INVESTIGACIÓN/RESEARCH

INVOLVEMENT OF THE TEACHER IN TECHNOLOGY-MEDIATED EDUCATIONAL ENVIRONMENTS

Claudia Islas Torres [1]**:** University of Guadalajara. México
cislas@cualtos.udg.mx

ABSTRACT

The presence of information and communication technologies in educational institutions of higher learning made forms of access to knowledge to be modified, the institutions offer different training alternatives and teachers and learners get involved by playing diverse roles that seem to depend on the educational context or setting, impacting on the performance of the players in the teaching-learning process.

In this sense, the purpose of writing this article is to introduce, from a systemic approach, how the involvement of teachers in technology-mediated educational environments has been.

The epistemological foundation of this paper is the General Systems Theory through the Systems Approach. Research was conducted under a paradigm of mixed research (quantitative and qualitative). In the quantitative stage, actions that describe the involvement of teachers in the atmosphere were identified, due to the relevance of these data we proceeded to a qualitative phase in which we delved into the information obtained and qualified the data, explaining their whys. Research was addressed from a theoretical approach and the need to fully observe the phenomenon of involvement of the teacher in technology-mediated educational environments was determined, the results indicate that involvement includes cognitive, attitudinal, educational and communication issues, the technological factors mark the educational actions but their beliefs, availability and digital skills outweigh them. For teachers, this type of environment is a way to make educational processes flexible, although they give more importance to presenciality.

---

[1] **Claudia Islas Torres:** University of Guadalajara. Mexico
cislas@cualtos.udg.mx

LA IMPLICACIÓN DEL DOCENTE EN LOS AMBIENTES EDUCATIVOS MEDIADOS POR TECNOLOGÍAS

RESUMEN

La presencia de tecnologías de información y comunicación en las instituciones educativas de nivel superior originó que las formas de acceso al conocimiento se modificaran, las instituciones ofrecen alternativas de formación distintas y los docentes y aprendices participan jugando roles diversificados que parecen depender del contexto o el escenario educativo, impactando en el desempeño de los actores del proceso enseñanza-aprendizaje.

En este sentido, el objetivo del presente escrito es dar a conocer desde un enfoque sistémico cómo ha sido la implicación del docente en los ambientes educativos mediados por tecnologías.

El fundamento epistémico de este trabajo es la Teoría General de Sistemas a través del Enfoque Sistémico. La investigación se llevó a cabo bajo un paradigma de investigación mixto (cuantitativo-cualitativo). En la etapa cuantitativa se identificaron las acciones que describen la implicación del docente en el ambiente, a raíz de la relevancia de estos datos se procedió a una fase cualitativa donde se profundizó la información obtenida y se dio cualidad a los datos, explicando sus porqués. Desde la perspectiva teórica con que se abordó la investigación se determinó la necesidad de observar integralmente el fenómeno de la implicación docente en los ambientes educativos mediados por tecnologías, los resultados indican que dicha implicación contempla cuestiones cognitivas, actitudinales, pedagógicas y comunicacionales, los factores tecnológicos marcan las acciones docentes pero pesan más sus creencias, disponibilidad y competencias digitales. Para los docentes este tipo de ambientes son una manera de flexibilizar los procesos educativos, aunque dan mayor importancia a la presencialidad.

PALABRAS CLAVE
Implicación-Docente-Ambientes educativos-TIC

1. INTRODUCTION

In recent decades, the presence of Information and Communication Technologies (ICTs) and especially the Internet has led universities to live a process of change which transforms them into flexible structures that facilitate access to knowledge and development of academic communities, according to the needs of the 21st-century society (Bozu & Canto, 2009). However, despite the obvious impact of ICTs in training processes and particularly in students, their educational use is still a big challenge, since different research reports show little use of such tools in the classrooms (Karsenti & Lira, 2011).

