Diagnóstico del uso de las tecnologías en el proceso de enseñanza y aprendizaje en la educación superior

Diagnosis of the use of technologies in the teaching and learning process in Higher Education

Uso diagnóstico da tecnologia no processo de ensino e aprendizagem no ensino superior

Rosario Lucero Cavazos Salazar
Universidad Autónoma de Nuevo León, México
lucero.cavazos@uanl.mx

Sergio Guadalupe Torres Flores
Universidad Autónoma de Nuevo León, México
sergiotorres63@hotmail.com

Resumen

Dentro de la perspectiva de las tendencias globales en la educación de incorporar las tecnologías emergentes en el proceso de enseñanza–aprendizaje, los procesos de comunicación en la educación han propiciado nuevos planteamientos. Organismos a nivel mundial como la Unesco promueven un modelo educativo sustentado en tres pilares: aprender a aprender (conocimiento), aprender a hacer (habilidades) y aprender ser (actitudes y valores). La presencia de las tecnologías en el aula exige cambios en la dinámica educativa. Es importante conocer los elementos que permiten una eficiente comunicación del saber, donde confluyen docente, mensaje, canal y alumno.

Esta investigación está fundamentada en la necesidad de describir y explicar un modelo educativo-comunicativo de aplicación de los recursos digitales dentro de una nueva dinámica en el proceso enseñanza-aprendizaje. El estudio se desarrolló mediante una estrategia cualitativa —de enfoque fenomenológico, exploratorio y descriptivo—, diseñada

para compilar información mediante un instrumento de captación con preguntas cerradas en escala de Likert.

Los resultados obtenidos dieron pauta para respaldar la propuesta de un modelo tecno-pedagógico en los procesos de enseñanza-aprendizaje, dirigido a los docentes que imparten sus cursos de manera presencial por medio de los recursos educativos digitales, lo que favorece el aprendizaje significativo. Como producto de esta investigación se plantean las siguientes recomendaciones: desarrollar una estrategia de capacitación y actualización del profesorado en todos sus niveles mediante el Diplomado de Formación Continua y Superación Profesional, apoyar al docente para que logre un perfil deseable ante los nuevos escenarios educativos en presencia de las TIC en el aula, y asimilar la nueva dinámica didáctica.

Palabras clave: tecnologías de información y comunicación (TIC), diagnóstico, educación, aprendizaje.

Abstract

In the perspective of global trends in education to incorporate emerging technologies into the teaching-learning process, the process of communication in education have led to new approaches. Agencies at global level like Unesco promote an educational model supported on three pillars: learning to learn (knowledge), learn to do (skills) and learning to be (attitudes and values). The presence of technology in the classroom requires changes in the educational dynamics. It is important to know the elements that allow efficient communication of knowledge, teaching, message, channel and student.

This research is based on the need of describe and explain a model educational-communicative de of application of those resources digital within a new dynamic in the process teaching-learning. The study was conducted using a qualitative approach -of phenomenological approach, exploratory and descriptive-, designed to compile information using a capture tool with closed questions in the Likert scale.

The results gave guideline to support the proposal of a technical-teaching model in teaching-learning processes, directed to those teachers that taught their courses of In-House way by means of the educational digital resources, what favors significant learning. As a result of this investigation the following recommendations arise: develop a strategy for training and updating of teachers at all levels through the Diploma of Continued Training and Professional Self-help, help the teacher achieve a desirable profile to the new educational scenarios in the presence of ICT in the classroom, and assimilate new educational dynamics.

Key words: Information and Communication Technologies (ICT), diagnosis, education, learning.

Resumo

Dentro da perspectiva das tendências globais na educação para incorporar as tecnologias emergentes no processo de ensino-aprendizagem, os processos de comunicação na educação levaram a novas abordagens. Organizações em todo o mundo como a Unesco promover um modelo de educação baseado em três pilares: aprender a aprender (conhecimento), aprender a fazer (habilidades) e aprender a ser (atitudes e valores). A presença da tecnologia na sala de aula requer mudanças na dinâmica de ensino. É importante conhecer os elementos que permitem a comunicação eficiente de conhecimentos, ensinando confluência, mensagem, canal e aluno.

