34% accumulated between "always" and "almost always" indicators regarding the importance of the use of the educational platform at UCE, and according to the data obtained by Revista de Tecnología Journal Technology (2013), it is mentioned that at the Latin American level, 68.5% of students consider as important the use of the virtual platform. The relationships between students and professors increase and contribute to the development of the activities and allow to appreciate the academic performance during the course development. According to this information, it can be observed that the importance of the educational platform at UCE in the students, is similar to other universities, but it is necessary to encourage students to use the online learning platform as an instrument of study in all educational scenarios.

Similarly, 658 key informants representing the 36.60% accumulated between the indicators "always" and "almost always" with respect to the indicator valuation of the educational platform and according to studies carried out by the Association for the Development of the Educational technology and New Technologies Applied to Education-EDUTEC (2013) in its article "Using online learning environments in higher education", in reference to the assessment of online learning environments-EVA, 100% of the universities consulted said that they considered them very appropriate. This allows to offer the opportunity to incorporate conceptual, procedural and attitudinal elements that facilitate a training in competencies in the students, in addition to interculturality by transcending borders imposed by distance. According to these data, it is necessary to encourage the use of the online learning platform at UCE, motivating the student through the use of various activities that are part of the platform and that allow to strengthen the learning and use of the tools that make them up.

As regards to the results of other competencies of the 394 key informants representing the 21.93% accumulated between the "always" and "almost always" indicators with respect to the indicator use and learning of online platforms, and according to the article "Using online learning environments in higher education by EDUTEC" (2013), 60% of students responded that they use the platform in learning activities. The activities that are generally used are: support materials and homework delivery. Therefore, it can be inferred that it is necessary for professors and students to learn to use all the tools that the online platform provides.

Likewise, from the 1 212 key informants representing 67.36% accumulated between the "always" and "almost always" indicators with respect to the ethics indicator and according to an article by Technology and Ethics (2002), there is an increase in the material that is offensive and dangerous on the Internet by 76%. Monopolies in the software and information industry by 60%, thus, it is clear that globalization linked to the Internet would seem to require standards of a global nature as well. The goal would be to establish behavioral patterns, i.e., a defense of human values.

In reference to other data obtained, it is analyzed that of 1 212 key informants represent 67.36% accumulated between the indicators "always" and "almost always" with respect to the indicator use of the Web 2.0, and according to data of the National University of Online Education, Knowledge Society and Education (2012), it is mentioned that 92.6% usually have access, participate or visit the Web 2.0 every day. It is necessary to implement a large number of tools offered by the Web 2.0 in the educational field that would allow to generate and share collaborative and autonomous learning to encourage the proper use of these technological tools.

7. Discussion

Future professionals have full knowledge of their own level of digital competences and believe that it is ideal for exercising this competence objectively. It will be taken into account as previously determined in Table 3, that the variable *ICT teaching competencies* is determined for this research from the knowledge of ICT activities towards the use of teaching learning processes. For this reason, nine research issues have been created and are related to knowledge, application and value (updating skills, teacher training, classroom management, learning support, evaluation processes, ethics, intellectual property and didactic teaching) technology in the learning processes in the classroom and outside it. the following questions can be answered:

- **What is the level of educational software used by teachers at Universidad Central del Ecuador?**
  When analyzing the data, it can be determined that the professors of UCE present averagely high knowledge percentages (66.89%) with respect to the use of educational software to promote learning in the learning processes. The use of the educational software allows to promote learning in the students by helping them in the evaluation, analysis and synthesis of the information; in this way the student is motivated to create and generate new knowledge.
- **What is the degree of knowledge updating regarding the technology of the professors of Universidad Central del Ecuador in relation to the classroom management through the search of information?**
  According to the data obtained, it is analyzed that the professors of the UCE have high percentages of knowledge (63.11%) with respect to the source of information *updating knowledge*.
- **What is the training level of teachers at Universidad Central del Ecuador regarding technology training?**
  It can be determined that the professors of UCE have medium to high (75.58%) knowledge percentages with respect to the source of information *training teachers*, and taking into account the report of the Economic Commission for Latin America and the Caribbean (ECLAC) it is seen that the percentage of professors who have taken courses on ICT is quite high in countries such as: Chile (90%), Peru (82%), Colombia (61%) or Costa Rica (60%) , while the percentage of professors who have taken courses on ICT is quite low in developing countries such as: Nicaragua (17%), Paraguay (10%) or Guatemala (6%).
- **What is the application degree of methodological strategies used by the professors of Universidad Central del Ecuador to improve the classroom management processes?**
  It can be determined that the professors of UCE present high percentages of knowledge (43.10%), with respect to classroom processes.
- **What is the support degree for learning with technologies to strengthen the autonomous work of students?**
  It can be inferred that the professors of UCE present high knowledge percentages (47.77%) with respect to the elaboration of multimedia resource support to the learning and according to the data of a study in the Spanish context, Vaillant and Marcelo (2012) point out that 28.5% of professors use ICT and 30% make occasional use (less than once a month). The remaining 41.5% of professors state to make regular and systematic use of ICT in their classrooms, although with very different intensity degrees. When professors make use of the technologies in their teaching, they do so to transmit content as support to the oral presentation (78.7%),

