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Las Tic en la educación superior, innovaciones y retos

The ICT in higher education, innovations and challenges

Tic no ensino superior, inovações e desafíos

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Resumen

La aparición de las Tecnologías de la información y la comunicación (TIC) ha incidido en las funciones del sistema de educación y permitido la innovación en la transmisión de saberes nuevos. Las instituciones educativas, poseedoras y distribuidoras del conocimiento, han dejado de ser las únicas fuentes del saber y del conocimiento. Muchos saberes que eran patrimonio exclusivo de las escuelas se pueden encontrar en diversos lugares. Las TIC están ofreciendo a los estudiantes acceso a fuentes de conocimiento ilimitados, a herramientas multimedia que permiten ampliar estos conocimientos de información. Sin duda, las TIC han transformado el entorno de aprendizaje actual, pasando de uno tradicional centrado en el docente a uno centrado en el alumno, ya que el primero ha dejado de ser la principal fuente de información y el principal emisor de conocimiento para convertirse en un guía o conductor del aprendizaje, y el alumno ha pasado de ser un receptor pasivo de información a un elemento que participa activamente en su propio aprendizaje.

Las TIC están ofreciendo nuevas formas de aprender y enseñar, con útiles soluciones para la educación y la formación.

Palabras clave: educación, innovación, retos, TIC.

Abstract

The appearance of ICT has influenced the functions of the education system and has innovated the transmission of new knowledge. Educational institutions, owners and distributors of knowledge, are no longer the only sources of knowledge. Many knowledges that were exclusive patrimony of the schools can be found in diverse places. ICTs are offering students access to unlimited knowledge sources, multimedia tools that allow us to expand this knowledge of information. Undoubtedly, ICT have transformed the current learning environment, mainly that which had traditionally been teacher-centered to a student-centered environment, where the teacher has ceased to be the main source of information and the main source of knowledge to become a guide or driver of learning, and where the student is no longer a passive receiver of information but actively participates in their own learning.

ICTs are offering new ways of learning and teaching, with useful solutions for education and training.

Keywords: education, innovation, challenges, ICT.

Resumo

O surgimento das Tecnologias de Informação e Comunicação (TIC) teve impacto nas funções do sistema educacional e permitiu a inovação na transmissão de novos conhecimentos. Instituições educativas, proprietários e distribuidores de conhecimento, não são mais as únicas fontes de conhecimento e conhecimento. Muitos conhecimentos que eram patrimônio exclusivo das escolas podem ser encontrados em diversos lugares. As TICs oferecem aos alunos acesso a fontes de conhecimento ilimitadas, ferramentas multimídia que nos permitem expandir esse conhecimento de informação. Sem dúvida, as TIC transformaram o ambiente de aprendizagem atual, de um tradicional focado no professor para um focado no aluno, uma vez que o primeiro deixou de ser a principal fonte de informação e a principal fonte de conhecimento para se tornar um guia ou motorista de aprendizado, e o aluno passou de ser

um receptor passivo de informações para um elemento que participa ativamente de sua própria aprendizagem.

As TICs estão oferecendo novas formas de aprender e ensinar, com soluções úteis para educação e treinamento.

Palavras-chave: educação, inovação, desafios, TIC.

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Introduction

We are living through an era of technological advances that have evolved in a dizzying manner and, as a result of these technological changes, UNESCO (2005) has warned that:

> In knowledge societies, the values and practices of creativity and innovation will play an important role - if only because of their ability to challenge existing models - to better respond to the new needs of society. Creativity and innovation also lead to promote collaboration processes of a new type that have already yielded particularly fruitful results (p. 20).

Information and communication technologies in higher education represent the new learning environments and, because of their impact on education, they are developers of skills necessary for learning and generating life skills; However, it is also important to consider the challenges that must be overcome so that higher education guarantees access to technological advances in affordable conditions.

For the new generations, technologies are present since childhood and are perfectly constituted and adapted to their lives; for the youngest, it is impossible not to conceive the information and communication technologies in the daily development of their activities because they are part of their personal and social life, because they have formed a new identity, because it constitutes a new way of relating and communicating and because they have developed new skills. It is necessary, then, that teachers adapt to the use of new

technologies and the development of new means of transmission, adapted to the growing needs of communication to incorporate them into the teaching-learning process.