Esta investigação baseia-se na necessidade de descrever e explicar um modelo educativo-comunicativa da aplicação dos recursos digitais dentro de uma nova dinâmica no processo de ensino-aprendizagem. O estudo foi realizado através de uma estratégia qualitativa -de fenomenológica, exploratório-descritivo e projetado para compilar informação através de um instrumento de coleta com perguntas fechadas abordagem escala de Likert.

Os resultados deram orientações para apoiar a proposta de um modelo técnico-pedagógica no processo de ensino-aprendizagem, destinado a professores que ensinam os seus cursos em pessoa através de recursos educativos digitais, o que favorece a aprendizagem significativa. Como resultado desta pesquisa levantou as seguintes recomendações: desenvolver uma estratégia de formação e reciclagem de professores em todos os níveis

através do Certificado de Educação e cursos Continuada e professores de apoio para atingir um perfil desejável novos cenários educativos na presença TIC na sala de aula, e assimilar novas dinâmicas de ensino.

Palavras-chave: tecnologias de informação e comunicação (TIC), de diagnóstico, de ensino, de aprendizagem.

Fecha recepción: Noviembre 2015 **Fecha aceptación:** Julio 2016

Introduction

The impact of the Information and Communication Technologies (ICT) is evident in all areas of society. In education, these technologies have generated a rethinking of the perspective that has the elements and actors in the process of teaching and learning, influence of certain way in the forms in which the teacher communicates with the students. This relationship has led to consider different models of communication that allow to explain the education process, considering the type of intervention educational and communicational that the teacher executes and the type of participation that the students have (Martínez-Frezada, 2007).

In this changing panorama, the ICT in the educational area modify the objectives and programs in training institutions, physical and technological infrastructure, as well as its administrative organization, resources management, training materials and teaching strategies; all of which outlines a new model of school (Domingo, 2011).

Today, ICT offer countless possibilities and scenarios to re-think the way of working. In education, these technologies provide resources that benefit the student process of learning, hence in this context the education-technology, the materials and the resources have special features that allow the autonomous learning process. These teaching resources may be help tools to carry out the training work (Cardenas, 2009).

In relation to this emerging area in education, this paper consists of an ICT research and innovative teaching and classroom integration. In this environment the following discussion is framed as it is essential to raise an effective communication model that accounts for the current educational dynamics in this context, all this in order to determine a communication model in education by incorporating digital educational resources dynamic teaching and learning.

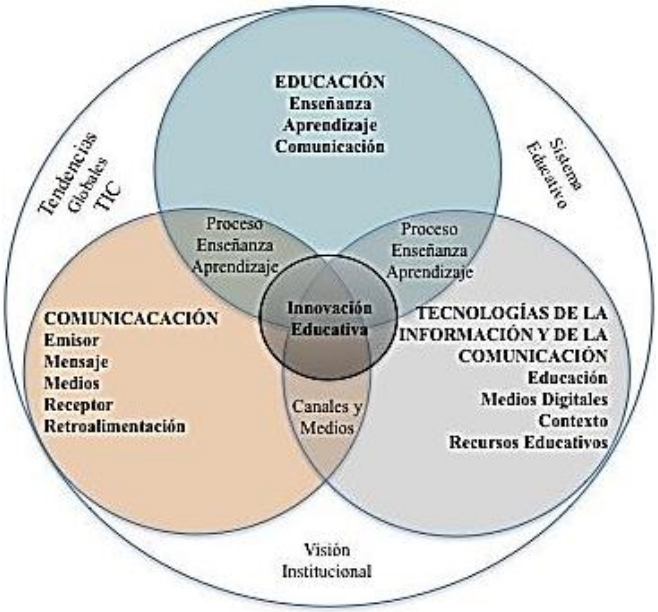
Method

This research hopes to form a model of educational communication. To do this we started from the perspective of constructivism, which pays special attention to the quality of the interactions that take place in virtual contexts in three main areas: the teacher, the learner and educational content. The relationships established between the three vertices of this interactive triangle appear as the core of the formal processes of teaching and learning, and as meaningful minimum unit for the analysis of such processes (Coll, Mauri and Onrubia, 2008). For this qualitative phenomenological approach with a design based on criteria used Hernández, R., Fernández, C. y Baptista, P. (2014).

