Vicario Solórzano, Claudia Marina
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Distance education in Iberoamérica in light of the Horizon Project: key technologies, trends and challenges

Abstract
Distance and virtual education is no longer a global trend, is the new territory of learning and a great opportunity for innovation and educational revolution. It results in the urgency that this trend has to have perspective instruments in order to draw scenarios for the future from different backgrounds. Hence the value of the Iberoamérica Horizon Report, where, technological emergences identified as the key to transforming the region are envisioned for the first time, particularly their implications in the educational dimension. The challenge of this contribution is to analyze the six technological trends of the Report and reflect on its potential impact on Iberoamerican distance education and, in turn, highlight the role of institutions of distance higher education in the educational transformation processes towards digital and knowledge societies.

Key words
Iberoamerica Horizon Project, Iberoamerica Horizon Report 2010.

Edición a distancia en Iberoamérica a la luz del Proyecto Horizon: tecnologías clave, tendencias y retos

Resumen
La educación a distancia y virtual ya no es una tendencia mundial, es el nuevo territorio de los aprendizajes y la gran oportunidad para la innovación y la revolución educativas. Se deriva de ello, la urgencia que tiene esta modalidad de contar con instrumentos de prospectiva a fin de trazar escenarios para el futuro desde distintos horizontes. De ahí el valor del Informe Horizon Iberoamérica, en donde, por vez primera, se avizoran las emergencias tecnológicas señaladas como la clave de la transformación de la región, particularmente, sus implicaciones en la dimensión educativa. Analizar las seis tendencias tecnológicas del Informe y reflexionar sobre su potencial de impacto en la educación a distancia iberoamericana y, de paso, resaltar el papel de las instituciones de educación superior a distancia en los procesos de transformación educativa hacia las sociedades digitales y del conocimiento constituye la apuesta de esta contribución.

Palabras clave
Proyecto Horizon Iberoamérica, Informe Horizon Iberoamérica 2010.

Une éducation a distance dans Iberoamérique à la lumière du Projet Horizon: des technologies clefs, des tendances et un défi

Résumé
L’éducation à distance et virtuelle n’est pas déjà une tendance mondiale, c’est le nouveau territoire des apprentissages et de la grande occasion pour l’innovation et la révolution éducative. Elle dérive de cela, l’urgence qui à cette modalité de disposer des instruments de prospective pour tracer des scènes pour l’avenir depuis des horizons distincts. De la valeur du Rapport Horizon Iberoamérica, où pour la première fois on a remarqué les émergences technologiques signalées comme la clé de la transformation de la région, particulièrement ses implications dans la dimension éducative. Analyser les six tendances technologiques du rapport et réfléchir à ses fonctionnalités d’impact dans l’éducation à distance iberoamericana a et, d’an pas, détacher le papel des institutions d’éducation supérieure à distance dans le processus de transformation éducative vers les sociétés digitales et de la connaissance il constitue le pari de cette contribution.

Mots-clefs
Projet Horizon dans Iberoamérica, Rapport Horizon Iberoamérica 2010.
Introduction

One of the most significant efforts of qualitative research these days is without a doubt the Horizon Project from New Media Consortium (NMC), which seeks to account for information and communication technologies (ICT), emerging with greater impact potential in contemporary education.

Every year this effort brings together hundreds of technology specialists, representatives of the ICT industry and academic leaders, who convened by the NMC generate a list of technologies, trends and developments from the analysis of a wide range of papers, articles, books and resources on the web, as well as interesting discussions on the subject. The results of this are manifested in the Horizon Report which is distributed via the Internet under Creative Commons license.

The Project dates back to March 2002 and in its most recent editions they have specialized by region, thus conveying different perspectives of the phenomenon.

In this regard, it is highly noticeable the interest and the work of the Universitat Oberta de Catalunya (UOC), which since 2007 translated these reports into Spanish and Catalan with the aim of promoting an intensive media campaign throughout Iberoamerica. This effort has consolidated a close partnership with the NMC and which has resulted into a special edition of the Report for that region this year 2010.

As in all Horizon reports, in the Iberoamerican one the six emerging technologies or practices are described which —according to the Advisory Council integrated to formulate it— are expected to have widespread use on college campuses in three horizons of implementation over a period of one to five years.

