

## Teaching Competences in Higher Education Virtual Learning Environments

**ALMA LILIA SAPIÉN-AGUILAR**

Universidad Autónoma de Chihuahua

Email: [lsapien@uach.mx](mailto:lsapien@uach.mx)

Tel: +116141927526

**MINERVA ISABEL CASTILLO-CUEVAS**

Universidad Autónoma de Chihuahua

Email: [minervacastillo@hotmail.com](mailto:minervacastillo@hotmail.com)

Tel: +118182596651

**LAURA CRISTINA PIÑÓN-HOWLET**

Universidad Autónoma de Chihuahua

Email: [lpinon@uach.mx](mailto:lpinon@uach.mx)

Tel: +116141691623

**PATRICIA ARACELI ARAIZA-ZAPTA**

Universidad Autónoma de Chihuahua

Email: [patyaraiza@yahoo.com.mx](mailto:patyaraiza@yahoo.com.mx)

Tel: +11614276676

**DOMINGO SALCIDO-ORNELAS**

Universidad Autónoma de Chihuahua

Email: [dsalcido@uach.mx](mailto:dsalcido@uach.mx)

Tel: +11614015845

### *Abstract*

*The information and communication technologies in education are a means to introduce alternative pedagogies and promote changes in educational structures. Virtual education is an option in the training process that represents new challenges for professors; who are responsible for setting educational facilities for the training of students. This highlights the need for professor's continuing education, since quality training should be adjusted to meet the changing needs of today's world. The aim of the research was to propose a teaching skills profile adjusted to virtual learning environments. The research design was not experimental and the focus was descriptive. This was a transactional research, from January 2015 to December 2016. The research was divided into three stages which are: 1) Characterization of educational practices of professors in virtual learning environments, 2) Identification of teaching skills for virtual learning environments and 3) Validation of a teaching skills profile adjusted for virtual learning environments. Six teacher performance skills were analyzed: 1) pedagogical; 2) educational interaction; 3) digital; 4) instructional design; 5) professional, ethical and legal responsibility; 6) research. The results enable the identification of professor's online activities and competences, in order to establish a validated reference to serve as a reliable assessment of virtual teaching activities.*

**Key Words:** *Competences, Virtual Learning Environments, Information Technologies.*

## Introduction

The dynamism of information and communication technologies (ICT) and its impact on the educational environment, require constant knowledge update for teachers. Duarte (2000) stated that quality education must adjust and respond to the current evolutionary requirements, so it requires a greater need for continuing training. Nowadays, with the use of technology, it is possible to access content and information from virtually all parts of the world, or from technologically advanced libraries. For example, Internet use has made information a resource available to all those who have a computer and a connection to this service. Thus, a network society, whose components revolve around the use of information technologies, is established.

In this new context, the role of the teacher must be transformed, since it must evolve from being a transmitter of information to being a learning facilitator. Also, it is necessary to understand and know the use of ICT in virtual environments, because as mentioned by Harasim et al (2000), learning in new environments requires a different role for the teacher. This entails that said role should be closer to being a professional-facilitator than a professional-transmitter of knowledge. The teacher, as a variable of the educational process, has to become familiar with the educational technology in order to generate learning experiences that promote the development of thinking skills and their application (Alonso and Gallego, 1995).

Marqués (2000) pointed out that the role of the teacher in the use of digital technologies and information is to help students learn autonomously, as well as to promote their cognitive and personal development through critical activities and applications. In another study, Sánchez (1998) mentioned that because of these new technological and communication needs, it is necessary to train academic personnel as a strategy to improve the quality of the programs and services offered. The same author suggests training quality academics in the times and quantities required, as a means to meet current demands and future increases in demand. For this reason, it is necessary to develop the necessary skills in the teacher, in order to meet new needs derived from the use of technology. The objective of this research was to propose a profile of teacher competences in higher education virtual learning environments.

## Literature Review

The Internet has become a means of communication, establishing a new organizational form of modern societies. In other words, it is the heart of a new socio-technological paradigm that is in fact, the material basis of society and various forms of relationships, work, and communication (Castells, 2001). The influence of the Internet, being an important element in today's societies, has changed the way communication takes place, on one hand it has minimized geographical distances, and on the other, it has enabled a new way to bring people together regardless of time or place; we already live in a globalized environment. It has clearly given way to new styles of interaction, thus changing social, communicational, and educational paradigms.