to present content through a multimedia or hypermedia system (62.3%), and to make demonstrations that allow simulating certain scenarios (44.5%); and according to these data it can be interpreted that the use of multimedia resources in education is not being exploited for the most part by the professors, they only use it as a support for oral exposure and to transmit content, forgetting that these tools should be used in an innovative way in their classes to generate knowledge.

- **How is the evaluation process applied by the professors of Universidad Central del Ecuador?**
  It can be determined that the teachers of UCE present average application percentages (46.46%) with respect to the indicator of *evaluation processes*, according to the competition standards in ICT for teachers of the UNESCO, ICT tools should serve as an assessment tool. In addition, Ecuador is one of the countries where ICT is used as an evaluation tool, an example of this is the conductionof tests *Ser Bachiller* in which 231 759 students of third year of baccalaureate participated to measure the dominance degree in the learning standards established by the Ministry of Education.
- **What attitude do professors have towards the application of ethics with regard to the use of technology in ICT-based education?**
  Regarding the attitude shown by the teachers of UCE towards the application of the ethics in the use of ICT in the education, it can be determined that the professors have very high application percentages (83.17%) with respect to the *ethics* indicator. Also, according to an article by *Technology and Ethics. Privacy in the Workplace in Perspectives in Business Ethics* (2002) is observed an increase in the availability of offensive and dangerous material on the Internet by 76%, monopolies in the software and information industry by 60%. To the foregoing, it is clear that globalization linked to the Internet would seem to require standards of a global nature that establish behavioral patterns and lead to a global defense of human values. This is certainly a complicated task as it would require laws of a global nature that many countries and governments would not seem to accept. It is important to rescue professors from considering the evidence of the importance of ethics in all areas of life.
- **What attitude do professors have towards respect for intellectual property when using technology in educational processes?**
  Regarding the attitude shown by the professors of Universidad Central del Ecuador towards the respect for the intellectual property in the use of technology in education, the analysis that reports the data (87.55%) is very high with respect to the indicator of intellectual property. According to studies conducted by McCabe to 2 294 High school students from 25 U.S public and private schools, it was obtained that 52% of students had copied explicit paragraphs from a website without making the corresponding citation. Also noteworthy is a South American research carried out by Bordigon et al., (2011) pointed out that "50% of the elementary and middle school students of the Argentine education system declared that they had copied to make their tasks and work" (p. 34). Due to the data obtained in the survey and the high rate of plagiarism made by the students, it is essential that higher education institutions take steps to prevent and reduce academic fraud through the implementation and use of online programs that detect anti-plagiarism and, thus, ensure a culture of respect for authorship (academic honesty) and enhance the management of reliable information.
- What attitude do professors have with regard to the support of technologies in didactic pedagogical processes?
  It can be inferred that professors of Universidad Central del Ecuador have high

knowledge percentages (87.23%) with respect to the *didacticpedagogical* indicator. In addition, according to Vaillant and Marcelo (2012) in the Spanish context most professors (78.7%) make use of technologies in their teaching to transmit content in support of oral presentation, forgetting the pedagogical aspects that should contemplate the use of technologies. Based on the aforementioned, it is necessary to give an efficient appropriation and management of ICT to the learning processes, which contributes to guiding educational policies, the organization of the institution, the material resources and the actors involved. It is not a matter of doing the same thing in another way, but of modifying the own objectives according to the requirements posed by the use of the technologies to articulate the pedagogical practice with the technological processes and products.

