UNAM online spirit, from Mexico to all Spanish speaking teachers and students

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Abstract
Nowadays, education is a lifelong process that is not only carried out in the classroom. With the rise of mobile technology, it has become possible to study and learn almost everywhere: in the office, at home and even while traveling. While this kind of education is now possible and valued, there is still a lot of work to do in order to position online learning at the level of quality and prestige that traditional classroom education possesses. National Autonomous University of Mexico (UNAM) has a decade of experience in a tremendous investment of effort and resources that support the importance of online education. In this paper we will talk about different initiatives at UNAM: the "Learning University Network" ("Red Universitaria de Aprendizaje", RUA), which will be the tool for relating educational resources with the current curricula; MOOCs; learning apps; the Mathematics Institutional Learning Improvement Program; and “All UNAM online” ("Toda la UNAM en Línea") that aims to make all of our public domain content available to worldwide users under an open access policy.

Keywords
Online education, online learning, learning resources, public content, mobile educational strategies.

Nowadays, education is a lifelong process that is not only carried out in the classroom. With the rise of mobile technology, it has become possible to study and learn almost everywhere: in the office, at home and even while traveling. Thanks to this, online learning has become a present reality with a promising future. While this kind of education is now possible and valued, there is still a lot of work to do in order to position online learning at the level of quality and prestige that traditional classroom education possesses.

Furthermore, universities all around the world have posted classrooms materials online during the last decade as part of an open access trend in higher education. For instance, the Massachusetts Institute of Technology (MIT) estimates it has reached more than 100 million people worldwide through the program called OpenCourseWare (OCW), with material used in the teaching of almost all of MIT’s subjects available on the web, free of charge. As they state on the website http://ocw.mit.edu/index.htm, “with more than 2,200 courses available, OCW is delivering on the promise of open sharing of knowledge”.

This is part of the Open Educational Resources movement. “Open”, or free higher education, is both a facilitator and a product itself that reflects universal access to education. Besides MIT and the OCW initiative, one can browse through more than 16,000 hours of content made available through the webcast.berkely program (available at http://webcast.berkeley.edu/), or enroll in a free engineering course offered by the Stanford University because “they believe that technology transfer is an important part of its mission”, which includes research and teaching, thus making important pieces of its curriculum available to a broader audience (http://see.stanford.edu/) as part of the Stanford Engineering Everywhere program. It is worth
noting that the movement of high-prestige universities into this arena has generated significant media attention.

National Autonomous University of Mexico (UNAM) is one of Latin America’s best-known and biggest universities, with a unique contribution from a higher education institution in the foundation of Mexican society. UNAM has a decade of experience in a tremendous investment of effort and resources because we recognized, long ago, the importance of these new ways of education. Besides being a tradition in the way our academic community works, the University commitment to openness, transparency and accountability has been made explicit in the manifesto for the “All UNAM Online” institutional program. In this context, our university keeps on working in developing educational resources for online learning, and promoting its use. Thus, UNAM hopes to collaborate in the creation of a new culture, one that is open to new ways of learning. Our goal is to get knowledge to reach more people, and, especially, people who, nowadays, has been left outside traditional education. It is our belief that, in this way, it will be possible to build a better society. At the same time, online learning is continuously improving and changing the way traditional classroom education is given.

In recent years, several strategic targeted educational initiatives have been driven at UNAM with the purpose to evaluate different aspects related with the incorporation of new learning models. Some of our goals are:

- Identify technological needs in order to incorporate new learning models.
- Determine learning strategies to incorporate online learning models.
- Establish study cases to recognize the students’ skills and abilities that will make them succeed in online learning models.
- Develop strategies to support not formal learning models.
- Incorporate solutions for educational institutions to meet society requirements according to global demands.
- Serve as a change agent in order to become an institution of reference that delivers high quality online education.
- Encourage self study.

All the projects that are being currently undertaken at UNAM reflect the importance and huge dimension of learning, and how people require interacting in the information era, thus construction of learning objects is a fundamental strategy at our University.