Nowadays, it is undeniable that the new information and communication technologies allow greater contribution through social networks; they favor social, cultural, professional exchange, etcetera; they allow distance learning through virtual platforms that in the future will be precursors among society by generating different communication environments and, above all, the possibility of having access to virtual learning environments through distance education.

This work proposes a reflection on the use of information and communication technologies as a reality in all higher education institutions and in all social sectors of which students are part, so that in their professional life they have the essential skills such as collaboration, innovation and problem solving, contributing to sustainable progress.

1. The importance of ICT in the education system.

The transformations and breakthroughs that we are living in science, technology and information are creating a new social context in which citizens must take on the changes and challenges imposed by the information and knowledge society every day. The expansion of communication and information technologies has expanded its uses over the last decade, thanks to web 2.0 applications that allow the creation of blogs, wikis and some virtual spaces, with which you can interact more dynamically and innovative.

At the World Conference on Higher Education, it is stated that students must assume the responsibility of being an active participant in the empowerment of knowledge, values and skills necessary to learn to know, do, work in a team, to be supportive, make decisions , solve problems, etc. (UNESCO, 1998).

Another recommendation is to create new pedagogical environments, ranging from distance education services to establishments and virtual systems of higher education, capable of establishing high quality education systems, favoring social, economic and sustainability

progress, as well as as other important social priorities. In addition, the figure of the teacher will now be that of the facilitator of learning, who should be perceived by the students as a friend, as someone who listens to them and helps them develop so that they acquire skills and abilities.

In a teaching-learning process, information and communication technologies play an important role as support in the interaction with didactic activities that integrate the visual, novel and interactive; encourages the use of applications, platforms and social networks; promotes new forms of teaching; facilitates the search for information and communication, the development of practical activities of the teaching task such as videoconferences, which constitute a service that allows contacting a group of people through interactive sessions so they can see and listen to a conference.

Students must, then, travel in a vast information environment, where they must be able to analyze, make decisions and master new areas of knowledge in an increasingly technological society. In this context, learning is permanent, in collaboration with other individuals using different communication and information technologies. In order for students to acquire knowledge and skills essential for their development that makes them competent, they must move from a teacher-centered to a student-centered teaching.

John Dewey affirmed that the teacher is the one who must connect the contents of the curriculum with the interests of the students (see table 1).

Table 1. Changes in the roles of teachers and students in student-centered learning environments.

Entorno de aprendizaje centrado en el docente y centrado en el alumno	
Antes	Hoy
Docente	Docente
Transmisor de conocimientos, de información, poseedor de la verdad y todas las respuestas.	Guía del aprendizaje, colaborador, tutor y facilitador en el proceso enseñanza-aprendizaje. Como evaluador identifica errores, refuerza aciertos, realiza comentarios pertinentes, señala criterios de trabajo, actuación, etcétera.
Controla y dirige todos los contenidos del aprendizaje	Permite que los alumnos sean más responsables de su propio aprendizaje.
Estudiante	Estudiante
Receptor pasivo de la información.	Participante activo del proceso de aprendizaje.
Reproductor del conocimiento.	Produce y comparte el conocimiento de forma más participativa y abierta.
El aprendizaje es una actividad individual.	El aprendizaje es una actividad colaborativa que se realiza con otros estudiantes.

Note Resta Paul, Alexey Semenov. (2004) *Las tecnologías de la información y la comunicación en la formación docente*, (p.28) Montevideo, Uruguay

ICT can favor universal access to education, the performance of quality teaching and learning, the competent training of teachers, as well as the more efficient administration of the education system, causing changes in many aspects of the education system because they are a great tool for teaching, promote communication and collaboration, remove barriers of distance and geography, are valuable resources of support for teachers and favors schools to develop their functions more efficiently.

In the year 2000, and with the purpose of generating innovative proposals to move towards the 21st century, the National Association of Universities and Institutions of Higher Education (ANUIES) decided to conduct a diagnostic exercise on the achievements and inadequacies of the higher education system. The document states the following:

> The 21st century will be characterized as the era of the knowledge society that is barely discernible today ... Knowledge will constitute the fundamental added value in all processes of production of goods and services in a country, making the domain of knowledge the main one. factor of its self-sustained development. A knowledge-based society can only occur in an open and interdependent global context, since knowledge has no borders (ANUIES, 1999).