The methodology used to prepare the Report is an adaptation of the Delphi technique, in which experts from the aforementioned Advisory Council are consulted in progressive levels of depth. First through online collaboration via a wiki (http://ibero.wiki.nmc.org), and then an attending event which, for this particular occasion, was held in the city of Puebla, Mexico, from April 14 to 16, 2010. For this reason, the Survey provides an agreed and arrived at by consensus opinion, but above all, based on years of experience and research in the field of the Advisory Council.

On another note, it is very important for the purposes of this article to note that, in this bid for the future the UOC is an institution of distance higher education which, rightly, has made it possible to host, also for Latin America, the Horizon Project. In that sense, share with the UOC the spirit that has led it to have interest in the Horizon Project and promote an edition for the Iberoamerican region is to join the prospective view of the Spanish first virtual university —which is celebrating 15 years of being a model case for current distance education, describing itself as a leader and innovator in ICT-based learning.

The six most significant Iberoamerican trends for 2015

Forty-four experts from 12 Latin American countries, Spain and Portugal, have been involved in the analytical work on the innovative use of technology in education, integrated into the Horizon Report Iberoamerica Advisory Board, 2010; it was taken into account the diversity of the participating countries and the fact that the challenges in some of these countries are deeper, especially in terms of access to technology; as a result of this, six technology trends were obtained considered by the Council as the most significant in terms of impact on teaching, learning and creative research for the coming years, in order of importance and due to time (figure 1).
Emerging technologies

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For purposes of analysis, each one of these technology trends is understood from the considerations of the Report itself in its Iberoamerican edition.

**Collaborative environment**

Are learning spaces that meet the optimum conditions for teamwork and collaboration in online communities. These include forums and chats, sharing of content editors, platforms with remote desktop connection, open CMS, LMS, social networks and any tools for online collaboration.

**Social media**

Are communication resources based on web 2.0 technologies. They enable content production, exchange, classification and evaluation, as well as access to all types of multimedia resources for learning. When used, teachers and students act as producers resulting in collaborative creation, monitoring and evaluation of content by its creators. Such means include YouTube, Blogger and Twitter.

**Open content**

It is the tendency to free access and movement of content, as well as the education, dissemination and collaboration open from such content. It involves the increasing number of content repositories opened by universities, meeting, of course, the challenges of speed of access, copyright and validation of the content itself.

**Mobiles**

The term *mobile device* is generally used to describe “pocket size” products of a mobile phone, this includes both the standard telephone service for calls and SMS messages, and smart phones, or other devices such as PDAs. In a broader sense, are also considered mobiles the ultra portable computers such as slates, pads or netbooks, among the best known, which despite having a very compact design can perform all typical applications. There is a third type of more specialized devices designed for specific purposes: e-books such as Kindle, e-mail readers like...
Peek or Flip camcorders. Obviously, the degree of effective mobility of each of these products is not equivalent and this determines the type of mobile applications they can provide.

**Augmented reality**

Integrates the signals received from the physical world—typically video and audio—with information digitally generated—multimedia objects, three-dimensional graphics, textual data, among others—and makes them match in order to build new coherent environments, integrated and enriched. Thus, enabling an integral perception (augmented) and even the transformation of a given physical environment, by overlapping layers of information about it, in a geospatial and temporal context. Moreover, augmented reality allows the use of physical devices to manipulate objects or trigger virtual actions and, thus, represents a new channel for human-machine interaction.

**Semantic web**

Is the challenge of generating meaning from the information available on the web. In this sense, the semantic web is in many cases leveraging the efforts made for years by integrating the trends described above and some others such as management of personal and collective knowledge, the construction of personal learning environments (PLE, its acronym in English) or the so-called “internet of things” from, among others, the one labeled with RFID technology (radio frequency identifiers, its acronym in English).

These trends represent, in the scope of this analysis, six major challenges for innovation in the context of distance and virtual education because, although the Iberoamerican Horizon Report 2010 is not a predictive tool, it does fulfill the role of emphasizing emerging technologies with considerable potential for the focus areas of distance education such as learning, academic work and school management or own research and development for the area.

In fact we can say that each of these technologies is the subject of work in some higher educational institutions (HEIs), with this type of educational experience around the world, as discussed below.

**Horizon’s short-term challenges**

The view of the horizon to 12 months or less of the Advisory Council for the Project Horizon.Ib confirms the appropriateness of distance learning experience in the collaborative environments that provide all existing platforms in which it is supported (forums, chats, LMS’s, CMS’s).

However, it warns about the educational models that underlie in most distance learning programs that institutions offer, expressed in their instructional design, because if they do not guarantee collaborative learning activities and collective knowledge construction, technology itself will not guarantee it either.