Educational resources: “Learning University Network”

In terms of educational resources, UNAM is working on an effort of great impact for students at all levels. This project is called "Learning University Network" (RUA for its acronym in Spanish, “Red Universitaria de Aprendizaje”) and is available at http://www.rua.unam.mx/. RUA aims to identify open educational resources through a different approach, so that they are related to components for each subject of the curriculum. The catalog of resources is displayed on a website for students and teachers reference. This initiative will create a library of applications for higher education, and within these standardization efforts, digital educational content is being produced with features and functionality that allow them to be reused and shared between people and systems, as well as being portable between different applications. In its first phase, the project is focusing on high school level, but some subjects for the
bachelor level will be ready by August 2014.

With the “Learning University Network”, UNAM is seeking to formalize its commitment to erasing geographical boundaries, since any Spanish speaker can benefit from the academic recommendations made by our faculty and content experts, this way reaching new audiences who eventually could register in our MOOCs (explained below) and consult our online content offer. We do believe that learning happens regardless of location, so it is our interest to place valuable content near the learner, through the Internet.

But there is an even more important principle working in the “Learning University Network”: breaking down learning sequences over an increased emphasis on curricular modularity. We accept that there is global pressure for just-in-time education, as stated by Wind and Reibstein (2000) “technology allows for the constant updating of materials” so that they are never out of date. We want to facilitate active learning, and to provide students with tools to study anytime, anywhere and in any increment of time, at their very self-pace, using the type of content that is suitable to his/her personal learning style: audio, video, exercises, text, multimedia, and more. All these require shorter sequences which we hope can be used in several different learning contexts.

We are aware that “a greater degree of ‘granularity’ through modularization becomes an obstacle to learning, because it destroys the learning context –the logical sequencing of carefully selected learning objects” (Matkin, 2012), that is, the type of sequence one can find in full open courses. And it is also a fact that “faculty members often resist using whole courses that someone else has developed, and when they must alter a fully designed course substantially, they frequently find it more efficient to create or select their own learning objects” (Matkin, 2012). But with the “Learning University Network”, teachers find different options to enrich their courses, and even better, they can make their very own suggestions on how to extend the RUA catalog, both with learning objects they have built, and with open online resources they have proven useful.

It is a fact that different sources make thousands of free “learning objects” available to teachers and students. These open repositories are accessed via Google, iTunesU, social networks as YouTube, all of which turn content “into a commodity that is ubiquitously available at no cost” (Matkin, 2012). However, at UNAM we are concerned with both students and teachers informational abilities which include seeking and filtering search results from engines like Google. As stated by Banzato (2012), it seem that for teachers, “searching for information is a mechanical process in which they limit themselves to a small set of sources, alongside the use of generic research engines such as Google. The storage and retrieval of information is not achieved through web 2.0 systems, but by means of traditional methods”. And no matter how students can be considered “full” digital literates, they also need to enhance their Internet search abilities.

The "Learning University Network" (RUA) includes:

• Educational resources generated by UNAM community members and other trusted content authors.
• Evaluation resources.
• Interactive resources, texts, videos, multimedia content, applications and more.

The "Learning University Network" (RUA) web portal will allow students, teachers, or anyone
who would want to contribute to the enrichment of its content to suggest materials to be included in its catalog, provided that they meet quality criteria. By the middle of 2014, it will have more than 3,000 learning objects for the National High School (Escuela Nacional Preparatoria) and 1,300 for the College of Sciences and Humanities (Colegio de Ciencias y Humanidades).

Sharing teaching resources in the "Learning University Network" (RUA) will bring different benefits:

• Make better use of university time and resources.
• Provide the university community with different opportunities for publishing their learning material.
• Enhance existing digital content channels with the participation of the community.
• Offer useful, quality resources to society.
• Provide an institutional mechanism for reviewing and disseminating resources.

For students:

• Motivate, arouse and maintain interest in different syllabus subjects.
• Complement and guide student autonomous learning.
• Evaluate knowledge and skills.
• Provide more learning opportunities.
• Promote independent study.
• Facilitate study time.