This globalized world has permeated all systems and areas of human life. Specifically, the use of ICT is demanding the educational sector to adapt into this modern feature. Cano (2007) noted that as a result of these new demands of time and place, an adaptation of the curriculum to the needs and abilities of students and professors should arise. Because of modern technology and the wealth of information available online, virtual education emerges as a real need for this global environment. The researchers Harasim *et al.*, (2000) stated that the educational paradigm that is emerging in this new century is the learning network, which is based on global interactivity, collaborative learning, and access to educational activities and resources throughout life. The virtual environment facilitates not only that these cooperation processes can be carried out; at the same time it serves individual needs of space and time. In this way, it responds to a more autonomous learning environment led by the student. There are also new possibilities for cooperation that

will enrich the pedagogical proposals that have emerged so far. As a result of this adaptation, Cornella (1999) documented that one of the basic challenges of modern education is to prepare people to be able to participate fully in the information society, where knowledge is a critical source of social and economic development.

Regarding the use of ICT in education, McClintock (2000) argued that such technologies represent an interesting and important means to introduce alternative pedagogies, and promote changes in educational structures. Likewise, Marques (2000) argued that the use of ICT has clear repercussions in the educational field. This author mentioned the following repercussions in particular: 1) the need for continuous training to meet the demands of the professional, educational and labor world; 2) the growth of the importance of informal education through media, and especially, through the internet; and 3) the development of new formative environments in cyberspace, which free students and professors from the need to coincide in time and space, thus facilitating access to training in any circumstance throughout life.

The evolution of technological environments and their impact on the educational environment, make evident the need to adjust the participants of said educational process, especially the professors, who are the professionals and specialists that establish the means of teaching for the training of their students. For this reason, the teacher's continuing education is required and made mandatory, since quality training must be adjusted and respond to the needs of this changing world (Duart, 2002). Never again must learning be circumscribed spatially and temporally in a place and time, instead it must lay down options of theoretical and technical knowledge that need to be used and adapted into the knowledge society.

As a consequence, the current professors face different problems because of these demands. Professors are in need of developing new skills and competences that meet the needs of their students and society in a globalized world. The insertion of communication and information technologies in the classroom is changing the teaching functions, and these changes in the role of the teacher are going to produce changes in the educational practices. Therefore, it is necessary to identify the new competences that need to be developed by the teacher, which would allow them to be part of a new virtual educational environment.

At present, in Mexico, there are several universities that have developed virtual education as a means of responding to the use of ICT in education. However, few institutions provide training and offer facilities for professors in virtual education, this new modality of education. In addition, institutions that have implemented online programs do not always have specific training programs for teachers. This reality has led professors to develop new skills and aptitudes in information management, but in an improvised way and in response to the demanding needs of students and the virtual environment. The knowledge of the competences developed by professors who are working in virtual environments, provides an understanding of the way in which professors perform their functions. In addition, it supplies real data on the needs of professors working on online mode.

## Materials and Methods

The research design was non-experimental and the approach was descriptive. It was a transactional investigation conducted in the period from January 2015 to December 2016. Due to the nature of the subject and the purposes of the research, the approach was mixed; that is, under this approach and according to Hernández *et al.*, (2007), it collects, analyzes, and links quantitative and qualitative data to respond to a problem. As a consequence, the mixed approach provides a greater amplitude, depth, diversity, and interpretative richness of the problem raised. The research was divided into the following three stages: 1) analysis of teaching practice in virtual learning environments; 2) identification of teacher/tutor competences in virtual learning environments; and 3) validation of the competence reference.

### First Stage of the Study

The first stage had the objective of characterizing the educational practices of the teacher, specifically, those related to online tutoring. For this stage a qualitative methodology was used, thus allowing a recount of meanings, activities, actions and daily interactions from different subjects, helping at the same time to question, interpret and relate what was observed. The characterization of this stage was carried out in two scenarios: in the first, a documentary review of different online educational models was performed to delimit the teacher's action; in the second one, a phenomenological design was used (Hernández *et al.*, 2007) which was intended to describe and understand the phenomena from the point of view of each participant, and from a perspective constructed collectively. This is based on the analysis of specific discourses and themes, as well as the search for possible meanings. The researcher then contextualizes the experiences in previously defined terms.

This first stage was developed within the framework of a virtual education forum held at a public university in the state of Chihuahua. The analysis forum basically looked for two major aspects: 1) the analysis of current educational practice, and 2) trends in teacher training in distance education. The first aspect was approached in five working groups: 1) design of online courses; 2) online course planning; 3) tutoring for distance education students; 4) evaluation of online courses; and 5) online course management. The working groups were conducted under the focus group modality and became our units of observation. This research highlights in particular the data provided by group three, the tutorial class for distance education students.

