UNIVERSITY EDUCATION

MOOCs and the Expansion of Open Knowledge

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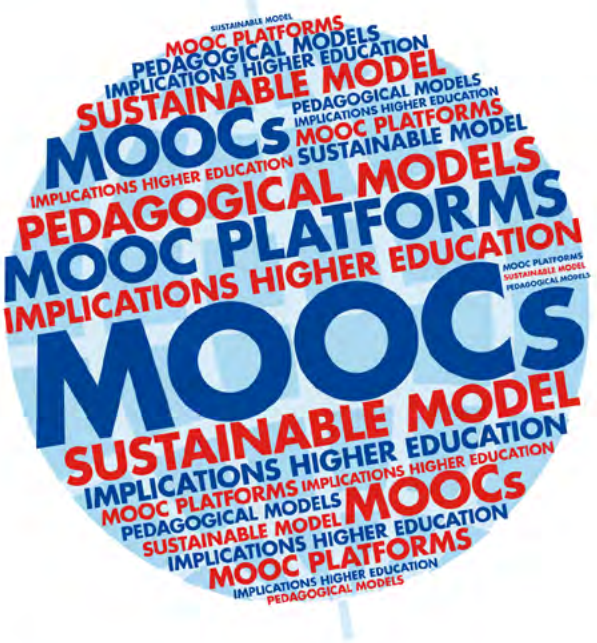

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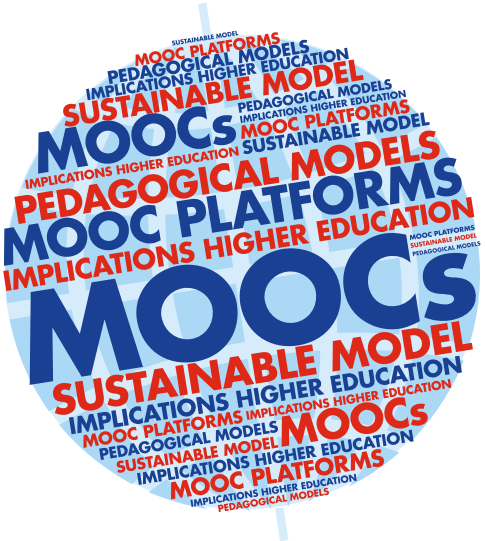

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Contents

Declaration of Intent

Ever since massive open online courses (MOOCs) started in 2008, we have witnessed six exciting years in the world of education. A new education landscape has come into being and the time has come to take a closer look at its defining features. This book presents some straightforward keys to understanding the MOOC movement. We aim at providing readers with a clear and precise contextual framework for building and spreading open knowledge. We wanted to avoid a glorified picture of MOOCs; as usual when innovations captivate the educational and global academic worlds, initial fever has given way to controversies that we did not want to leave unanswered. Readers will therefore be exposed to the pros and cons of the movement, enabling them to form their own educated opinion about the free and massive principles applying to general and Higher Education.

If you google the MOOC acronym, you'll obtain more than 2 billion search results including articles, blogs, news, forums, databases ... This amount of data is difficult to apprehend. Here, in 25,000 words, we put you on the main tracks to start your MOOC journey. We have tried to clear the way, place sign-posts and direct the MOOC-hiker on a course, free of initial obstacles. Fetch your torch and bag, and when you've finished reading, head "To infinity...and beyond!" (Toy Story).

The authors

Foreword

Rosabel Roig-Vila
Christine Sagar
University of Alicante

This book by Profs. Vázquez, López and Sarasola is a landmark in its field. It is a globalizing work on Massive Open Online Courses (MOOCs) that starts by addressing general issues to delve into the most concrete, innovating and current questions arising from a model that has recently burst onto the scene of e-learning.

Since the dawn of civilisation, Education, knowledge transmission and teaching have been recognised as essential for society to renew itself and knowledge to advance. Mesopotamian city-states, Ancient Egyptians, Preclassical, Classical and Hellenistic Greeks have left numerous traces of their dedication to transmission and learning. Ancient Egypt had a god for scribes: Thot. Egyptian tombs for scribes allow us to witness the special care given to the conservation of their working tools as illustrated by the carefully wrapped inkwell (still full of ink) and two feathers found at the site of Oxirrinco. In the Egyptian tradition, these materials helped the scribe continue his noble task in the afterlife.