The diversity of literature that deals with research regarding the use of ICTs in education agree that technologies in higher education have entailed modifications, adaptations, innovations and restructuring in which teachers are daily faced with the need to rethink their teaching practices . For example, the Bologna Declaration (Bozu & Canto, 2009) proposes a new university model where the student is the center of the teaching role and his role is diversified to become a counselor or guide who also know how to use ICTs to provide content, generate dynamic interactive teaching materials and design mechanisms that capture students' attention by helping to build meaningful learning.

In turn, educational institutions follow their ways according to their academic models, vision and mission, investing in technological infrastructure as a way to justify innovation in education and join the information society; however, there are few relevant studies to show a real impact of these factors in university teaching (López, 2013).

As authors like García Márquez, Bustos, Miranda y Espíndola (2008) and Bernal (2008) say, technologies may eventually cause discomfort in teachers because they involve the transformation of their professional skills to integrate them into the curricula, since it is a requirement of educational institutions with the idea that technologies be appropriated, a situation that seems to prioritize technological innovation, neglecting pedagogical innovation, the latter being established as a true challenge to teachers since they must design learning activities that are of quality for students (Santamaria, San Martin, & Lopez, 2014), in order to develop optimal an teaching-learning process in which the styles and technologies used by teachers in teaching line up to the learning styles of students.

In this light, the inclusion of ICTs in the teaching-learning has given way to the configuration of various educational environments where the degree of presence of technological tools gives them characteristics of their own that describe them as being completely online (e-learning), mixed (b-learning), ubiquitous (u-learning), among others, the essential element of which is the implementation of technological tools based mainly on Internet as a means to complement the training processes.

In this sense, the problems identified in this piece of research turn around situations described in the preceding paragraphs: what it means for teachers to include technology in their daily work, what institutions do to include ICTs, what the technology-mediated teaching-learning process represents in pedagogically terms and technological skills; finally, these issues set the guidelines to state that knowing, from a systemic approach, how the involvement of teachers in technology-mediated educational environments has been is the goal of this piece of research. The systemic approach as an epistemic foundation that enabled a comprehensive view of the phenomenon under study.

The results of this piece of research let us see that the involvement of teachers conceived as active participation in technology-mediated educational environments can be understood from comprehensive observation, in which various elements describing their daily tasks are involved. Systemic observation helped identify factors that characterize the involvement of teachers in this kind

of environment, so the contribution of this paper is the use of a theory that arises in the area of natural sciences as a foundation explaining social phenomena when they are addressed as a network of systems that have their own functionality and influence each other.

2. METHODOLOGY

The systemic perspective with which this piece of research was devised identified five main dimensions from literature (cognitive, attitudinal, educational, technological, communicative) that would expose the elements that, from this perspective, characterize the involvement of teachers in technology-mediated educational environments.
The research paradigm used in this study was of a mixed type (quantitative and qualitative) (Hernández, 2010), the intention was to start from a diagnosis that quantitatively identified actions denoting the involvement of teachers in the environment, and later to quality data that were significant after a correlation analysis.

2.1 Quantitative Stage:
• In this research phase, a questionnaire with closed questions on a Likert scale was designed and applied. The instrument was validated by experts and applied to a group of 8 teachers participating in mixed mode courses.
• Once information was captured and collected, a correlation analysis of variables was conducted through which it was determined which were the elements of each dimension that gave evidence of the involvement of teachers in the environment under a trust factor of 95%.

2.2 Qualitative Stage

To complement the quantitative stage, teachers were interviewed in depth, the interview was interpreted through discourse analysis from which it would be possible to describe what teachers live in an unconventional educational context, in such a way that what was expressed was information denoting their involvement in the environment.

2.3 Empirical reference

The empirical reference of this piece of research is the University Center of Altos de la Universidad de Guadalajara, which offers a total of 14 bachelor's degrees which correspond to social economic administrative areas, health, biological and social sciences, with a population of approximately 3,772 students and 374 teachers.
Due to the scope of research, we worked with 8 teachers who had participated in mixed courses on the calendar 2013B. The sample is small because, due to the characteristics of this piece of research, dimension in probabilistic terms is not

necessary, because the researcher's interest was not the generalization of the results but qualitative inquiry.