Being an area where repositories that store learning objects grow rapidly, this initiative creates the potential for automated exchange between digital libraries and systems for educational applications.

**MOOCs**

In Latin America, UNAM became the first public institution of higher education in offering Massive Open Online Courses (MOOC) entirely in Spanish. They have been included in our institutional open education strategy because MOOCs explore alternative and innovative schemes for open online learning, and provide the basis for discussing and analyzing issues related to the creation of educational programs that attend a great number of students, whether in formal or non-formal education schemes.

Such is the case of Coursera, which emerged as an association of internationally recognized American universities. The project grew very quickly as other notable universities joined it. Soon, it became possible to take courses from different important universities around the world. UNAM is part of this important project which shows that our university is capable of offering courses that are at the same level of the best institutions in the world, and that we are interested in increasing the institution's worldwide educational impact. In an initial phase, via the [https://www.coursera.org/unam](https://www.coursera.org/unam) website, UNAM has offered three MOOCs: “Scientific thinking”, “Being more creative”, and “ICT in education”, with over 96,000 students from 108
different countries: Mexico, Spain, Colombia, Peru, Argentina, Brazil, United States, Venezuela, Guatemala and Ecuador, among others.

The delivery of these courses proved to be a successful education alternative to the spread of knowledge, to promote networking and boost the generation of learning communities among participants, regardless of their place of residence. For instance, the first emission of the “ICT in Education” MOOC registered more than 22,000 students, over 13,000 of them actively participated in the course, generating over 10,000 forum entries in 1,345 discussion threads; 1,540 students delivered their final project. Of the population served in the three courses offered by UNAM, almost 10,000 students satisfactorily passed the stated requisites for getting a written acknowledgement for their participation. Such percentage exceeded the average rate of fulfillment of MOOCs taught in Coursera.

Of course, we found several limitations. It is more difficult to establish direct dialogue with a teacher or between classmates in a MOOC. It is also difficult to meet and understand the diversity of such a varied student community, and it becomes clear that there is an urgent need to improve study, teaching and learning schemes, in order to get to accomplish learning objectives and take advantage of a learning environment that can become chaotic at times.

On the other side, MOOCs extend access to training, in the broadest sense, using focused teamwork and self-management models. They promote institutional partnerships and build bridges that link formal education with non-formal education (Enríquez, 2014).

Building learning apps

As we have seen in recent years, mobile devices have revolutionized the way we work, learn and interact, becoming “a contemporary paradigm for connecting, communicating and getting things done on mass-customized and yet personal relationship level that extends to the devices themselves” (Kainz, 2011). Also, as stated by Gikas and Grant (2013), “mobile computing devices and the use of social media allow student interaction with content”. Since 2012, UNAM has focused in a continuing effort to develop applications on major mobile platforms: Android and iOS, available at http://www.apps.unam.mx/. Part of the university community is participating in working on the creation of different Apps, according to their own needs, to be exploited in their courses as well as in general study, this way becoming an important asset for online open education. Currently, more than 70 learning apps have been generated by high school professors, in collaboration with technical and pedagogical experts.

At the same time, other professors learn how to use mobile applications in their everyday teaching, and ICT infrastructure is improved in high school spaces. It is a win-win combination for everyone involved.

One of the most successful examples of the mobile apps UNAM is producing and that is intended both for learning and cultural goals, is the “Descarga Cultura.UNAM” program (“Download Culture.UNAM” in http://www.descargacultura.unam.mx/), which is a public, free service where more than 500 podcasts are available online, including science, poetry, short stories, essays, radio dramas, music, conferences, courses and more. People from 144 different countries have made more than 2.8 million downloads in this service.

The Mathematics Institutional Learning Improvement Program

As a result of several assessments, UNAM has decided to work proactively in linking mathematics to real life, fostering a culture based on logical reasoning and practical
applications, and integrating concepts of this topic in areas such as biology or sociology. These are some goals that a group of professors and researchers from UNAM have been working on in a new strategy for teaching mathematics in an efficient and creative way to high school and bachelor students. The academic challenge is to overcome the rejection in this area and attract students to the discipline, with the use of playful exercises, developing new technologies and skills to solve specific problems.