The information collection instrument was structured into four sections. The first is the identification and general references, the second section corresponds to the educational subject and teaching, the third to the subject communication and media, finally, section four corresponds to subjects related to the information technology and communication.

attitudes and opinions on the subject of the investigation were also evaluated. In Figure 1 the core issues are presented, and in Tables 1, 2 and 3 identified variables and their respective indicators.

Graph 1. Approach of the analysis categories.



Fuente: elaboración propia.

Table 1. Category: education process.

Categoría de análisis	Variable	Dimensión	Indicadores
Educación	Enseñanza	Docente	Información Facilitación
		Contenidos	Contenido curricular
		Evaluación	Logro del aprendizaje Medición del aprendizaje
	Aprendizaje	Alumno Estilos de aprendizaje	Acceso a la información Operaciones cognitivas Concepción de aprendizaje Aplicación de conocimiento
	Comunicación	Mensaje Canal	Estructurado Sensorial
		Medio	Tangible Virtual

Table 2. Category: communication process in education.

Categorías de análisis	Variable	Dimensión	Indicadores
Comunicación	Emisor	Codificador	Lenguaje propio del tema
	Mensaje	Multi-formato	Audio
			Video
			Imagen
			Texto
	Receptor	Decodificador	Asimilación de la información
	Retroalimentación	Emisor	Reordena la información
		Receptor	Asesoría para asimilar la información
	Medios	Uso en el aula	Herramienta didáctica
			Canal de información
			Nueva dinámica docente

Table 3. Category: integration of technology in education.

Categorías de análisis	Variable	Dimensión	Indicadores
Tecnología	TIC en la educación	Enseñanza	Rol docente
			Nuevas estrategias educativas
			Disponibilidad de recursos para enseñanza
		Aprendizaje	Nuevo planteamiento del rol de alumno
			Aprende a aprender
			Autoaprendizaje
			Estilos de aprendizaje
	Medios	Emisor	Docente con competencias digitales
		Mensaje	Multi-format
		Receptor	Alfabetización digital
	Contexto	Presencial	Dinámica docente
		Nuevos escenarios	Nuevas estrategias de enseñanza
	Usos y gratificaciones	Uso	Búsqueda, comunicación
			Interacción, aporta cambios
			Elaboración de actividades
		Satisfacciones	Motiva
			Satisface necesidades
			Cognitivas
			Afectivas
			Personales de integración
			Sociales de integración
			Liberar tensión
			Confiere estatus
			Permite el desarrollo de competencias digitales
	Recursos educativos digitales	Enseñanza	Disponibilidad de recursos
			Acceso a información
			Repositorio de actividades
			Posibilita interacción
			Espacio de consulta
			Crear recursos educativos
			Presentación multi-formato
		Aprendizaje	Facilita comprensión
			Favorece el desarrollo de habilidades digitales
			Favorece la interacción

Results

The teacher

Education, to say the International Standard Classification of Education (ISCED, 2013), is an organized and continuous communication designed to bring about learning. It is understood as communication relationship between two or more people, which means the transmission of information, messages, ideas and knowledge, which can be verbal, nonverbal, in person or remotely, and involves a variety of channels and media. Communication in education should be organized, ongoing, and be designed to cause learning. The results of this study show that the teacher fulfills its function of providing organized content and continuous information by exposing clear and understandable ideas, condition that is backed by student responses, although there is a slight difference between the roles where the teacher has the highest values.

As a teaching strategy during the course, the teacher provides a variety of educational resources for consultation: the printed book is the one with the highest percentage, followed by the board and still images; They are also 30% software and telematic services. Students in this context mentioned that use more than the book, blackboard, still images and audiovisual materials. In both cases, teachers and students very low proportion mentioned in other resources, such as television and interactive video. Educational resources consulting that turned the teacher during the course were more books, followed by fixed images and web pages.