Participating teachers had from one to two courses in mixed mode in the careers of Computer Engineering, Bachelor of International Business, Bachelor of Public Accounting and Bachelor of Administration. Therefore, the sample was self-selected (Hernandez, 2010) as participants responded to an invitation by the researcher.

2.4 Unit of analysis to approach the empirical reference

The unit of analysis corresponded to: the involvement of teachers in a technology-mediated educational environment.

This unit distinguishes the involvement and active participation of teachers with the environment. Due to its characteristics, the analysis unit is of a subjective type as regards the qualities of people.

3. ANALYSIS AND DISCUSSION

3.1 Quantitative Stage

The demographic characteristics of the population were as follows:
• five female teachers
• 3 male teachers
• The ages of those involved range from 30 to 43 years
• Senior teaching at the university is from 3 to 24 years

In technological terms, involvement of teachers in the technology-mediated environment was observed under the following criteria:
• 100% said they have computer equipment as well as a mobile device, in turn, 80% of them said they use these tools as a means of communication. 30% use them to send and receive files and 50% for academic purposes.
• Their skills in using the Internet are reflected in their daily search for information; however, only 80% used this network to prepare their lessons daily while 20% do so only once a week.
• For purposes of communication through chats, only 25% of them use it daily, the others do so sporadically or never.
• For teachers, the Internet is a tool that facilitates sharing of information.
• With regard to their ability to use tools of Web 2.0, it is primarily focused on social networks, followed by use of shared documents and sites to generate animated presentations.
• The involvement of teachers in technology-mediated educational environments is also noted for their opinion on whether the technology had transformed their teaching actions, communication, time management, search for information and lesson planning; from their perspective. there has been a transformation reflected in the way they plan their lessons and how they organize their time.

72

In terms of *cognitive* aspects that mark the involvement of teachers in the environment, it was identified that they regard the Internet as essential to teach in a mixed mode and what follows is some of the reasons they expressed:
• It is essential
• To stay in touch and in line with technological innovations
• It is essential to step 1
• I can use many tools and interact with all
• Accessibility
• All applications can be used to benefit teaching and learning practices
• If you do not handle internet, you cannot work

When teachers were questioned about whether teaching in a mixed mode was better than in a classroom, 50% said they agreed and 50% said no and expressed the following arguments:

For no:
• Indecision
• In the classroom I am in direct contact and there is feedback
• If the presence part is necessary
• I only use it as support to the subject for feedback

For yes:
• Fall into the monotony, if imparted on a presence basis enthusiasm would be lost
• It works smoothly
• I look for a way to combine the two moments and strengthen with resources
• I provide information and facilitate consultation

For participating teachers, getting involved in a subject where technologies are implemented such as in the case of mixed courses is a challenge, especially for practical subjects, so they prefer presenciality for such subjects, in the case of theoretical subjects, they consider more flexibility to implement ICTs.

Besides, the benefits of implementing ICTs are valued in terms of time, they can perform other activities in addition to being forced to learn to use more technologies and evaluate objectively. They also said they apply different teaching strategies, make the lesson dynamic and plan the courses well.

Regarding attitude, the teachers express acceptance of technology-mediated environments, their actions are aimed at setting up courses where they can implement ICTs and try to follow up the activities that are generated.

As for teaching, the teachers said they relate the activities carried out on a presence basis to those implemented online to reinforce learning, confirm knowledge, meet the concerns of students, close the activities and conclude debates and support students to identify the relevance of what they learn.

Teachers also always say they follow up the learning activities undertaken by the students, it is not this way as regards feedback via personal messages or follow-up in forums.

Concerning the application of teaching strategies, teachers seek to activate prior knowledge of students so they can relate it to the new information through classroom activities and online. They also provide information reviewed by

73

themselves to provide it to students and enable them to understand and demonstrate it in activities in which there are real problems to which students must find a solution.