Moreover, collaborative environments reaffirm the value of teachers in their role as facilitator, tutor and instructional designer for these virtual or blended learning contexts because he is the mediator, energizer of collaboration and co-participant in the process of knowledge building par excellence. In this regard, the Advisory Council pointed out when developing the Report that collaborative learning environments necessarily eliminate the hierarchy imposed by the master dynamics, promoting horizontal relationships between teachers and students, and recognizing the role of the latter as designers of their process of learning and creators of knowledge objects (Consejo Académico, 2010, p. 15).

However, in the education environment for distance learning there are much less common actions aimed at exploiting these technologies for collaboration among teachers or even for the development of research networks and management of cooperative education. All of them key factors for success in the consolidation of distance higher education systems.

In such contexts there is enormous potential for educational innovation in the opinion of the Advisory Council, which has said: the Iberoamerican region has as one of its identity values its sense of community, collaboration and communication very flat and horizontal (García et al., 2010, p. 3). The examples given in this regard include: Proyectos Colaborativos en el Portal Colombia Aprende (www.colombiaaprende.edu.co), Educational Management Support Network (Red AGE, www.redage.org), and Docentes Innovadores.net (www.docentesinnovadores.net).
As social media, they must be seen to its full potential as teaching resources for distance education courses, either within an instructional design at the hands of the facilitator-tutor, or the student’s own choice. This application also involves the use of features designed to comment, rate or label, which students can use to classify or even to “evaluate” collectively a given product (García et al., 2010, p.16).

But, how many tutors and facilitators of the method are considering Facebook or Twitter in the design of distance learning activities? Sure, most of them still remain outside of these technologies and therefore have serious doubts about their chances for learning. Perhaps unaware that one of the potential of social media is its ability to make them producers or rather “prosumers” — producers and consumers.

In this regard the Report states: In addition to the possibility of contextualization, production and distribution of local content, any social media is an open channel that cuts across different countries, cultures, histories, etc., and may serve as speaker of minority groups or to simply facilitate the promotion of content not suitable for mass distribution through traditional media. In this sense, it can be said, that they are democratic means, because of the opportunity of access they offer, and the type of production processes involved as well, allowing users to remix and create new pieces from the creations of others. Another added value of these media is linking users with their activity, i.e., with their creations. The technology used automatically generates an activity log each time a user posts, comments, labels, etc., Which enables the traceability of production, thus facilitating the identification and monitoring of interest and related lines (García et al., 2010, p. 15).

Perhaps it is also worth mentioning that, despite the fact that social media has been located, in the Report, in the horizon in the short term, in most distance education institutions in Latin America there is great resistance to its immediate incorporation due to its democratizing and disruptive nature, which threatens the traditional education that has been managed to be preserved in virtual environments. In this regard, the following are some of the sites related to social media recommended by the Report: canal de videos de la Escuela Virtual del PNUD (www.escuelapnud.org/portal/index.php/canaldevideos); Project CONCEDE-CONtent Creation Excellence through Dialogue in Education (www.edu-inno.bme.hu/surveys/Concede/index.html); Facebook Project, Argentina (www.proyectofacebook.com.ar); Congenia Project (www.congenia.blogspot.com); Espacio Común de Educación Superior a Distancia, Mexico (ECOES, www.ecoesad.org.mx/index.html); examples of social media at universities (http://comunicacionesellamaeljuego.com/ejemplos-de-social-media-en-universities).

Challenges of the second horizon in adoption

As noted, the second horizon of adoption that the Report states is in a period of two to three years which includes the open and mobile content. Despite its potential, this trend is not yet widespread in its use and adoption, not for the case of technology-supported classroom education nor for distance education.

In the case of open content it may be because they constitute a strategy of democratization par excellence which demands guaranteeing total compliance of interoperability standards in the production models of digital content and a culture of production and open distribution that sometimes threatens not only regulatory frameworks, but also the culture of the HEIs, the interests of ICT companies with licenses of the applications associated with formats the content and societies indifferent to the challenges of the “civilization of knowledge”.