It is observed that the teacher still uses more conventional materials such as educational resources, followed by audiovisual materials and imaging and to a lesser extent the materials offered by the Internet.

However, for the student values change a little. Although there is greater consultation conventional material such as printed books, there is an increase in the use of audiovisual technology and supported by materials materials. This coincides with the cognitive model, which describes learning as an active process that occurs within the student and in whom the results depend on the information the teacher presents.

Course content

Teachers believe that the contents of their courses are usually consistent, clear and organized. These responses differ somewhat in relation to externadas by students; however, on average the answers in this section match those of teachers. These results correspond with those reported by Alonso (1999), for whom the teacher is a facilitator of learning because it offers consistent, clear and organized content by distributing their time between teaching content to teach and direct and indirect education through strategies learning.

Learning objectives

The communication was considered both by teachers and by students as a key to understanding the content and promote learning factor in this sense the answers are similar, although teachers are slightly higher. Teachers and students mentioned in a high percentage that achieve: knowledge, values, attitudes and skills at the end of the course, so that the learning objectives are achieved. It has been observed in these responses that the values are similar, however, teachers have more answers. The teacher says he favors the conditions for learning in most cases, but students disagree with it.

Learning

Moreno (2008) mentions different approaches to learning theories. In this study, the teacher prefers factual information within the classroom and relying less on printed information sources such as books, privileging the query virtual media. The student in this section shows similar values, however, their response is low on virtual consultation. Access to information consulting teachers so formal, virtually or other reference source not seen in the classroom, reaches a high percentage in the virtual section. Not so with students who prefer in very similar proportions objective-tangible sources such as books and impresa-consultation and the virtual, ie digital educational resources.

Information processing

The teachers believe that students learn easily when in class audiovisual material is used, as well as through information and research activities. Meanwhile, students consider learning easily primarily through activities, audiovisual material and research, almost always with the support of educational technology.

For the teacher, learning takes place through reasoning the item, the application of learning and meaningful learning. On the other hand, the student believes he has learned when assimilates and applies seen in the classroom, understands the reasoning of the issue and feels that he has managed to obtain meaningful learning.

Knowledge is considered significant when it can interact substantially with what the student knows, that is, when they can be incorporated into the structures of knowledge possessed by the subject. Learn significantly is able to attribute meaning to the material object of learning and this allocation it can only be made from what is already known by updating appropriate for the situation in question (Ausubel, Novak and Hanesian, 2009) knowledge schemes.

The teacher said that his way of representing the student learning is by conducting collaborative activities, almost always through solving practical problems and meaningful learning achieved. For the student, his way of representing what is learned through collaborative activities, meaningful learning and problem solving. Learning, by Ausubel et al. (2009) is organized and integrated into the cognitive structure of the individual, that is how each individual has organized his knowledge, seeks to overcome the mechanical memorization of content and gives logical sense to what the student learns. In the classroom, learning occurs in two dimensions: learning repetition and repetition significant discovery.

In a constructivist approach it mentioned that knowledge is not passively received, but is actively constructed by the cognitive subject. Learning is a relationship of theory-prediction-trial and error-correction-theory.

Evaluation

The method most frequently mentioned evaluation is done through activities both the teacher and the student, but the teacher still usually evaluated with a final work. It should be noted that the evaluation section headings scored with low response by the teacher and student. The evaluation is focused on the final product, evaluated, measured and quantified by the criterion of evaluation of the objectives achieved. The acquisition of knowledge is done rote manner and assumed primary levels of understanding, it adds that the behavior and learning are the result of environmental stimuli.

Classroom Communication

The evolution of technological resources has become obsolete paradigms of communication systems. Communication research now should pay particular attention to the effects exerted by the technological transformation in the communication system.

The most common communication channel in this study is that between the teacher and student in the classroom, which is done in person. In both cases they aid resources available to them to communicate, however, it shows that the teacher uses virtual media more than the other options.