Regarding communication, teachers reported that they have ability to discern when and how they should communicate with the students participating in a technology-mediated course and trigger debates to exchange views with students referring to the topics covered in the course. Though these answers seem to indicate a good communication with students, when questioned about the possibilities of communication with students through technology-mediated environments, five respondents said that there is more flexibility for communication, whereas three saw no and what follows is the arguments they are commented:

For no:
• Unsure, sometimes I can better work out doubts in presence lessons.
• I rather like the presence modality, because in the mixed one you have to work twice over.
• Communication can be 100% in a presence course, it is a matter of organization.

For yes:
• Sometimes the student expresses himself quietly and does not want his comments to be viewed or heard by the whole group.
• Communication is not only the classroom, but constant.
• Communication is simultaneous.
• You keep in touch through the platform in presence sessions and by other means such as social networking.

One more question that teachers were posed in terms of communication was whether they interacted more with students through a platform than in a presence session, to which all replied no and expressed the following arguments:

They said no, providing the following reasons:
• I interact more with them a presence session.
• I interact more in the classroom.
• There is more communication in the classroom.
• I would say I'm irresolute.
• I always try most doubts are worked out in person.
• It is a more interpersonal way.
• Interaction is equal in the two modes.

Descriptively, the preceding paragraphs give an idea of the involvement of teachers in technology-mediated educational environments, apparently their behaviors are favorable and may be deduced there is an active participation to the benefit of the environment. There is a perceivable reasonable preference for activities in classroom, a situation that could be explained by the educational background of those involved in this piece of research since they were trained in a traditional scheme and patterns are usually repeated.

The results presented are not intended to be a generalization of the involvement of teachers in technology-mediated educational environments, but the

74

representation of a reality that gave enough interviews to deepen elements and thus qualify the data.

To specify a little more the opinion of teachers and identify the significant elements that denote involvement, a nonparametric statistical test for Taub Kendall ordinal variables was performed to see the correlation among dimensions wherefrom the most representative variables that explained the involvement were obtained (Figure 1).

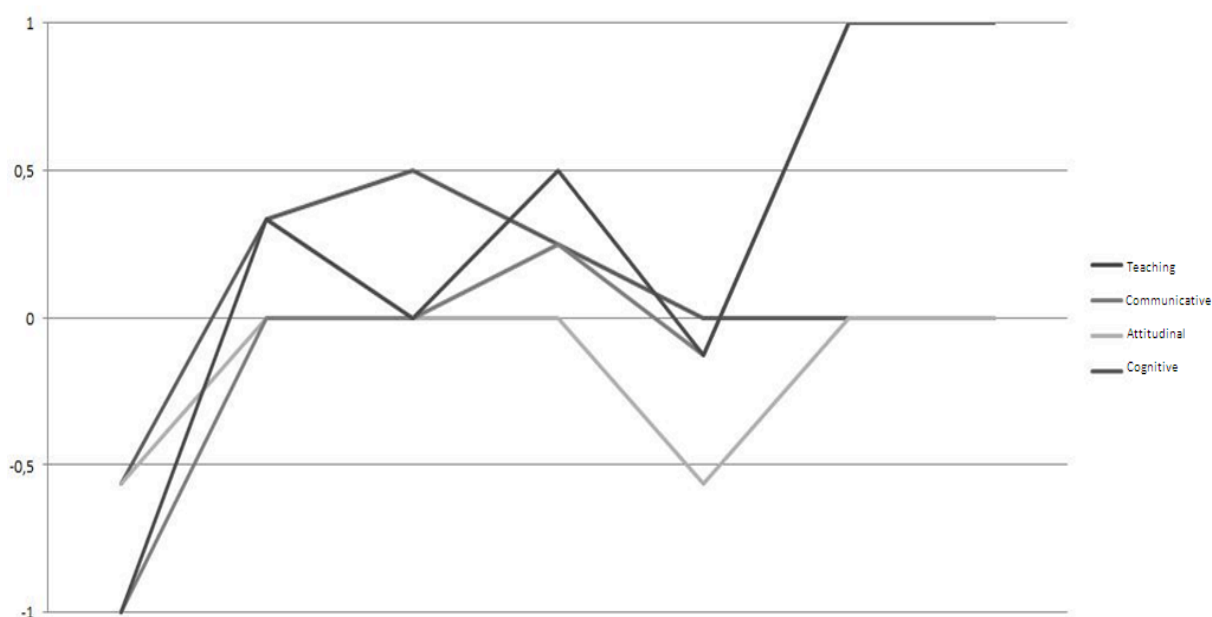|	Cognitive. Perception	Attitudinal. Acceptance	Teaching. Training	Communicative. Interaction
Attitudinal. Acceptance	-1			-0,775
Communicative. Interaction	-0,775	-0,775	-0,775	
Teaching. Hab. Instructional	1	-1		
Teaching. Training	-0,775	-0,775	-0,775	-0,775
Cognitive. Perception		-1		-0,775
instructional teaching				-0,775
didactic teaching				1