The data was recorded in the context of a group interview situation without further intervention from the researcher that could skew the information provided by the participants. The information was obtained in a session in which 22 people participated, of whom 17 were professors of the different academic units of the convening university, and 5 came from other universities in the country. The requirement to participate in the research was that they should be part of the virtual university from their institution, regardless of the academic unit to which they belong, or their time teaching online. The professors with experience as teachers in virtual education were diverse, with experience spans fluctuating between two and seven years. Regarding academic training, the majority had a master's degree; some held a bachelor's degree and others a doctorate. The participants were 18 women and 4 men. All professors carry out an institutional educational practice in which they perform various teaching functions such as: teacher coordinators, principals, and teacher representatives, among others. For this reason, the participants on this table only addressed the question of virtual tutoring, which corresponds to the object of study of the present research.

At the next session, the number of professors did not vary and the information was collected during a single session that lasted three hours. For data recording, the focus group provided information regarding how tutoring is carried out in the Higher Education Institutions (HEIs) from the northwestern region of the country. To document this session, audio and video recording of the focus group session took place, which, as mentioned, consisted of bringing together various people to talk about a predetermined topic. It is important to mention that the focus group is a qualitative technique that consists of a discussion with a group of people that meet certain common characteristics for their selection and are guided by a moderator, who conducts the session based on a moderation guide. Through discussions and the exchange of opinions, this technique allows the interested parties to know how the participants think about a specific subject or topic (Hernández and Coello, 2002, Rodríguez-Andino Milagros, 2007). This type of session required a special atmosphere, for which a physical and social environment was designed in order to maintain a relaxed group, and thus allow perceptions, attitudes and opinions to emerge informally and spontaneously. The procedure followed for the implementation of the focus group covered the following phases: A) preparation of the session, and B) development of the focus group, which included the following stages: 1) openness; 2) introduction of the focus group with questions focused on educational practice, tutoring program, online tutor activities, and tutoring instruments; C) closure of the discussion. The rapporteur and

moderator briefly summarized the points of view and asked the group whether this perception was correct and accurate, inviting them to ask questions, make comments, observations and/or corrections.

### Second Stage of the Study

In the second stage, the analysis of the information gathered from the professors participating in the focus group, was processed using the model proposed by Coll *et al.*, (2000). This model was used to study the evaluation practices of professors in Catalonia, Spain; therefore, it was ideal for use in the context of the object of study. However, it was necessary to adapt the model, taking it only as a general reference, and incorporating the main approaches of the virtual teaching work focusing on competences, and the very particular characteristics of the educational practice in virtual environments. For this reason, the description of each stage of the model and some of its moments or segments, were taken into account. For the qualitative information procedure, content analysis was used as a technique to formulate reproducible and valid inferences from certain data. The content analysis was divided into four phases: 1) transcription of the recording; 2) pattern analysis; 3) use of evidence matrixes to organize the relevant aspects of each of the dimensions treated, as well as to construct the conclusions; and 4) preparation of the final report.

Data analysis was performed according to three dimensions and sub-dimensions: 1) pedagogical approach; 2) program or didactic planning and 3) teaching activities. The analysis of information about professor practices in virtual learning environments allowed identification of virtual practices, and characterization of the professor. The information obtained in the focus group shed light on a qualitative perspective of what were the educational practices of the professors. From the phenomenological knowledge of what professors do online, we proceeded to develop the identification of the competences, taking into account the qualitative part contributed by the professors and the theoretical part of the authors. This stage was carried out in two phases: the first one consisted on the documentary revision of models or proposals of online tutor's competences. As a result of this analysis, the Authors described a theoretical list of tutor's competences deemed necessary in virtual learning environments.

The second phase proposed that this construction of generic competences be grouped into categories for their evaluation and purification, proceeding to the delimitation and validation through expert judgment. The Delphi method was used, which is a method of structuring an effective group communication process, by allowing a group of individuals to deal with a complex problem as a whole (Linstone and Turoff, 1975). Area experts agreed on the importance of an assessment of necessary competences for online professors. The instrument was based on 16 competences defined from a theoretical review and the results of the focus group. A consultation questionnaire and consensus strategy was constructed through electronic means, which allowed its revision. Subsequently, specific activities were identified for each area, which resulted in a list of 6 competences with their necessary teaching attributes, necessary for virtual learning environments.