Message

According to the teacher, so that the student can effectively interpret information should hear the kind supported by audiovisual material, activities and use of educational technology. For the student, it is more effective interpret the class information with the help of audiovisual material, conducting activities and almost always a textbook.

Medium

The medium used most frequently is the classroom, with students and teachers using printed material; the results show a very low preference for other means such as the telematic network and images. The medium is a component element of the communication process, so the sender and receiver are worth it to send and receive the message. With the evolution of the various technologies concerning forms of communication, it has been

necessary to improve the channels through which messages are transmitted. It may be mentioned according to the results that indeed intentional communication system that occurs within an institutional framework and strategies are generated which causes learning. The objectives to be covered are those related to the way in which ICTs enable learning processes and teaching practices.

Communication

Several authors have developed approaches in relation to the teaching as a communicative model. For teachers and students of this research, the process of proper communication in the classroom is one that is given by combining: exposure in the classroom, ICT as a teaching support and virtual learning platforms. Effective communication of course content should be organized and sequenced manner; meanwhile, teachers and students noted the importance of these features. Instructions and through the educational platform low levels reported in their responses.

The support material most used by teachers and students is the printed book, but they also mentioned much virtual classroom materials, like the audiovisual material used by the teacher. The most suitable material support for teaching and learning remains the printed book for teachers and students, followed by audiovisual materials and websites. The supporting material considered appropriate for learning is personally printed book, which received more mentions, followed by audiovisual materials; It emphasizes the student's preference for software and teacher the website.

Support materials may vary according to the nature and characteristics of the subject or topic in question. On the issue of instructional support packages teaching units, academic guides, assessment tests, teaching and audiovisual materials (film, 2013) they are included.

The presence of ICT in the classroom for teachers is an information, learning support and teaching, as well as an important source of consultation, but not give much value to the possibility of personal interaction. Students, for their part, consider that ICT are a source of advice and information, and they can support them for learning. On the other hand, like teachers, students do not see that are important as a means of personal interaction.

Educational resources most used by the teacher are printed materials and audiovisual material, followed by auditory materials and images. The use of Internet as an educational resource is mentioned more often by teachers for students; but for the student consult online topics gives you more security. There is a high proportion of teachers who always uses the internet to check their school activities, and considers that it has the ability to see issues of interest in this medium. The query format is the most widely used text format, which has to do with printed books, then there is the audiovisual and image format; meanwhile, the student shows more heterogeneous results which include the auditory format, images, audiovisual material and finally the text. In this context, Torres (2009) defines the concept of digital educational resources as the material for educational purposes, tangible or not, that is produced and designed with educational elements, intended to facilitate the process of teaching and learning in any form and involving human and technological factors.

Learning

The educational process involves interaction between teacher and student to teach to learn, however, are involved in this relationship more environmental factors, for example, knowledge, training of teachers and student relationship study (Saint- Onge, 2000).

Teachers believe that interact with the content of the class can learn, and rely on the Internet to find information can develop digital skills. However, for students consulting resources on the web facilitates their understanding of the subject in class, so almost always rely on this to develop their digital skills.

Teaching in the classroom should be open to the ideas of their students, thus encouraging creative thinking, persuading to participate, capturing the different learning styles and establishing more appropriate to combine learning and thinking styles of communication. It should also identify the different sensory processes through which the student achieves gain knowledge; Finally, the teacher applies the most appropriate teaching technique as needed and sensory abilities of the group. In this sense, the student notes that effectively measure the sensory needs and learning techniques best suited to the characteristics of the group are almost always used.

The achievement of learning objectives determined largely accompaniment of teachers in the development of student activities, to measure the achievements of the group and adapt themselves changing situations of different educational dynamics.

Discussion

The presence of ICT in the classroom changes the educational process. Innovations in technologies and their application in education have generated a diversity of approaches and concepts, their incorporation into the process of teaching and learning has allowed to take as a tool that supports teachers during the course or the technology to education offers an environment that fully perform the didactic dynamics. Imagination and innovative perspective of teachers can incorporate technology into their teaching. The future that education presents against the incorporation of technology, is based on the vision of the manager of education and the application of teaching methods with the innovative capacity of the teaching professional.