Figure 1. correlation values obtained.
Source own creation

Figure 1 represents the dimensions and the correlations that were less significant at an alpha of 0.05 representing a value of 95% confidence.

Note also the outstanding crossings among dimensions and the representative variable of each one which, in turn. were indicators of involvement. It shows that while the teacher is less interested in teaching in the presence modality he will teach better in a technology-mediated environment, coupled with the fact that the teacher must have instructional skills that he needs, have received training and

75

identify opportunities for interaction with students.

Teachers are more interested in the presence course when they do no perceived that they can teach better in technology-mediated environments, plus the teacher does not have sufficient training and instructional skills for such terms and does not identify communication possibilities. He teaches if he has sufficient training and identifies opportunities for communication through interaction. Communication through interaction occurs when the teacher prefers less the presence course, perceives that can teach better in a technology-mediated environment, has instructional skills and is training for that modality, in addition to employing appropriate teaching strategies.

3.2 Qualitative Stage

To complement the findings of the quantitative stage, we proceeded to apply in-depth interviews to four of the eight participants, the interview was semi-structured, for which we took into account the significant variables of each of the dimensions (cognitive, attitudinal, teaching, learning, technological and communicational); the flexibility of this type of interviews allowed additional questions to be posed to point out some concepts or opinions that were expressed by teachers. The questions helped in some cases to corroborate or further details in which the involvement of teachers in technology-mediated environments was detected.

The interview lasted approximately 45 to 60 minutes, participants were asked permission to record their comments and record the data that would serve for analysis.

Considering the objective: Introduce the involvement of teachers in technology-mediated educational environments, the results of discourse analysis led to the following:

The conception of teachers under two aspects was identified, in the first instance what was positive: the organization of time, upgrading their technological skills, knowledge building with the student, innovation in its practice, and what was negative: poor institutional administrative organization, little response by students, poor materials, poor structuring and programming of courses, negative situations that weigh in the work of teachers, these coincide with those of Figueroa (2008), who stressed the need for teachers to reflect on their practice without being limited to traditional conceptual structures and give scope to situations of flexible and innovative training.

Teachers may have different visions of what a technology-mediated training environment is, a perception that is reflected in their practice and in which respondents agreed. Their involvement are observed more in the traditional and transmissive sense, their beliefs and experiences lead to their conducting their sessions monotonously and the appropriation of tools to facilitate the activities is secondary, they speak about facilitating readings and some other materials, but few of them mix different tools that stimulate the class more.

Teachers also agreed that students are not sufficiently self-managing because

76

there is a noticeable and clear dependence on teachers, students wait for their guidance to take initiative and organize learning. While students recognize the potential and capabilities of ICTs, they do not seem to appreciate that technology can help them in their academic development (Santamaria, San Martin, & Lopez, 2014).

Regarding the conception of teachers concerning a technology-mediated educational environment, participants clearly identify the moments composing it, the presence course and the virtual or online course. However, some appreciate the presence course more because it represents more contact with the student, an opportunity for socialization, as to what is technological, what is virtual is generally represented by the Moodle platform where you can deposit some resources, give instructions, evaluate, or configure some different activities, but there is little openness to other tools.