Ever since, working tools dedicated to the tasks of teaching and learning have permeated the walls of history and have reached the present, where the most powerful tool at hand is the Internet. Teaching and learning are carried through this medium, of which MOOCs are an expression.

This book by Profs. Vázquez, López and Sarasola is precisely about this new system of knowledge transmission. It is about understanding the nature of this new medium, the strategies and concepts underlying it. Profs. Vázquez, López and Sarasola defend the importance of teaching, methods and technologies that characterise MOOCs, without losing sight of the main priorities which are Education, didactics and what is transmitted by didactics. They address not only how we learn over a MOOC but also how we can transmit knowledge over MOOCs ourselves.

The book starts by declaring its intents as to the contents to address. The first chapter presents a framework of MOOCs as virtual scenarios for the massive expansion of knowledge via the Web, and then analyzes their genesis, discussing whether MOOCs really do represent disruptive innovation to higher education and consequent implications.

The second chapter analyses the pedagogical model underlying MOOCs, explaining teacher and learner roles in detail. It provides a typology of MOOCs and their theoretical groundings allowing us to acquire a much needed birds-eye view from the start.

The third chapter thoroughly describes institutions, websites and platforms offering their respective MOOCs over the Web and thus provides us with a referential setting. This meticulous analysis, based on fascinating up to date research and market data, is synthesized into an all-rounded description of the MOOC phenomenon and adds value to the content of this book. The Internet Galaxy, as Castells calls it, needs its guidebooks. This work is one of them as we are taken through the MOOC labyrinth along subtle pathways towards clear and bright destinations.

To finish, in chapter 4, Profs. Vázquez, López and Sarasola skillfully introduce key issues related to MOOCs that call for in-depth research and debate. The MOOC model is far fom being definitive, and is rather an object of study in constant evolution. This is due perhaps to its novelty or simply because the model is inherently linked to integrating technology into Education, a general process that is in perpetual motion and progress.

While explaining that "All that glitters is not gold'", the authors lead us towards new questions that define the future of education. They draw our attention to the fundamental issue of authentication, and accreditation, and the growing role of "badges". Well-focused argumentations elicit important points such as "MOOCs: network turbo capitalism or educational altruism?", and the "McDonaldisation of Education", providing us with ideas and paths to build sustainable massive and open learning models. They conclude with a very interesting concept called "sMOOC" or "sustainable MOOCs".

The author's cautious approach to the question is in itself a source of learning: contributing to the new pilars of Education, the authors Profs. Vázquez, López and Sarasola, far from becoming engrossed, explain the chapters and epigraphs of this book with persistent rigour, modesty and ease characteristic of whoever masters their subject.

Facing a new, and unchartered territory, through a reflective and all-rounded approach, grounded in study, they produce a true treatise so that, quoting Ferran Valentí, (the fifteenth century Mallorquin humanist and pupil of Leonardo Bruni)– it may "be of worth and benefit to many".

Introduction

> The new learning context in Higher Education is moving towards a model of massive, open and free education using a methodology based on video simulation and collaborative student work.
>
> Vázquez Cano, 2013:1

In this 21st century, education is moving towards new models of open and free mass education. These interactive, collaborative and online models enable and increase access to Higher Education universally. The "MOOC" (Massive Open Online Course) movement is based on platforms providing directed learning, shaped by principles of ubiquity, self-assessment, modularity and video simulation. Traditional, "old smart" ideas of education such as "packaged" knowledge, limited access, imposed authority and a scientific rationalist paradigm are being upturned by a dynamic knowledge ecology. This environment is infused with new principles and expectations of increased collaboration, interactivity and learner-generated knowledge. For teachers and students, new doors are unlocking onto knowledge; they are newly challenged to build their own learning actively, dynamically and within collective intelligence-knowledge communities. While knowledge remains guided or directed, acquisition can also be complex, and subject to self-directed learning paths.