Innovation of teaching practice involves a change in current educational perspectives and involvement in the trends of new educational scenarios, that is, considering the technological, educational psychology currents and new ways of teaching, learning and assessment of this latest.

The use of ICT in the educommunicative process is based on the skills and competencies of teachers and responsible and innovative use. The presence of ICT in the classroom, which is presented in the virtual networks, allows teachers to incorporate educational resources through blogs, text formats, images, videos, audios, emulation environments, interactivity and hyperlinking, all innovative resources and relevant that promote learning. Thus, with an instructional and educational scheme allow you to create a new way of teaching and learning.

Should be considered under a functionalist perspective that the educommunicative technology is present in the classroom does not guarantee learning, the effects of ICT in the classroom are based on the activities performed by the student, strategy methodological implemented and the type of interaction that can be given between teacher, student and media technologies in the teaching-learning process.

The uses and gratifications theory of communication supports the idea of the proposed model, because the conditions are observed: influence of pragmatic knowledge and psychology; according to Spears (1987), together in the interest of perception. This theory suggests that some needs are met by the media, also considers the receiver as an active entity and uses the media to achieve goals for fun, fame, knowledge and company.

With regard to the educational field, this model is based on the different processes of teaching and learning.

It is defined education as the socialization process whereby individuals learn and assimilate knowledge, materializing a range of skills and values, and generating in them intellectual, emotional and social changes (ISCED, 2013). This condition of socialization is between teacher, student and student-student.

Faced with the prospect of the use of ICT in education, techno-pedagogical model proposed digital communication arises. ICT in the educational context to organize and develop the learning process socioconstructivist nature, one of the most current and extended theories. Social constructivism, psychological theory of learning is consolidated in educational research and is supported by contributions of Piaget, Vygotsky, Brunner, Cole, Kholb and Rogoff (Area, 2007) the theoretical argument.

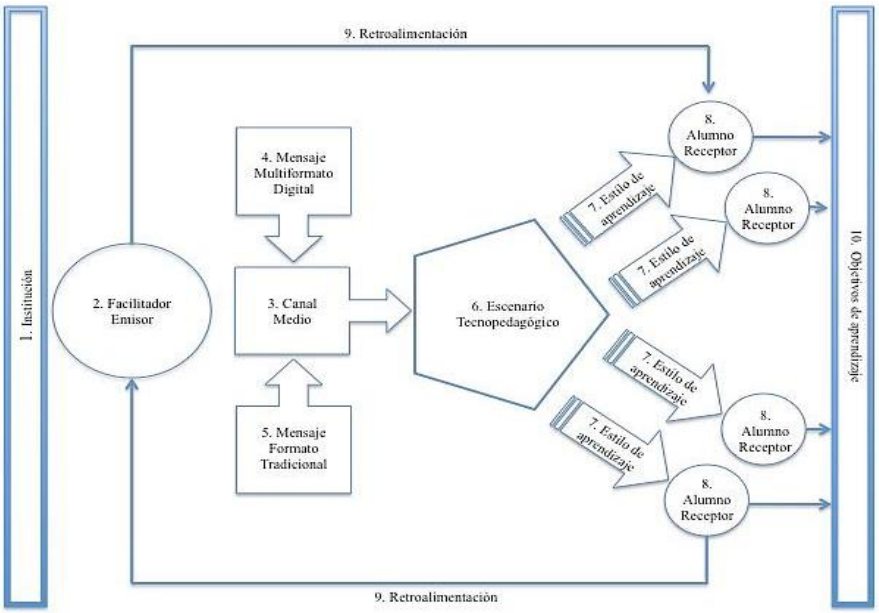
According Area (2007), learning is a process of reconstruction of meanings that each individual performs based on their experience in a given situation. The technology in this educational scenario is a mediator between knowledge element to be built and the activity to be performed by the student. The protagonist must be the students themselves, who develops technology shares.

Supported by a systemic approach, the proposed model product of this research, consists of ten elements, which have been determined by the course of this study are based on the results obtained, the support based on the theories of communication, as the objective of the present investigation.