Thus, only those universities with an educational model and a legal framework — with an unwavering commitment towards democratization of knowledge— as well as technological and organizational infrastructure to ensure the production and management of open digital content — in the sense of free access and free collaboration — will be able to move in this direction, as it has happened in the cases OpenCourseWare from Universia (http://ocw.universia.net/); OpenCourseWare of the Massachusetts Institute of Technology (http://ocw.mit.edu); UOC OpenCourseWare of the Universitat Oberta de Catalunya (http://ocw.mit.edu); and Mediacampus, UNAM, in Mexico (http://mediacampus.cuaed.unam.mx/). Other references of open content stated in
the Report are: Repositorio Digital Institucional CAB-1B (http://ricabib.cab.cnea.gov.ar); UOC OpenCourseWare (http://ocw.uoc.edu); Connexions (http://cnx.org); Folksemantic (http://es.folksemantic.com); OpenLearn (http://openlearn.open.ac.uk); UNESCO OER Community (http://oerwiki.iiep-unesco.org); FLACSO (http://conocimientoaiberto.flacso.edu.mx).

For its part, in relation to mobile devices—which increasingly rampant among college students of all majors—there are various possibilities as these devices when coupled with the respective sensors allow students to conduct research work in a similar fashion to the ones used by professional teams.

Some universities operating at distance are beginning to design courses and interoperable content across multiple platforms and channels, adapted to mobile devices. In this context, the interaction between students and tutors is one of the most common applications through mobile phones. Monitoring and mentoring are made by using simple text messages; and in the same way they are used to receive school and educational communication information—sending instructions for extracurricular work—or raise and get the answer to questions at the right time. Some examples of the use of mobile devices, in the field of Iberoamerican higher education, stated in the Report are: Project “Aprendizaje móvil” from Tecnológico de Monterrey (www.ccm.itesm.mx/tecmovil); Projects My Way and Choose! from Universitat Oberta de Catalunya (http://mywayblogs.uoc.edu); Project Mobile Learning of the Escuela de Organización Industrial (EOI, www.eoi.es/blogs/mlearning); Moodle4Iphone Project (www.youtube.com/user/moodle4Iphone); Project Campus Móvil (www.campusmovil.net/inicio.php).

In fact, in the opinion of the Advisory Council, some of the most attractive possibilities with these devices are related to the use of geolocation tools and augmented reality, to be addressed in the next section.

However, the challenges for distance education are even higher in mobile devices than in the open content, because their educational potential and coverage do not only depend on the innovative capacity of universities to deal with this type of programs, but also on the movement of forces that occurs in the ICT industry, on which the architecture and evolution of such devices depend, as well as public policies associated with these practices, ranging from ensuring universal Internet access as a civil right, to legislative reforms needed to give the regulatory framework to make more viable this type of educational services. Some of the most representative legislative projects in Iberoamerica in this regard are in Spain, Chile, Colombia, and recently in Mexico.3

In any case, HEIs providing distance learning would have to solve the situation of application development, content and services designed specifically for these type of devices, which requires to have infrastructure and resources aimed at technological innovation, to which not all have had access.

According to the Advisory Council, the marriage of this technology with open content and social networking can help to democratize the access to higher education in various ways. For example, supporting collaborative sharing of experiences among students located in geographically dispersed areas, or facilitating the work with learning objects such as lectures, cases, documents, etc., through different media (radio, video, podcast, etc.) (Consejo Académico, 2010, p. 34).

The long-term horizon and its challenges

For enthusiasts of knowledge—of its ways and tools—leave no doubt that the augmented reality and the Semantic Web will facilitate the construction of “higher mental structures”4 in students. Augmented reality facilitates the understanding of complex phenomena, allowing a visualization of surroundings and objects from different angles, most comprehensive and rich, detailed and supplemented by the added digital data. Its bid is the possibility that any

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3 In the case of Mexico the progress, albeit slow, is taking gains as it has happened in the state of Colima which got last September 2, 2010, the ruling in its Constitution to include the following point: It is the right of Colima citizens to have access to the information society and knowledge, as a state policy, to achieve a community, integrated and fully intercommunicated, in which each of its members live in an environment of equal opportunities with respect to their diversity, preserving their cultural identity and development-oriented, allowing a clear impact on all sectors of society (Congress of State of Colima, 2010).

4 That is, complex mental schemes in the Piagetian sense, this from the notion of knowledge that the author has developed in recent years, considering knowledge as the interactive relationship valued and intentioned that exists between a social cognitive agent (epistemic subject) and reality to be transformed through experience and a scheme (s) of action-representation (organization and the organizing), which includes an information system with a high degree of complexity (Vicario, 2010).
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The promise of these applications is to help us find links that already exist, but are invisible to current search algorithms because they are hidden in the context of the information on the web (Consejo Académico, 2010, p. 44). Some sites mentioned in the Report related to semantic web projects are: GeoNames (www.geonames.org); DBpedia (http://dbpedia.org); SIMILE (http://simile.mit.edu) Google Translator (http://translate.google.com); Linked Data (http://linkeddata.org); Calais (www.opencalais.com); Information extraction/Semantic text analysis (www.scai.fraunhofer.de/en/business-research-areas/bioinformatics/research-development/information-extraction-semantic-text-analysis.html).