This new type of learning poses a challenge to universities and teachers as they need to redefine the current methodological paradigm and venture into designing new interactive, collaborative and ubiquitous educational materials, as well as new modes of dynamic self-assessments. To integrate these new learning spaces, universities must adapt existing curricula so as to offer a broader catalogue of diversified courses from which students create their own skills map within an academic or professional field. The notion of "diversified learning" would this way make much more sense than with current standardized university programs. The trend should be to offer open programs directly related to working, academic and professional areas. Students could then create a learning itinerary that suits the

skills needed in a diversified world of work, subject to constant change, new tools and widely interconnected spaces.

Post-graduate education is needed so the market can make a distinction between students. So far, we have not been able to detect and assess informal competencies and informal learning, even though they constitute the foundation of the lifelong learning objective set by the European Union. Initiatives for assessment and recognition of other types of learning have thus emerged, e.g. through student self-study across Open Educational Resources, as set out by the OERtest project, xMOOC certifications or initiatives such as the Mozilla Foundation's Open Badges project.

The very definitions of knowledge and learning are being rewritten. They now incorporate notions of portability, ubiquity, cost-free and massive dissemination (Figure 1), based on the pedagogical principles of "Connectivism" (Siemens, 2004, 2012).

Connectivist theory holds that "Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning for the individual". Knowledge is based on interconnection between nodes; in humans, these interconnections occur over neural connections and in societies, over relations between humans and resources. Learning therefore means creating and deleting connections between nodes and to this end, the concepts of similarity, continuity, feedback and harmony are essential (Downes, 2012a, 2012b).

The current role of citizens in a community is not and should not only be to conform, but also to be creative and produce content (Vázquez

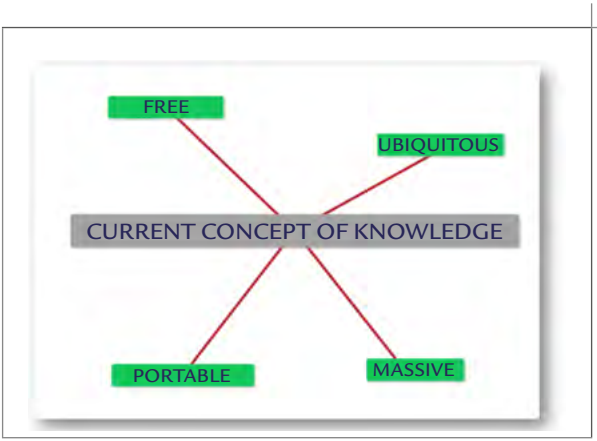


Figure 1

Principles underlying an updated definition of knowledge

Cano and Sevillano, 2012). Concepts of creativity and content production turn human beings into actors at the heart of their existence, directing their own learning rather than being passive observers. They underlie the principle of interactive and highly collaborative teaching. However current MOOC design does not adopt a specifically creative orientation. It follows a passive content transmission model using automated subject assimilation tests that do not encourage creating, reprocessing and producing of the contents covered. This recent open knowledge movement, in its current application, needs to be redefined and built along new parameters more consistent with 21st century methodological principles and digital contexts.

Current massive education is characterized by the following theoretical principles that are not always reflected in the way courses are actually delivered today:

- Open Access: no need for enrollment in a school and no training fees to develop this type of training.
- Scalability: the interactive and collaborative development of the course relies on active participation, where learners formulate questions and complete projects, with minimal or no intervention from the teacher-tutor.

The next four chapters present the most relevant aspects of the MOOC movement. **Chapter 1** describes the genesis of MOOCs and their defining features. We also analyse their emergence in the world of Higher Education in the light of Disruptive Innovation theory. **Chapter 2** provides a description of the different pedagogical models on which the movement is based. We also give advice on how to shape teacher-tutor and student roles along basic principles of quality and productivity. **Chapter 3** describes main features of the most reputed MOOC platforms to date. On one hand we present platforms where you can take courses, and on the other, platforms that let you create your own customized courses. Readers can thus become familiar with both sides of the coin: participating in a MOOC and building a MOOC. Finally, **Chapter 4** critically reviews main controversies and challenges now facing the movement, as it needs to find a sustainable ground to establish itself in the educational and training worlds. In the **Annex,** readers will find an interesting webgraphy of courses and sites for sharing thoughts on MOOC philosophy.