Definitely, the rise of new information and communication technologies has created new conditions for the emergence of knowledge societies, understood as those communities that have practically unlimited and immediate access to information, thereby contributing to drive innovation, the progress of its economy and human welfare. This society in formation will only gain its true meaning if it becomes a means at the service of the global construction of knowledge societies that are sources of development for all and, above all, for the least developed countries.

ICT can help educators to build a global knowledge society because they allow the development of innovation capacities that can be decisive in the development of society and that affect sustainable development globally. We can not let go unnoticed that the education of the future will involve a teaching-learning process with certain particularities such as the fact that it can be done at any moment, it can be performed anywhere and the pace of learning will be personalized.

However, it is inexcusable to also raise the need to reduce inequality between people who can and those who can not access new technologies.

How to achieve a training in skills and abilities when you are educated does not belong to a sector that has all the technological advances?

The technological exclusion that still exists today is the main reason for this phenomenon. Inequality in the access to digital services between the different sectors of our society is exacerbated by those who have less economic possibilities: the indigenous people or those who live in contexts of high marginalization and poverty are the most affected. Access to

ICTs represents a great opportunity to study, to access the labor market, as a visual, auditory or perceptive stimulation or as an alternative communication system.

How can we explain that public policies promote technological and scientific progress with social marginalization at the same time?

According to the old paradigms that have studied marginality, it is no longer enough to approach it solely from a perspective of material or economic deprivation; to the insufficiency of the income other deficiencies could be united and one of them is the opportunity of access to the use of the TIC. The exclusion of access to new technologies includes socio-economic differences between social sectors that have access and sectors that do not, which, therefore, are people who suffer at least two exclusions: economic and technological.

The digital divide that originates this marginality is one of the factors of exclusion in both the educational and social spheres, since it limits the equality of opportunities that a subject can develop, and its access to part of the information and knowledge that is build and share in the contemporary world.

2. ICT in higher education institutions

The work carried out by teachers in higher education institutions has a significant impact on the training of students, and it is they who show the way for students to appropriate knowledge; therefore, the use of technological resources during the teaching-learning process will allow students to solve effectively the problems that arise, they can improve their skills and abilities in the development of their academic and personal activities.

Which are the degrees that offer more possibilities of studying them at a distance?

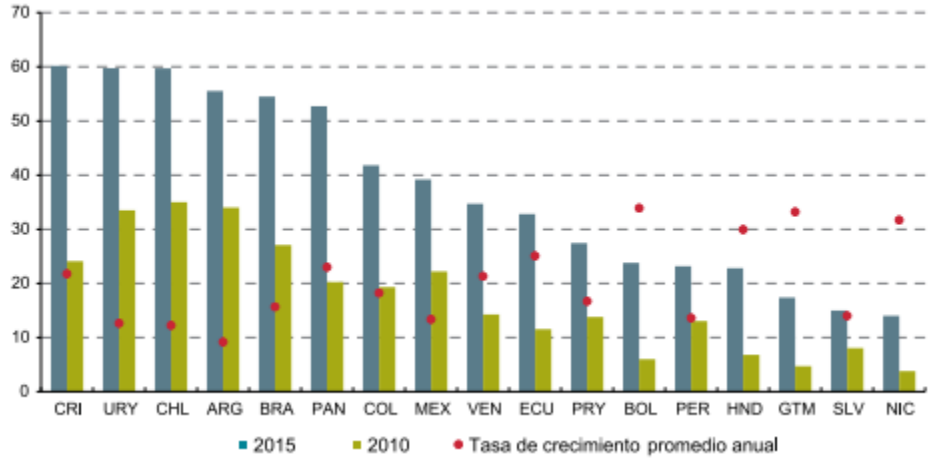
At the undergraduate level, programs in the social and administrative sciences predominate (business administration, public accounting, law, economics, sociology, social work, international relations, banking and finance, international trade); followed in importance of engineering and technology and agricultural sciences (industrial engineering, and agronomic engineering with three different specialties); and in the areas of education and humanities

(pedagogy, humanities, philosophy, education, teaching French, teaching English, geography, history, Spanish language and literature, modern language and literature, Spanish letters, among others); there are few programs in health sciences (psychology and nursing) and none are reported in the exact sciences (ANUIES, 1998).

In order for progress in the teaching-learning process in higher education institutions to become a reality, it is necessary to have the necessary technological infrastructure and for teachers to possess knowledge, skills and abilities for the management of technologies applied to education. We are living a stage in history in which information technologies are advancing at an accelerated pace and society has the right to remain within the collective included in the new technological framework.