### Third Stage of the Study

This stage was done in two moments. First, 55 professors who had experience participating in online teaching activities, as well as knowledge of virtual platforms and course implementation in virtual learning environments, were selected as sample. An instrument was constructed with the six competences and their specific attributes, obtained from the judgment of experts. The evaluation was based on a Likert scale with two scales of assessment: one related to its importance for online teaching performance, and another corresponding to the level of mastery that the respondents considered to have in a sort of self-evaluation of their teaching competences in virtual learning environments. The SPSS statistical package was used for the quantitative information processing, using descriptive, correlational and comparative analyzes. The results obtained from the first and second stages allowed validation of the competence referential, which started with 77 attributes and was then reduced by 47% to 41 attributes in total, distributed over the six competences.

The second moment took place on virtual platforms, for which we proceeded with a qualitative methodology by means of a checklist obtained from the referential. That is, the statistically refined referential gives way to a checklist to know if the attributes most valued by the 55 professors were those that are reflected in the teacher's actions in the different virtual platforms. In this phase, six virtual platforms were accessed in six different universities: four from Mexico, one from Brazil, and one from Chile. Access to the platform of a course taught by the online university was requested. Said course was developed at the time of the visit in order to verify the performance of the professor in developing their online teaching-learning process, considering that it was necessary for the professor to manifest some kind of communication with the students. This was the inclusion criterion used in the checklist to verify communication between teacher and students. Derived from this criterion, three universities of the six that allowed access were eliminated, leaving two universities from Mexico and one from Chile as participants in this last phase. The application of the checklist in the course allowed identification of the activities or attributes that the professors established on their online course. The information obtained enabled validation of the referential and confirmed the relevance of the six previously obtained competences, and their corresponding attributes.

## Results and Discussion

### First Stage of the Study: Characterization of Teaching Practice

The first stage of the research allowed a theoretical and empirical delimitation of the teaching practice. Regarding the theoretical revision, several pedagogical models that delimit the professor's action within an institution were found. These models present similarities and differences in approach, professor's activities, relationships with other professionals, and professor's monitoring. In general, it is perceived that some are student-centered, others are teacher-centered, and others given equal importance to students and teachers. In some models, the professor is a learning facilitator, while in others they are "multitasking" teachers. Depending on the institution, the tutor may or may not have multidisciplinary support teams for their work in virtual learning environments. As a result, the analysis of the information allowed to identify three general models of online professor's performance, which are presented below in Table 1.

Table 1. Virtual Teacher Performance Models

Characteristics	Model A	Model B	Model C
Student-centered	*		
Professor-centered		*	
Professor-student equality			*
Defined professor activities	*		
Varied professor activities		*	*
Work teams support	*		*
Communication and interaction as a learning factor	*	*	*
Elaboration, design and production of activities		*	*
Various interaction tools	*		*
Monitoring of teaching performance	*		
Participation in research	*		

Own elaboration (2016)

For the purposes of this research, it is considered that the tutor in virtual learning environments must perform activities attached to the A model. This model contemplates the tutor as a learning facilitator for the student, promoting interaction and constant communication with students; in such a way that the tutor's main responsibility is to accompany said students.

The second moment on the characterization of the teaching practice, was performed by means of a focus group. In the conversation participants acted naturally, nodding, dissenting, analyzing, contradicting, contributing, keeping silent, interrupting and enriching information with details that were added to the central theme. The group had its own dynamics, determined by the characteristics of the participants and their context. The conversation was kept within one focus, during each period of the session. The question guide generated synergies and participation from all members of the group. Questions were generally raised from general to specific issues, and the session was recorded and transcribed in order to prepare the primary information for analysis and interpretation. The results of the four dimensions derived from the model of Coll et al. (2000), were: A) teaching approach, B) teacher education program, C) teacher activities, and D) teacher tasks. These three models of work in virtual education coincide with those presented by Garduño (2007), which place the teacher as a centerpiece in the teaching-learning process. The model A is related to the one mentioned by Duart and Martínez (2001), who focus on the student's accompaniment, and with the one presented by Sangrá and Duart (2000), who emphasize the flexibility, cooperation, accompaniment, and personalization of the teaching-learning process.