The systemic approach that guided this piece of research let us identify that part of the involvement of teachers in the environment depends on their cognition and attitudes observed from the willingness with which teachers respond to the situations they face and accept to be actively involved in the environments because they represent facilities in organization, planning, time management, access to information and control or monitoring of students, some people consider it to be a good experience that has served to support them in the fulfillment of their academic activities and because It is a tool that contributes to the development of knowledge of students.

Moreover, for teachers engaging in these technology-mediated educational environments, it involves their having more time investment and represent more work for them, a position that matches what Cabero (2010) had reported on his research, since in his conclusions he mentioned time investment in the preparation of materials, review of tasks, follow-up of groups and learning more about the use of technologies.

Regarding what is attitudinal, the interest that the teachers have about this type of environment is an indicator of their performance, it could be seen in the interviews that, for those involved in technology-mediated environments, it means more than simply using the platform as a means, it visualizes that there is significance beyond Moodle, it is open to using other tools to be in contact with the student and give greater importance to interaction and feedback.

The attitude of teachers towards the environment also has to do with the influence of the context in which teachers are, their training, the attitudes of students, their skills in the use of technologies and knowledge about them, their experience, availability and openness are crucial in getting involved with the environment.

With regard to education from a systemic perspective, it was inferred after the reference of teachers describing the applied teaching strategies, their instructional skills and the actions they take to capture the attention of students and achieve their learning.

The teaching dimension is present in the description that teachers make during their interviews, they speak about their instructional skills and some of the

strategies used to attract attention and achieve student learning, if these are good or bad or the best or the worst is not something which has been described in this piece of research, however, it can be identified if the dimension is present and interacts with others, among them there is mutual influence.

Technology-supported education, in this case setting up a mixed-type scenario, seems more influenced or conditioned by subjective aspects such as beliefs, knowledge, perceptions, values, experiences, interests, availability, etc; making the practice of teachers somewhat inconsistent since their responses to common situations can be totally different, as Torres (2010) and Castillo (2006) mentioned, the role of the teacher is seen beyond their expertise because it is based on their conceptions and values.

The didactic variable is related to instruction and training since what was more significant is that the teacher must have adequate teaching skills to design and implement this type of environments that not only deal with the transmission of content or make selected information available to students, but also shape their critical, reflective, selective thinking that leads them to discern, out of a world of information, which is the piece of information that best fits them to learn and apply it to their context, that is, their didactic strategies should prepare them to compare information and select the right tools and strategies to do so in line with their own learning styles.

With regard to the *technological* dimension, although quantitative analysis had no significant representations, it is present at all times as a transverse dimension, teachers mention it during interviews implicitly or explicitly, they make reference to them as the platform, internet, facebook, other tools, dropbox, googledocs, e-mail, graphic organizers; they are necessary elements of which it is known they are there and are used to a greater or lesser extent, to some people ICTs become a way of giving greater dynamism to classes, having better and more opportunities for communication and therefore interaction , while for others they should not be a substitute for a presence lesson and should only be used as a means, not to reduce physical contact the presence face to face.

In this sense, technologies are not an obstacle to practice but rather their use is related again to what the teacher thinks of them, to their availability to be used regardless of what it involves and what it can mean in innovation of their teaching. As can be seen once again, the gear of dimensions is present, a dimension is not conceived in the absence of the other, but as complementary elements that shape the act and involvement of teachers.

Finally, the *communicative* dimension is represented by the interaction variable, in the statistical analysis there was perfect correlation when being crossed with the didactic variable, highly significant to the variables perception, acceptance, instructional and training, since teachers consider that technology-mediated environments provide greater possibilities for communication with students, a situation that is corroborated by what was told in their interviews, in varying degrees technologies support this communication and, to some of them, opening to different means by which they can be in touch offers the option of having students express their doubts, ask about their grades, or the teacher feeds them

78

back on their work. Communication in the teaching-learning process in mixed environments plays a vital role, it is through it that you can build shared knowledge, we should not forget that the stakeholders are social individuals by nature and require this approach with the other to give meaning to what they learn or teach, generating strategies for synchronous or asynchronous interaction which in turn strengthen the cognitive development of students by pursuing shared goals and intentions of learning.