8. Conclusions

Systematized experiences based on data presentation and the corresponding analyses consider technologies as an innovative paradigm that is rapidly embedded in the higher education of the 21st century. To conclude with the research, it is inferred that since there are changes and rapid rhythms of modern pedagogical, these will be observed in two areas: the first relates to the competencies that professors have developed in the teaching-learning processes, and it is clear to infer that it is possible to improve or develop some instrumental skills in professors to provide students with better technological tools offered by Web 2.0, whose purpose is to integrate systemic approaches that combine the theory and practice related to professional contexts.

The following area relates to the perception of the future professionals of Universidad Central del Ecuador, which shows that although men use more technology, women have a similar number, therefore, it is not possible to establish that men have developed more competencies than women.

The research carried out focuses on the teachers and students of Universidad Central del Ecuador, and it was noticeable that professors have problems using the tools of the Web 2.0, causing difficulty in the pedagogical mediation of educative scenarios, especially in the incorporation of technological tools to promote quality teaching-learning processes; while students have an accelerated attachment in their use. Therefore, the implementation of technological resources promotes a paradigm shift in institutions of higher education, which will allow to create competitive beings according to a millennium education.

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Authors

JUAN COBOS –VELASCO obtained his PhD in educational research issued by the Department of Education of Universidad de Alicante (Spain) in 2018; he holds the title of MSc. in educational computer systems at Universidad Tecnológica Israel in 2005, and obtained his bachelor degree at Universidad Central del Ecuador in 1996.

He is currently a professor in the Faculty of Letters, Philosophy and Education Sciences in the career of Pedagogy of Computer Science. He is also the Coordinator of the Entrepreneurship program of Universidad Central del Ecuador and is technical coordinator of Revista Cátedra, of the Faculty of Philosophy, Letters and and Education Sciences, His main research topics are related to digital competencies of the professors, students, Web apps applied to education, digital resources for improving performance and entrepreneurship at Universidad Central del Ecuador, and has books such as digital systems to the classroom, E-learning in higher education.

LILIAN JARAMILLO-NARANJO obtained her master's degree in Technologies Management and Teaching Practice from the School of Education at Pontificia Universidad Católica del Ecuador (Ecuador) in 2015. She obtained a master's degree in Education and Social Development from the Faculty of Communication Arts and Humanities at UTE University (Ecuador) in 2008. She obtained a degree in Biology from the Faculty of Philosophy, Letters and Education Sciences at Universidad Central del Ecuador in 2007. She holds a PhD in Education Science.

She is currently assistant professor at UTE University of Ecuador. She is columnist and member of the International Council of Reviewers of Journal Sophia of Universidad Politécnica Salesiana (Ecuador). Her main research topics include education, ICT, biology, natural science, natural science didactics, development of metacognitive strategies for the teaching practice using ICT. She has participated in international conferences organized by Universidad Técnica del Norte, 2018. She is the author of chapters of books and articles published in high-impact journals (Emerging Source Citation Index, Latindex, Redalcy, Scielo). She is the author of the book *National Reality for the UTE University.*

SANTIAGO VINUEZA-VINUEZA obtained his master's degree in Communications Networks, from the Engineering Faculty, Pontificia Universidad Católica del Ecuador in 2016; he has a master in Educational Computer Systems, Universidad Tecnológica Israel en 2009; he holds a Bachelor degree in Education Sciences, specialization in Computer science at the Faculty of Philosophy, Letters and Education Sciences, Universidad Central del Ecuador in 2002. He is a Computer Engineer, Universidad Autónoma de Quito in 2002.

He is currently an associate professor at the Faculty of Economics, Universidad Central del Ecuador. He is member of the Severance Fund of Uiversidad Central del Ecuador, member of the Senior Director of the Faculty of Economic Sciences, Universidad Central del Ecuador,

coordinator of the qualification unit of the financial career of Universidad Central del Ecuador, Coordinator of the subject Information Systems of the Faculty of Economic Sciences of Universidad Central del Ecuador; his principal research topics are related with educational field and the technologies of the information and communication.