### A. Teaching Approach

The conception of a teaching model as a structured plan that can be used to set up a curriculum, is required in order to design teaching materials and guide teaching in the classroom. Regarding the teaching approach that professors follow when giving an online course, it was possible to identify that professors use a traditional model of teaching; that is, a method of transmitting knowledge from the teacher to the student is chosen. The professor is in charge of developing and explaining the contents at the beginning of the course and it is the professor who provides the information of the course, the objectives, weights and activities. On the other hand, the students receive the information, abide by the rules and do not interact with the professor directly. In addition, students only present their doubts or comments regarding what the professor has said. The professors said that they tried to teach online the same subjects that they taught in person, and they did it in order to avoid the struggle of preparing new things and materials. With the contributions of the professors, it is evident that they migrate their style of teaching face-to-face to an online format. This is important because they are the transmitters of knowledge, use the same materials and do not encourage independent work or study by the students; in other words, it is a traditionalist approach to teaching. These data are related to model B tutoring, in which the professor is the expert and transmitter of knowledge. Conversely, in professors belonging to other universities, a more flexible teaching approach is perceived in order to accompany the student; that is, more in line with model A of tutoring.

### B. Teaching Program

Teaching program is understood to be the document that refers the contents that will be developed within a subject in a previously defined school cycle of online work. Professors stated that they used the program provided by the institution; that is, they did not design the course. The institution provides them with thematic information, the activities to be developed, and the delivery format of each activity. The academic institution, by providing the study program, gives the professor freedom to weigh the activities and suggests whether they will be individual or group assignments. However, some participants in the focus group indicated that they used the same study program and adapted it to an online format; that is to say, they eliminated or modified those activities that were assigned to groups, along with those that required a manual product or a presentation to the group, because they were not compatible with an online format. The professors showed that the program to be developed within the subject was provided by the institution, in some cases being the same one that was implemented in the face-to-face modality. They had the opportunity to adapt the activities in terms of format and weighting, but not the objective or the number of activities to be covered during the course. The programming of the course by the professor, regardless of the university to which it belongs, is of the traditionalist type. That is to say, attached to the model B, in which the institution is the one that provides the information and delimits the activities to perform, and where the tutor does not have decision power on the objectives to perform. When talking about

characterizing the educational practice of the professor in virtual environments, it is necessary to know what are their daily tasks for the delivery of an online course.

### C. Teaching Activities

When questioning them about what activities they perform for the implementation of an online course, it was found that in public universities the professor's activities are holistic and they are attached to the model B. The professor of the public university is in charge of the content of the course, design, organization, weighting, evaluation, and implementation. He or she is also responsible for granting students access to the course, clarifying administrative and technological doubts, promoting work teams, and providing them with emotional support. There is a difference with the professors of private institutions, who present activities delimitation, do not perform many functions previously mentioned, and are immersed in work teams within which there are people in charge of the didactic, academic, technological, and design part. It is clear that the professor is part of the team, but does not have full responsibility for the design and development of the course; for this reason, their work is linked to the pedagogical model A. Professors in general stated that an important part of their work as an online professor is the socio-affective part, since the student tends to feel isolated or disoriented in the process, so they have to implement strategies of emotional support in order to avoid student desertion. This practice is consistent with the philosophy of Duarte and Martinez (2001) for whom the virtual professor should be located in the new training space, recognizing him as the guide and traveling companion of the protagonist of the learning process, which is the student. The role of the virtual professor is based on the accompaniment.

Regarding the student's attention related to the course process and the administrative type, the professors at public universities stated that they are the ones in charge of clarifying the student's questions, inform about payment dates, face-to-face consultations, and appropriate periods to drop-out the subject, among others. It is important to specify that in private universities there is a specific area that is responsible for the administrative processes of students. The academic institution as such, expects its professors to implement the curricula in accordance with their mission and vision of education, therefore it is expected that the professor will fulfill specific tasks for an adequate teaching-learning process.

### D. Professors Tasks

It was identified that when working in online courses, public university professors perform various school activities of administrative, academic, technological, and motivational nature. Within the discussion group, professors in model B stated that the institution supported them with training courses, but clarified that they have specific needs in order to achieve an adequate teaching-learning process. It is clear that when entering a virtual environment, professors use the program provided by the institution. It was possible to identify that professors of pedagogical model B use a traditional method of exposition, because they apply their usual classroom strategies for a virtual environment. Professors transfer their contents, calendar, supports, and teaching strategies. Students are encouraged to work individually and avoid forming work groups, as it requires more time from the professor. With regard to the activities they regularly carry out, professors are expected to cover several areas of performance that include administrative, technological, pedagogical, didactic, organizational, and emotional tasks, among others. From this perspective, the professor is a pivotal piece for knowledge transmission. This agrees with Garduño (2007) who stated that in virtual education the professor should be considered as a central element to achieve the proper development of the learning process. For its part, the academic institution demands from the professor activities of a technological, administrative, academic and emotional nature, all focused on developing the course adequately and thus avoid students dropping out of school. With the above, it is evident that in the public university there is no division of labor. In other words, the professor has an extra workload to make the course work. The professor must become an expert not only in his pedagogical area, but is also expected to master administrative and technological issues. In contrast, in private institutions there are multidisciplinary teams that support the main role of the teacher, which is to facilitate student learning. Professors gave an