This ongoing work aims at breaking new ground for education professionals and help them embrace our massive new socio-technological landscape. Our second objective is to encourage thought-sharing and a collective debate on the implications of the seismic shift brought on by MOOCs, and how they can integrate into our educational landscape.

Chapter 1.
MOOCs: Virtual Environments for the Massive Expansion of Knowledge

MOOC stands for Massive Open Online Course. In September 2008, George Siemens, Stephen Downes and Dave Cormier created and offered an open course on connectivism, popularly known as CCK08 (Connectivism and Connective Knowledge). Five years later, MOOC methodology has given rise to a model that has been globally adopted by top universities. This unusual movement is sweeping the world and generating much confusion in the field of education as the traditional university model is being challenged. The very idea of paying for acquiring knowledge is now being called into question.

The Genesis of MOOCs

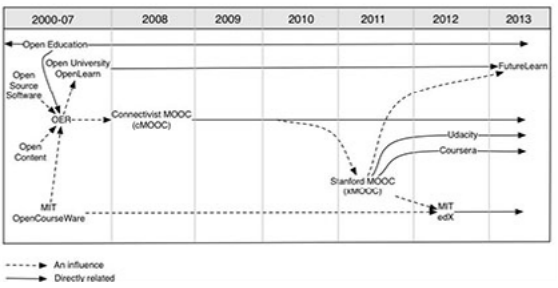
The world of education is in turmoil as it witnesses massive new techno-pedagogical trends, undermining the traditional model of transmission learning. This traditional model shaped an educational praxis oriented towards linear transmission of knowledge, learners as passive agents accumulating content and immersed in evaluation approaches centred on rote memory tests. As major universities offer Massive Open Online Courses (hereon MOOCs), new learning lives leading to massive expansion of global knowledge can emerge in a spirit of innovation and lifelong quality education for all.

To understand the implications of MOOCs in Higher Education, we will first describe how they evolved since their launch in 2008, and mass dissemination in late 2011. We also shed some light on previous initiatives in the field of education.

The MOOC acronym was coined in Canada by Dave Bryan Alexander Cormier to describe an online course conducted by George Siemens and Stephen Downes in 2008. The course, entitled "Connectivism and Connective Knowledge", had 25 enrolled students who paid tuition fees and obtained a certificate. However at the same time, another 2,300 students

Figure 1

Chronology of the genesis of MOOCs and open education



SOURCE: *White Paper "MOOCs and Open Education: Implications for Higher Education."*

as well as the general public followed the course via the Internet for free but without any final accreditation.

Meanwhile in the summer of 2011, Sebastian Thrun and Peter Norvig announced that they would offer a free online course entitled "Introduction to Artificial Intelligence" (https://www.udacity.com/wiki/cs271) in parallel to face to face classes that they were offering at Stanford University in the United States. The course was made up of exercises, questions and tests, and attributed completion certificates. This course took place from October to December 2011, attracting more than 160,000 students from 209 countries, while 175 attended in-situ. Due to this overwhelming reception, a scalable technological architecture had to be developed to accommodate such a vast number of students. And it was a huge success. John Markoff in "The New York Times" of August 2011, (http://www.nytimes.com/2011/08/16/science/16stanford.html), reported that this course was one of three experiments launched by the Stanford Computer Science Department to extend technological knowledge beyond the campus to the entire world.