Even though it has been shown that ICTs have been a social phenomenon of great scope that has transformed the life of society, in the case of Latin America there is an evident lag in the possibilities of access to these technologies under equal conditions. The countries that had the highest growth rates of the number of households connected to the Internet in 2010-2015 were Nicaragua, Guatemala, El Salvador and Bolivia, which had a very low penetration rate at the beginning of the period. The largest increase in the absolute number of connected households per 100 households occurred in Costa Rica (from 24 to 60). Chile, Argentina, Mexico and Peru fell two positions in 2015 compared to 2010; El Salvador, three, and Costa Rica and Ecuador rose four and two positions, respectively (see Graph 1).

Graph 1. Número de hogares con acceso a Internet por país, 2010 y 2015



Nota Rojas, Edwin. (2016) *Estado de la banda ancha en América Latina y el Caribe.* (p, 10) Santiago de Chile

Another aspect raised at the World Conference on Education is the need to create new pedagogical environments, ranging from distance education services to establishments and virtual systems of higher education, capable of bridging the gap and establishing high education systems. quality, thus favoring social and economic progress and democratization as well as other important social priorities; However, they must ensure that the functioning of these virtual educational complexes, created from continental or global regional networks, takes place in a context that respects cultural and social identities (UNESCO, 1998).

In this context raised by UNESCO on higher education, it establishes the need to take full advantage of information and communication technologies for educational purposes, striving, at the same time, to correct the serious inequalities that exist between countries, as well as in the interior of these with regard to access to new information and communication technologies and the production of the corresponding resources.

In Latin America and the Caribbean there has been a rapid development in the rates of incorporation of technology and connectivity, but there is still a long way to go to ensure equal and universal access. If governments do not implement public policies that make it

possible to take advantage of the potential of ICTs in favor of education and development, these will become a further factor of inequality that further expands social and educational exclusion.

For about a decade, in Mexico, actions have been carried out around the innovation and implementation of technologies in different sectors of society. Institutions of higher education have realized some changes in their process of flexibilization in their plans and programs of study in order to enable access to education to a greater number of students and to consider the greatest possible access to the university for all. . It has also been necessary to consider and rethink the traditional teaching-learning method of a dominant educational model, where the teacher controls and directs all aspects of learning.

Distance education in Mexico represents an instructive alternative for social groups that, due to the economic crisis, current security, global trends in education, the conditions of higher education in the country can not adjust to the rates of education schooled This system has tools and strategies that prevent education from becoming an isolated act, which seeks through a virtual campus, that students and facilitators have a space to interact and interrelate, eliminating attendance restrictions, advance at the same pace as student according to their ability and time availability.

A new model of society is being born under the influence of new information technologies, generating changes in the way we educate, work, teach and communicate. The impact that ICTs have generated in society is, at the same time, a field of opportunities and challenges, which impose the urgent task of finding meaning in the use of technologies that strengthen the collaborative construction of knowledge as the engines of development. , as the heart of processes of change in the economic, political and cultural spheres that have given rise to what is called globalization. The need to generate and disseminate knowledge according to the social and technological changes that are taking place is creating the demand for a transformation in universities.

Given this scenario, it is necessary for higher education institutions to offer versatile, willing and flexible school structures with a technological structure that make possible the efficiency in higher education, competitiveness, and the production of collaborative knowledge.

The design of collaborative and interactive spaces is essential in the generation of adequate and effective environments, by which students enjoy more their academic tasks and achieve better learning results. For this it is important not only to provide tools that favor group work, but to create spaces dedicated to argument, discussion and decision making.

Teachers have the duty to make use of several technological alternatives, awaken interest in the contents of the learning units and generate new attitudes among students. For this, it is necessary to train and update the teachers so that they feel part of this process of change, since often due to lack of time, interest, ability or motivation, technological means are not used.

In this regard, ANUIES states that the capacity for innovation will include important changes in the ways of conceiving learning, in the use of pedagogical methods and educational technologies and in the definition of the roles of the fundamental actors in higher education: teachers should be much more learning facilitators and tutors; the most academic and professional managers; and the students will be more active and more responsible for their training process (ANUIES, 1998).