account of the skills they consider necessary for online work, which include digital, pedagogical, socio-affective, communicative, and writing skills.

### **Second Stage of the Study: The Profile of a Teacher in Virtual Learning Environments**

Eight experts on virtual, distance, and competence education, were summoned from different universities in the country. They were first asked to express their opinion on a general document containing 16 competences covering various areas of professor action in virtual learning environments. By means of a consensus, the teaching practice in virtual learning environments was reduced to six general competences and their characteristic activities. This process was useful to reach a consensus on the specific activities that the professor should perform, which were grouped in six competences: 1) pedagogical; 2) educational interaction; 3) digital; 4) instructional design; 5) professional, ethical and legal responsibility; and 6) research. Pedagogical competency refers to implementing, developing and evaluating the teaching-learning process in a virtual environment. The competency of educational interaction refers to the ability to develop the process of accompaniment, follow-up, and educational interaction in virtual tutorial classes. Digital indicates the ability to handle technological, communication, and informational tools in the teaching-learning process, as well as in the tools management of the virtual learning educational platform. The instructional design competency indicates the ability of the professor to plan and generate pedagogical training and evaluation devices in the design of virtual learning environments. Professional, ethical and legal responsibility refers to the ability to commit to the institution and its values, as well as to assume a personal commitment as an instructor at work in virtual learning environments. The research competency indicates the ability to design, execute and participate in the development and dissemination of relevant research for virtual learning environments.

The information obtained from experts allowed to identify and maintain the six competences, conceding to a modification regarding the attributes of each one. Consequently, the pedagogical dimension was reduced to 21 attributes. For the educational interaction competition, 3 attributes were eliminated, as well as 2 for digital competency. The instructional design competency was reduced by 47% from 19 to 9 attributes. The competency of professional, ethical and legal responsibility was delimited to 10, out of a total of 14 attributes.

Finally, in the research competition, 4 attributes were eliminated, thus defining it with 11 elements. These six competences are linked to the competences presented as necessary by various authors such as Urdaneta *et al.*, (2010) who proposed that the online tutor should have at least four competences: pedagogical, communicative, psychological and technical. These competences are complemented by those presented by Pérez (2007) who documented a competency scheme contextualized within the act of teaching, emphasizing the organizational, leadership, scientific and evaluation, and control competences.

### **Third Stage of the Study: Validation of Benchmark Composed by Six Competences**

To reach this result, 55 professors were consulted and a questionnaire in electronic format was sent to them. The evaluation was carried out under a Likert scale with 2 valuation subscales: one referring to the importance of each attribute and one corresponding to the domain level the respondents consider themselves to have regarding each attribute (Tuning, 2003).

Table 2 shows the results from the analysis of the statistical average obtained for each competence according to their importance and their perceived level of domain. In the same way, the attributes considered the level and importance valued. Table 2 also presents the attribute of each competence that scored the highest and lowest score (statistical average).

Table 2. Statistical average of competences according to importance and level.

Competence	Importance	Level	Indicator			
	Statistical average	Statistical average	Most important (Statistical average)	Less Important (Statistical average)	Highest level (Statistical average)	Lowest level (Statistical average)
1) Pedagogical	3.41	3.02	1 (3.65)	19 (2.96)	1 (3.38)	20 (2.36)
2) Educational interaction	3.13	2.87	5 (3.56)	2 (2.96)	12(3.16)	3 (2.35)
3) Digital	3.34	2.81	1 (3.45)	6 (3.16)	10 (2.98)	6 (2.56)
4) Instructional design	3.28	2.74	3 (3.42)	4 (3.13)	6 (2.91)	4 (2.55)
5) Professional, ethical and legal responsibility	3.36	2.85	2 (3.49)	9 (3.15)	1 (3.09)	9 (2.40)
6) Research	3.08	2.30	3 (3.29)	11 (2.87)	3 (2.64)	10, 11 (2.13)

Own elaboration (2016)

The competence most valued by professors in relation to their importance and level was the pedagogical one. This result can be derived from the identification they give to the use of technologies and the teaching-learning process. These data are in agreement with what was presented by several authors such as Duarte (2002), Ryan (2000), and Solari and Monge (2004) who emphasized the pedagogical functions of the professor as a means to guide and orient the student in achieving the proposed objectives. In contrast, the research competence obtained the lowest scores, both in importance and level, which shows the competence's lack of relevance to the professor.