Statistically, the strategy used by teachers to detonate communication is the discussion on the topics addressed in the course, note in interviews that this information is confirmed when teachers describe how they encourage discussions on topics already reviewed by students and on which the discussion takes place mainly in the classroom.

4. CONCLUSIONS

Based on the above, we can say that the proposal of knowing the involvement of teachers through a systemic approach for the purposes of this piece of research has been successful, the way in which the relationship existing among the dimensions has been presented confirms that the characterization of this involvement would be more complex if they were isolated dimensions, so this way there was greater precision and schematization of the considerations about their reality.

The approach used in this study to represent the educational element as a system in itself constituted in turn by the cognitive, attitudinal, educational, technological and communicative dimensions allowed us to visualize the relationships among them, forming an integrity of constructs in which a series of actions or interactions with mutual influences as a result of their interconnections are involved.

Affirming that the involvement of teachers in technology-mediated educational environments could be studied from a systemic approach forced us to interpret quantitative and qualitative results from the actions that the teacher applies to fit in the requirements of the different circumstances in which the teacher has to live and which are demanded by the environment, for which the teacher develops habits which in turn allow them to learn from the situation in order to also make decisions about how to conduct their practice.

In this sense, teachers are immersed in an evolutionary process to which they gradually adapt out of what they believe, accept, know showing their capabilities to interact with the student and the environment.

5. REFERENCES

Complete books:

Hernández, R., Fernández , C., & Baptista, L. (2010). "Metodología de la investigación". México: McGrawHill.

Articles in paper and electronic:

Bernal, A. (2008) "Institución y decepción. La salubridad institucional y lapráctica docente". Revista Española de Pedagogía, pp. 405-423.

Bozu, Z., &Canto , P. J. (2009). "El profesorado universitario en la sociedad del conocimiento: competencias profesionales docentes. Revista de Formación e Innovación Educativa Universitaria", 2(2), pp.87-97.

Cabero, J. (Enero 2010). "Usos del E learning en las universidades andaluzas: Estado de la situación y análisis de buenas práctica". Sevilla: Grupo de Investigación Didáctica de la Universidad de Sevilla.

Castillo, N. (2006). "Cómo los modelos de cambio e innovación curricular pueden ayudarnos a comprender el fenómeno de la implementación e integración de las TIC en las prácticas docentes. Resultados de una investigación en 22 unidades educativas de la provincia de Nuble. Congreso Internacional de Nuevas Tecnologías de Información y Comunicación". Temuco Chile: Universidad de la Frontera.

Figueroa, N. (2008). "Pensamiento didáctico del docente universitario. Una perspectiva desde la reflexión sobre su práctica pedagógica. Fundamentos en Humanidades", pp. 111-136.

García, B., Márquez, L., Bustos, A., Miranda, G., Espíndola, S. (2008), "Análisis de lospatrones de interacción y construccióndelconocimientoen ambientes de aprendizajeen línea: una estrategia metodológica". Revista Electrónica de Investigación Educativa.

Karsenti, T., & Lira, M. L. (2011). "¿Estan listos los futuros profesores para integrar las TIC en el contexto escolar? El caso de los profesores en Quebec, Canada". Revista Electrónica de Investigación Educativa, 13(1), pp56-70.

López , M. C. (2013). "Impacto de las tecnologías de la información y comunicación (TIC) en el docente universitario. El caso de la Universidad de Guadalajara. Perspectiva educacional", 52(2), pp4-34.

Santamaría, M., San Martín , S., & López, B. (2014). "Perfiles de alumnos según el uso deseado de las TIC por el profesor universitario". PixelBit. Revista de medios y educación(45),pp 37-50.

Torres, L. C., & Aguayo, Z. (Octubre,2010). "Uso sistemático de las TIC´s en la Docencia el caso de los profesores del nivel medio superior de la Universidad de Guadalajara". Apertura, pp49-59.