A new profile of the teacher must be present in the university classrooms. Therefore, innovation in knowledge means incorporating the use of various tools in order to achieve flexibility in the teaching-learning process, without forgetting something very important: teachers will have to learn to use the new information and communication technologies , but they must also have the ability to do it properly, that is, with ethical responsibility.

A new society is emerging: that of knowledge. This means new ways of seeing and conceiving the environment that surrounds us, which offers new communication systems of universal scope, which provides means to travel quickly to any place and applications to carry out our work. The devices, connected through global networks, interactive media, virtual

reality and other advances in the area of information technology, have radically transformed notions of time and space, and even of reality.

3. ICTs recognized as a human right

The art. 6 of the Political Constitution of the United Mexican States establishes freedom of expression, the right of access to information; textually expresses:

> The State will guarantee access to information and communication technologies, as well as broadcasting and telecommunications services, including broadband, and Internet …

In section B, section I of the aforementioned article, the right of access to ICT is strengthened by establishing that the Mexican State has the obligation to guarantee:

> To the population, its integration into the information and knowledge society, through a universal digital inclusion policy with annual and sexennial goals.

For its part, paragraph 1 of Article 27 of the Universal Declaration of Human Rights provides that:

> 1. Everyone has the right to participate freely in the cultural life of the community, to enjoy the arts and to participate in scientific progress and the benefits that result from it..

In this context, in Mexico the right to access and use of ICTs includes the freedom of people to access and use technologies effectively, surfing broadband and acquire quality information through various digital, radio and television media.

The current discussion on the importance of access to ICT and its value in the formation of new generations of students is due to the fact that they connect people to networks by facilitating access to relevant information, the exchange of knowledge as significant elements that contribute to the development and to social change as human rights.

Indeed, for a society to achieve full development in the economy, in industry, a better quality of life, a quality education, in universities and public and private education institutions, requires the support and use of science, of technologies and innovation. For this reason, we have a Law on Science and Technology (published in the Official Gazette of the Federation on June 5, 2002) which has been reformed, with the aim of promoting support for the scientific community and activity, supporting the creation of the public centers of scientific research, which also establishes the link between the scientific community and the productive sector, universities and other higher education centers.

Conclusions

Transformations in the light of new technologies have changed in a revealing way human relationships, new forms of access to information and communication technologies are now the engine of new paradigms regarding how people relate to new forms of communication. social participation, control and activism through social networks.

What are the challenges that must be overcome to guarantee higher education access to technological advances in affordable conditions?

Government

The public policies of developing countries are immersed in a series of contradictions when they recognize in their own legislation the access to information technologies as a human right, but they can not supply the most elementary goods with which they can cover your basic and complementary needs.

Including ICT in the education system must mean much more than an instrument to improve higher education; it is about using them as tools to generate skills and abilities necessary for a good performance in the personal, social and work field.

There must be an unrestricted commitment on the part of the government to reduce the differences in the possibilities of access and use of ICT among different social groups, since experience shows that economic marginalization affects many students, which causes conditions and possibilities unequal for learning. In the same way, in the institutions of higher

education there should not be differences between them in terms of infrastructure equipment and technological resources because this brings with it an educational inequality.

It is necessary that the governments of developing countries commit, in the short term and responsibly in all sectors of society to generate all the necessary means and mechanisms for the realization of a sustainable development, equitable with a social dimension and focused on person.

Institutions of higher education

ICT should serve to support improving the teaching skills that should allow the student to be more responsible for their own learning by offering various options for them to investigate, invent, produce, collaborate, transform, etc., always with the objective of forming a new generation of innovative citizens.

In order to transform a traditional teaching-learning process under an innovative teaching practice, it is necessary to challenge the obstacles to improve a new conception and educational practice that allows all teachers to transmit knowledge quickly, make the approach between students and students viable. teachers located at long distances that would allow real access to information and at any time.

Higher education institutions acquire, therefore, a relevant role as places where they can make real and effective use of information and communication tools and have the best and latest cutting edge technology for the development of new capabilities skills according to the technological incorporation.

Finally, it is necessary for institutions of higher education to guarantee students:

a. Access to technological resources of the highest quality.
b. Train their teachers to use technology in their teaching work.
c. The development of skills necessary for their learning and for life.
d. The disposition and support of the federal government is necessary to equip and equip the institutions of higher education with infrastructure, virtual classrooms, technological equipment and Internet.

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