For its part and regarding augmented reality, experts noted that it is projected into the field of Iberoamerican higher education as a technology capable of making significant changes in how students from different disciplines perceive and access to physical reality, which is understood as the amount of space, processes or objects, thus providing richer and more immersive learning experiences (García et al., 2010, p. 28).

Additionally, it should not be forgotten that augmented reality has also been recognized by Time magazine as one of 10 technology trends for 2010 and one of the 10 most disruptive between 2008 and 2012 according to Gartner Research Company, a global firm specialized in consultancy and ICT.

The author believes that augmented reality is a promise that poses a revolution and a quantum leap in the worlds of learning to get more collaborative and contextualized spaces, but certainly requiring going beyond the commitment to learning.

For those still unfamiliar with these ideas, the Horizon Report Iberoamerica offers a list of augmented reality applications in different disciplines and fields of higher education such as: Project EDRA (www.proyectoedra.cl); 3D perception system for visually impaired, Brazil (www.planetaeducacao.com.br/portal/imagens/artigos/aprenderdiferencas/Tese-postarRSW tese RA.pdf and www.pabolongiovanni.com/2010/02/realidad-aumentada-aplicada-la.html); RASMAP Project (www.labein.es/rasmap-w.nsf/descripcion.html); Project Prisma (www.realida daumentada.es/6C7E8B6A-C113-442F-BF0D-D9E2F9BE4CD0.html); Herbario virtual interactivo in RA (www.grubercreaciones. com).

At the same time, the Report warns that the possibilities that these technologies can offer in the area of distance higher education, as elsewhere, depend more on what you can devise and design as educational applications, rather than the potential of technology itself.

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Risks in the Horizon

To be or not to be is never a dilemma when it comes to technology, it is known that “not being” producers and “not being” included with regard to its use is an open lag which will always be reflected in social and economic development indicators. Therefore, the Advisory Council Report has recommended that all countries of the region address the critical challenges that are still being faced from higher education, including distance learning, as requirements for the progress toward the expected horizons. Among such challenges stands out the need to:

- Implement comprehensive educational reforms from a transformative approach ranging from the adequacy of educational models to ways to generate, manage and transmit knowledge.
- Give incentive to diverse ciberculturization strategies for teachers and students, enabling digital inclusion of the former in the new educational scenarios and enabling the latter to work and participate socially at a worldwide scale.
- Consider emerging technologies identified by the Report as “civilizing resources” and, therefore, not only reflect about their development and use, but put them in the dialectic of the solution of complex problems of society, which is one of the challenges of higher education.

Another critical consideration is the one related to technological development strictly speaking and the production of educational resources supported directly in these technologies, which
requires a state policy that integrates the main sectors involved and provide the financial and regulatory frameworks required to boost venture capital ecosystems in that direction, which encourage the ICT industry for education, as well as promoting societies that value innovation.

Conclusions

Facing the educational challenges of the third millennium, it is critical nature of have prospective instruments that allow nations foresee scenarios from different horizons of possibility.

Distance and virtual education—as anticipated in the abstract—is no longer a global trend, it has become the new territory of learning for humanity and a great opportunity for innovation and educational revolution. Hence, the value of the Horizon Iberoamerica Report, where technological emergencies, which are identified as the key to the transformation of reality, particularly in its implications for the educational dimension, are envisioned.

The six megatrends that the Report announced in 2010 are challenges and opportunities but at the same time, important risks to Iberoamerica depending on the decisions and actions that each country and region assume as a whole.

The greatest challenge faced is to work collaboratively to promote, in all cases, an education policy that supports not only the adoption of these technologies in distance education, but mainly Iberoamerican leadership in the development of technological solutions and the implementation of models of usage for each of these in the modality.

To do so, it would be convenient to have a united front, academia, society, government and enterprises, which allows, at the same time, to guarantee agendas and relevant regulatory frameworks at all levels, institutional, local, regional, national, Iberoamerican and worldwide, capable of combating all risk of inequality and exclusion that might arise. Ensuring at all times, that these trends are factors of improvement of living, work, culture conditions and welfare of society.