Instructors Peter Norvig and Sebastian Thrun are prominent world figures in the field of artificial intelligence and robotics. Sebastian Thrun is a Research Professor of Computer Science at Stanford, Google Vice President, member of the National Academy of Engineering (NAE) and the German Academy of Sciences. Thrun is known worldwide for his work on unmanned vehicles, after leading a group of Stanford students in 2005 and winning the DARPA Challenge, a project sponsored by the Pentagon. Today he is head of the Google Self-Driving Car Project. Peter Norvig is a former NASA scientist, director of research at Google, a member of the American Association for Artificial Intelligence, a member of ACM (Association for Computing Machinery) and author of one of the most influen-

tial books on artificial intelligence. Both Thrun and Norvig were surprised at how their announcement went viral after they advertised it at a conference in Spain and shared it by e-mail with Carol Hamilton, director of the Association for the "Advancement of Artificial Intelligence". Two additional courses were on offer: an introductory course on databases, taught by Jennifer Widom, Chairwoman of the Department of Computer Science at Stanford; and "Introduction to Machine Learning" taught by Andrew Ng, Norvig and Thrun. Both courses were based on the principle that one-to-one tuition works best (Bloom, 1984), which they tried to emulate though the teaching went from one to thousands.

One student wrote: "I see examples of Bayesian networks and game theory everywhere". The objective was not that students memorize formulas but rather that they manage to view the world differently. Thrun said: "It is ironic that seeking to revolutionize traditional education, online classes ended up being much more similar to traditional classes than other online offerings. In other online classes, videos are available for viewing at any time, and if it is available tomorrow, you may end up leaving it for then, so we introduced the innovation of setting dates." Video-classes were available to watch during the week and at the end of the week you did the homework. This sustained motivation and made students gather into one place around the materials, so if you asked a question over a forum, you would get a reply within a few minutes from a fellow student. Peter Norvig said: "Peers can be the best teachers, because they're the ones that remember what it's like to not understand." To make class participation possible, students were encouraged to participate in forums, questions were then collected weekly through the Google Moderator service and the highest rated were commented by teachers over video or via "Google Hangouts".

Harold Abelson, professor and author of the well-known "Structure and Interpretation of Computer Programs", MIT scientist and co-founder with Lawrence Lessig of Creative Commons, developed a similar previous initiative in 2002. He said: "Now the question is how do you move into something that is more interactive and collaborative, and we will see lots and lots of models over the next four or five years".

Hal Abelson is importantly involved in the movement, as in 2002, he founded the MIT OpenCourseWare program, that provides teaching materials from MIT classes for free. This was the first ever large corpus issued using a "Creative Commons" licence.

This brings us to the recent emergence of open content. We will at present review the origins, importance and impact of Open Educational Resources (OER). OERs offer content for teaching and learning, tools and services, and licences that allow for open development and re-use of content, tools and services (Geser, 2007). In this sense, Downes (2007) notes

that OERs include static physical objects and digital resources such as texts, images, graphics and multimedia. Different authors (Geser, 2007; Guzman and Vila, 2011) indicate that the "Open Educational Resources" (OER) movement has grown exponentially in recent years due to among other factors: the wide media coverage of the OpenCourseWare (OCW) initiative; the success of open source software such as Moodle in the education industry; the work of a growing amount of organizations that promote the use of Creative Commons licences (http://creativecommons.org/choose/) and finally the support of national and international organizations such as the OECD and UNESCO.

Following step, Stanford University gave an online course on "Artificial Intelligence" in early 2012 attracting 58,000 enrollments. One of those involved in the project was Sebastian Thrun, later founder of the "Udacity" (https://www.udacity.com) MOOC platform that provides support to universities to develop open education (Meyer, 2012). The Massachussetts Institute of Technology first created MITx to design such courses but evolved into a joint platform for Harvard university, UC Berkley and MIT itself with the name of EDx (https://www.edx.org). Coursera (https://www.coursera.org) however has been the most active platform in developing these initiatives and sets itself as the standard bearer in pedagogical design (Lewin, 2012; DeSantis, 2012). Alongside these platforms countless designs have emerged.

It seems the educational community is currently evolving in the same way as educational materials, as teacher student rapports are becoming increasingly participatory and collaborative. A new style of learning is emerging.

Are MOOCs really a Turning Point in Higher Education

MOOCs may be considered to be a turning point in Higher Education and can be interpreted in light of the theory of "Disruptive Innovation" (Bower & Christensen, 1995). This theory explains which mechanisms and innovations help institutions become more competitive.