When performing a review of the scores obtained, we can appreciate the differences between importance and level. For example, the competence that presents a smaller difference in score or gap is that of interaction, evidencing the relevance of communication in the teaching-learning process. This is desirable because, as documented by Pérez (2007), communication competences are essential to improve interaction processes, make more dynamic the professor's training, and sensitize them to their continuous improvement, among others. The competence that presented the biggest difference between importance and level was the digital one. That is, professors consider it very important, but their level of mastery of it is not high.

The most important competences were digital, pedagogical and ethical, legal and social responsibility. Those with minor relevance were design, interaction, and research. In terms of mastery of competences, professors refer to pedagogy as the most developed competence, followed by interaction and ethical, legal and social responsibility competences. In the same way, they refer to the digital, design, and research competences as less developed ones. A relevant find is that digital competence is valued as the most important, but not as a competence highly dominated. This result shows the need for professor training. It was clear that the research competence does not offer relevance to the professor's work, and was the least valued in both areas.

### Analysis of differences between Competences' Importance and Level of Mastery

The factorial analysis allowed grouping the attributes by loads, in such a way that they were tagged with names that represent the activities belonging to each factor. The derived factors made it possible to find personal and professional elements that influence the development of the course in virtual learning

environments. In the six competences concordances were found among the grouping by importance and level. However, the differences allowed elucidating that professors do not value the importance and the level of the attributes studied in the same way. In addition, this analysis allowed knowing the weight of the attributes in each one of the factors. They were grouped into three factors and the most significant attributes in each factor are identified as shown in Table 3.

Table 3. Factors derived from factor analysis

Competence	Importance	Level
Pedagogical	Learning construction Learning strategies Follow-up to the teaching-learning process	Teacher's personal activities Encourage learning Follow-up of the teaching-learning process
Educational interaction	Socio-emotional support Group support in the teaching-learning process Individual support for learning	Development of individual learning Socio-emotional support Teaching activities
Digital	Use of technology Mastery of technology Personal activities	Use of technology Mastery of technology Personal activities
Instructional design	Pre-course activities Course development Course implementation	Course planning Course organization Course implementation
Professional, ethical and legal responsibility	Professional performance Ethical activities Personal commitment	Professional commitment Ethical activities Personal identity
Research	Research development Research dissemination Project management	Research development Participation in research Research dissemination

Own elaboration (2016)

It was clear that professors do not value equally the importance and level of the attributes studied. According to several authors such as Ryan et al. (2000) the basic roles that the virtual professor had to play included the pedagogical and the social. For these researchers, the most relevant role was the pedagogical one because through it, the professor contributed to the creation of specialized knowledge, focused critical points, answered questions, responded to students' contributions, and synthesized information. Likewise, they hypothesized that through the social role the professor encouraged the creation of an atmosphere of online collaboration among participants, controlled the time of interventions, and set the agenda for the development and presentation of each topic.

The validation of the referential from the perspective of the professor's action was complemented by a visit to the virtual classroom. The refined reference, composed of 41 attributes, was valued with the professor's activities. The virtual platform was allowed to express the way in which the professor establishes the teaching-learning process on seven virtual platforms from different online universities. In this regard, each university establishes the content and organization within its platform so that they are easily accessible, and the professors are able to work with the program provided by the university. The functions that the professor performs depend on each university. The means to supervise the professor are not specific to all platforms, and work support teams were only found in two of the universities studied.