The key elements of this proposal include promoting basic culture in the field of mathematics from high school level, which must permeate in schools. It involves the development of mathematical thinking and logical reasoning, understanding of fundamental concepts, skills development issues in and out of this field, skills in the use of technologies, recognizing the factors that affect the development of these sciences and promoting human values that support the teaching-learning and research processes.

The educational focus of this initiative promotes an inclusive vision of instruction, with practical examples from other subjects, and strengthen values such as responsibility, respect, tolerance, collaboration and solidarity. As a result, the unified contents for the National High School (Escuela Nacional Preparatoria) and the College of Sciences and Humanities (Colegio de Ciencias y Humanidades) will include arithmetic, calculus, analytic geometry, trigonometry, geometry, algebra, statistics, probability, sets and combinatorial calculations. These contents will be offered through the “All UNAM online” institutional program and will be available for every Spanish speaker.

“All UNAM online” institutional program

All of these initiatives are part of a monumental scope effort: “All UNAM online” (“Toda la UNAM en Línea”), that points to an institutional aspiration because we hope to upload everything we have in our holdings –from 19th century newspapers and vintage films, to hundreds of thousands of student theses and learning objects – and let the world have it at no cost to its users. This program shows how UNAM’s longer-term plans extend far beyond providing educational online material, and also responds to public questioning and demands for public universities to be more transparent.

The “All UNAM online” program strategically aims to achieve free and public access to all our digital products, collections and developments. This vision represents a significant challenge due to the University size and its implications. To support UNAM fundamental tasks: teaching, research and promotion of culture, programs and projects have been developed under a continuous web visibility improvement approach, to enhance our worldwide impact and the major role we play in Mexico’s higher education and research. Several university entities and academic departments participate in the program, since an important part of the online effort also means coding material to make it easier to find via search engines like Google.

It is also true that many of the University’s divisions were already converting material to digital form, but this program has quickened the pace. “All UNAM online” is only possible because thousands of members of our community work tirelessly to provide web access to the University’s vast collections of photographs, old radio recordings and documentary films, catalogs of thousands of species of plants and animals, and more. And in order to have additional tools for exploiting all this information, there is a website in http://www.unamenlinea.unam.mx/ that includes an advanced search tool to enhance Google results and, at the same time, get information from thousands of data records reflecting the abundant, wide variety of web resources that UNAM means to put within reach of anyone with
an Internet connection, in Mexico and abroad.

We at UNAM not only intend to make lecture notes and classroom handouts available, but to provide users with digital access to libraries, special collections, conferences and the research of students and professors. We make this effort so that the products and resources of the University can reach the most Mexicans and Spanish speakers possible. This way, anybody can see the quality of teaching or research, the diversity of topics that the institution covers, and this way give back to society what we do with its financial support. It is a key to UNAM’s social mission as a public institution: provide high quality content in online resources to populations usually underrepresented in the higher education system, to anyone who desires to access them.

As a result of this institutional mandate, teachers and students outside the University might use its culture podcast (“Descarga Cultura.UNAM”, already covered before in this text) to hear late poets like Jaime Sabines reading his work, or browse through the half-million entries in UNAM’s vast biological collection (http://unibio.unam.mx/) to learn about scorpions in central Mexico or cactuses in the north. One can surf the University-housed national periodicals archive, with newspapers going back to the nineteenth century, and take a first insight on Mexico’s history with only a few clicks. These, to name only a few, are proofs that we at UNAM do believe that this University belongs to the people, and work accordingly.

Future work
UNAM is presently conducting continuous research on the topics covered in this paper: OER production, open access, mobile and online learning, to determine true impacts being made on instructors’ teaching and the students’ learning. Furthermore, since our institutional vision is to influence Mexican and Spanish speaking Internet content consumers, we are also committed to evaluate how we deliver that content to our users, and how efficiently they get to take advantage of it.

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