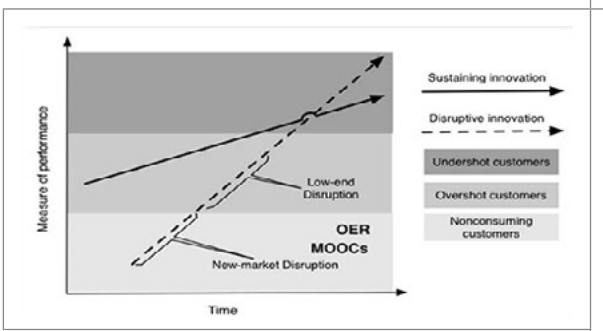
Disruptive Innovation Theory

In scientific literature on technology and business, "disruptive innovation" is used to describe innovations that improve a product or service in ways that the market does not expect at that time. Christensen (2003) identified two types of innovations that influence the development of companies and business: **sustaining innovations** and **disruptive innovations**.

Sustaining innovation aims at improving the existing system, while disruptive innovation creates a new market system based on lower prices or a completely different model in response to new realities. Disruptive innovation typically applies highly flexible new technology in a way that creates a new business market. Figure 2 shows how MOOCs represent disruptive innovation.

Figure 2

Evolution of MOOCs as disruptive innovation



Source: *White Paper "MOOCs and Open Education: Implications for Higher Education".*

Overall, sustaining innovation aims at improving an existing product, while impact innovation does not seek to improve existing products, but to develop a new market model through a new business model or a new product and business design.

MOOCs hold the promise of education that is flexible, low cost and adaptable to the learning needs of the academic and labour markets. Figure 2 identifies the initial market segment as constituted by non-consuming customers of Higher Education to whom a more affordable and contextualized product is offered. This turns MOOCs into potential disruptive innovation, as they come to represent an interesting product, based on technological development that creates new demand and a new business market. But will MOOCs really embody disruptive innovation in the near future?

As a preamble, we invite readers to watch a talk by Javier Uceda Antolin, Rector of the Polytechnic University of Madrid, given at the Conference on the Impact of Mas-

sive Open Online Courses ("Jornadas sobre Impacto de los Cursos Masivos On Line en Abierto").[1]

To summarize, market and education models are still incipient. We are yet unable to predict their consequences for Higher Education. The education world is complex and dynamic, involving countless actors and institutions with diverging educational and ideological interests as well as different economic stakes. Therefore, we have to be careful about applying the theory of "disruptive innovation" to the field of MOOCs. For example, Lawton and Katsomitros (2012) make a comparison between the MOOC model and iTunes. While the latter replaced compact discs improving format and price, it is less clear that MOOCs exceed existing educational models based on e-Learning and Blended Learning. Issues such as accreditation, certification and monetization, which are still not very well defined in the MOOC model, affect its impact (see Chapter 4 for further explanations).

Start-ups such as Coursera and Udacity have developed MOOCs along disruptive innovation lines, focusing on a business model for a new market promoting affordable and flexible education. However for Higher Education establishments, MOOCs are only a support to the existing system of online education. For example, MIT or Harvard uses MOOCs to experiment how to improve student development in the physical and virtual campus (Bates, 2013). The University of San Jose is experimenting with MOOCs in their classes: they generate a "flipped classroom" model where students take the MOOC as homework, and engage in discussion and reinforcement of the content acquired thanks to the MOOC in the classroom (Jarrett, 2012). Distance and virtual university education in several countries (Open University in the UK and UNED in Spain, among others) have opted for mixed models of lifelong learning (e-Blended-Learning) that do not differ significantly from the MOOC model proposed. Despite these applications so far, it is true that some defining features of MOOCs make it stand out as potential disruptive innovation. They have currently attracted a large number of developers and companies with unpredictable futures. Progress in instructional design along with new information technology solutions should consolidate the model as truly disruptive innovation.

1. <https://www.youtube.com/watch?v=-RpXpBsDsiw>.