The proposal of a model of communication in the classroom, in any of its educational methods, in which ICT plays a key role in the process of teaching and learning is presented.

This educommunicative approach in the context of technologies is called: Techno-pedagogical model of Digital Communication. It appears schematically in Figure 2.

Graph 2. Techno-pedagogical model of Digital Communication.



Fuente: elaboración propia.

Conclusion

The school, with its vision supported by the development plan, based on global trends and policies that determine the progress and achievements of the Global Education, supports the initiative to incorporate the resources offered by telematics global network for educational purposes and to support teaching. The teacher, in his role as facilitator-emitter, has functions requiring expertise and complementary to its training skills in order to make efficient resources offered by the Internet and thus integrate their training as a teacher and his skill in handling of information technologies and communication. The academic role in the new educational scenarios involves knowing and manage communication channels offered by the new media with the potential to encode the message in multiple formats, and arrange it in the classroom, virtual or in person.

This combination of message formats provides the learner community, the opportunity to interpret the contents in their respective learning style, which combined with the

educational context is complemented by students with learning through the different options offered by both traditional reference sources and virtual. Thus, meaningful learning, represented by knowledge and preparation is achieved, and teaching and learning objectives are achieved.

Bibliography

Alonso, C., Gallego, D. y Honey, P. (1999). *Los Estilos de Aprendizaje. Procedimientos de diagnóstico y mejora.* España: Mensajero.

Ausubel, D., Novak, J. y Hanesian, H. (2009). *Psicología educativa. Un punto de vista cognoscitivo*. 2ª ed., México: Trillas.

Área, M. (2007). Algunos principios para el desarrollo de buenas prácticas pedagógicas con las TIC en el aula. *Comunicación y pedagogía: Nuevas tecnologías y recursos didácticos, Nº 222*, (42-47). Recuperado el día 14 de julio de 2014, de: http://dialnet.unirioja.es/servlet/revista?tipo_busqueda=CODIGO&clave_revista=322

Clasificación Internacional Normalizada de la Educación (2013). Unesco-UIS Reedición 2013. Recuperado el 17/10/13. www.uis.unesco.org

Cárdenas, R. (2009). *Los Recursos didácticos en un sistema de aprendizaje autónomo de formación.* Instituto Pedagógico de Estudios de Posgrado 2004.

Coll, C., Mauri, T., Onrubia, J. (2009). El análisis de los procesos de enseñanza y aprendizaje mediados por las TIC: una perspectiva constructivista. // Barberá, E.; Mauri, T.; Onrubia, J. (Coords.). *Cómo valorar la calidad de la enseñanza basada en las TIC: Pautas e instrumentos de análisis*. Barcelona: Editorial Graó, pp. 47-60.

Domingo, F. (2011). Juan La Sociedad del Conocimiento: Las TIC, su influencia social y educativa. Innovación y conocimiento. Recuperado el 17 de mayo de 2014 de: https://juandomingofarnos.wordpress.com/author/juandomingofarnos/

Hernández, R., Fernández, C. y Baptista, P. (2014). *Metodología de la investigación*. 6ta. ed., México: McGraw-Hill.

Martínez-Frezada, H. (2007). *Nuevos modelos de comunicación, reflejo de la cultura*. Universidad Francisco Vitoria. Madrid. Recuperado el 18 de mayo de 2014 de: www.comunicaciónyhombre.com

Moragas de, M. (2011). *Interpretar la Comunicación. Estudio sobre medios en América y Europa*. Editorial Gedisa, Barcelona. ISBN: 978-84-9784-661-5

Moreno, A. (2008). Estrategias y medios instruccionales. Universidad de Oriente, núcleo de Bolívar.

Saint-Onge, M. (2000).Yo explico, pero ellos… ¿aprenden? México: Biblioteca para la Actualización del Maestro de la SEP.

Torres, F. S. (2009). *Factores críticos a considerar en la producción de recursos educativos para cursos a distancia*. Tesis de maestría no publicada. Facultad de Ciencias de la Comunicación de la Universidad Autónoma de Nuevo León. Monterrey, México.