## Conclusions

In the first stage of study, three models of online work were identified: model A, based on multidisciplinary, delimited, and specific work that places the responsibility of learning with the student; model B that is centered on the professor, which is conceived as a multitasking actor with a holistic vision in charge of academic, administrative and technological responsibilities, among others; finally, model C places the professor and students on the same level, with a clear definition of work and activities. It is concluded that there are two styles of performance: the first is the traditional one where the professor must meet the technological, administrative, emotional, academic, and pedagogical needs of the student, so that different responsibilities for the proper development of the online course fall on the professor; the second refers to a limited or circumscribed educational practice, in which the professor's action refers to the development of the course through the accompaniment of the student in the learning process, thanks to multidisciplinary work teams where different needs are met and in which the professor is primarily focused on being a facilitator of the process. It concludes with the delimitation of six competences of teaching performance: 1) pedagogical; 2) educational interaction; 3) digital; 4) instructional design; 5) ethical and legal professional responsibility, and 6) research. The pedagogical competence was the best evaluated in both aspects (importance and level) while the less valued competence, by importance and level, was investigation. It is concluded that there is a clear distinction between public and private universities in terms of professor performance. The reference of teaching competences resulting from this research constitutes a useful tool as a reliable means to evaluate online professors and delimit their teaching work.

## References

- Alonso, C. y Gallego, D. (1995). Formación del profesor en Tecnología Educativa. Barcelona: Oikos-Tau. Pp: 31-64
- Cano, B. (2007). Sistemas de gestión de aprendizaje en la enseñanza de programación. Master's Thesis from the Universidad Autónoma de Yucatán.
- Castells, M. (2001): The Internet Galaxy. Reflections on Internet, Business and Society. Oxford: Oxford University Press.
- Coll, C., Barbera, E. y Onrubia, J. (2000). La atención a la diversidad en las prácticas de evaluación. Revista Infancia y Aprendizaje, 90, 11-132
- Cornella, A. (1999) En la sociedad del conocimiento la riqueza está en las ideas” doctorate course UOC. 2001-2003.
- Duart M, y Sangrá A. (comp). (2000, 2002). Aprender en la virtualidad. Barcelona, España.: Gedisa
- Duart, J. y Martínez, M. (2001). Evaluación de la calidad docente en entornos virtuales de aprendizaje. Available at: <http://www.uoc.edu/web/esp/art/uoc/0109041/duartmartin.html> [12/05/2011]
- Garduño, R. (2007). Caracterización del docente en la educación virtual: consideraciones para la Bibliotecología. Revista Investigación bibliotecológica. Vol 21, num 43. México.
- Harasim, L.; Hiltz, S. R.; Turoff, M. y Teles, L. (2000).: Redes de aprendizaje Aprendizaje. Guía para la enseñanza y el aprendizaje en red. Barcelona: Gedisa
- Hernández, Fernández y Baptista (2010). Metodología de la investigación. México: McGraw-Hill.
- Hernández, R. y Coello, S. (2002). El paradigma cuantitativo de la investigación científica. La Habana, Cuba: Editorial Universitaria EDUNIV. 112p.
- Linstone H., Turrof, M. (1975). The Delphi method, techniques and applications. United States of America. Addison wesley publishing.
- Makrakis, V. (2005). Training teachers for new roles in the new era: Experiences from the United Arab Emirates ICT program. Actas de la Tercera Conferencia Panhelénica sobre Didáctica de la Informática, Corinto (Grecia).
- Marqués G, P. (2000). Funciones de los docentes en la sociedad de la información”. Revista Sinergia, núm. 10, pp. 5-7”

- Mcclintock, R. (2000). Prácticas pedagógicas emergentes. El papel de las tecnologías de la información y la comunicación. Cuadernos de Pedagogía No 290, pags 74. 77. España McGraw-Hill.
- Pérez, A. (2007). ¿Competencias o pensamiento práctico? La construcción de los significados de representación y de acción. En J. Gimeno (Ed.), Educar por competencias, ¿qué hay de nuevo? (pp. 59-103). Madrid: Morata
- Rodríguez-Andino, M. (2007). Aplicación de las técnicas análisis del campo de fuerzas y Focus group al estudio de las limitaciones y potencialidades para la aplicación de las TIC en la Universidad de Camagüey
- Ryan, S., Scott, B., Freeman, H. y Patel, D. (2000). The virtual university: the Internet and resource – based learning. London. Kogan Page.
- Sánchez, J. (1998). Aprender Interactivamente con los Computadores. El Mercurio, Artes y Letras, 19 de Abril. Retrieved from: <http://users.dcc.uchile.cl/~jsanchez/Papers/papers/aprenderinteractivamente.pdf>
- Solari, A. Y Monge, G. (2004). Un desafío hacia el futuro: Educación a distancia, nuevas tecnologías y docencia universitaria. Retrieved on March 11th, 2010, from <http://www.oei.es/tic/ed.htm>