The Implication of MOOCs for Higher Education

> After several attempts in recent years, free and open courses taught by top-standard teachers are suddenly emerging , aspiring to transmit knowledge on a massive scale. We are of course referring to the increasingly commented MOOCs (Massive Open Online Courses). A paradigm shift is occurring: while computer-network based instruction has existed for many years, it is now becoming universal and collaborative.
>
> Martínez López, 2013: 7

The MOOC model is certainly having an effect on socio-cultural, educational and technological aspects of Higher Education. The current educational context requires progress models that respond to the ubiquity and portability of devices giving access to learning. Factors of change in the landscape of Higher Education include:

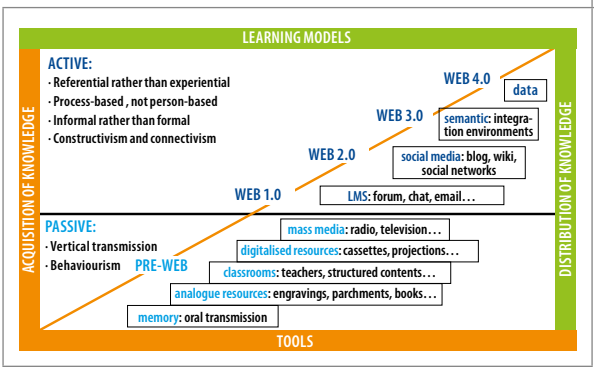
- Globalization and the strong internationalization process.
- Increasing demand for access to Higher Education with an estimated 120 million students by 2020.
- The need for lifelong learning.
- Increasing access to technology and social networking.
- Changes in the business model and costs.

Therefore there is a clear need for change, and Higher Education establishments tend to branch off into four different categories: traditional university teaching, the diversified system, the hybrid system and the virtual system. The new model will also generate competition between universities and other Higher Education bodies that will offer more affordable and mixed education models together with official accreditation and certification. All this makes way for opportunities to share ideas and for institutions to collaborate on local, national and international levels. A universal model of open knowledge expanding beyond the university or national borders is taking shape. Figure 3 shows how network knowledge has expanded in recent years.

In an open curriculum, students blend different educational resources, activities and use diverse access devices to generate knowledge. The challenge is therefore to construct knowledge by creating and reworking contents. Within this process, learning scenarios are rebuilt and interactions take place within communities of collective intelligence, to achieve desired objectives. In open learning, tutors or teachers build individual and collective learning opportunities within contexts of content access and generation that should enable students to develop tasks and skills while promoting competences in accordance with the standards of Higher

Figure 3

Model of network knowledge expansion



Education (Dublin Descriptors, 2005, European Commission, 2010; Villa and Poblete, 2007). In consistency with open curriculum and learning, open assessment is based on peer review and the dynamics of group participation. This open learning design needs to be supported by technological infrastructure providing open access platforms where intuitive and user-friendly interfaces for both students and teachers foster active and fluid exchange of information. Platforms must also integrate virtual scenarios that encourage participatory construction of activities.

Final Thoughts

> Academic content taught in formal education is no longer exclusive or uniquely accessible to enrolled students. Anyone can learn American History using the same resources as a student enrolled in the subject at MIT.
>
> Mengual-Andrés, 2013

Today we can follow a course at Harvard or Stanford comfortably settled in our armchairs; we can become a student of Berkeley or of the world-class John Hopkins University, without walking out the door. Access to cost-free and flexible applications brings down many barriers to realizing new collaborative projects. No cutting-edge computers are needed to tap cognitive surplus. A phone is enough. But one of the most important lessons is that "once you have figured out how to tap the surplus in a way that people care about, others can replicate your technique, over and over, around the world" (Shirky, 2012: 29). In this sense, according to the same author, our society and our daily lives will improve dramatically when we learn to harness our altruistic potential and our leisure time. He

adds that this paradigm shift is possible because we love to collaborate, share over social networks and thereby feel part of something big. This allows our intelligence and our free time to come together to create projects that would be impossible to create on an individual basis or by a single company or institution.

Moreover, some of the most interesting characteristics of the Internet are its decentralization, its immateriality, and the way it breaks down space and time barriers. Internet growth has been such that it is impossible to measure. Its contribution to human knowledge and society is undeniable and as such has given rise to new scenarios for formal and informal training, education and learning, and above all, competence acquisition (Mengual-Andrés, 2013). Current scientific literature indicates that very soon MOOCs will be the new technological trend in education. For further introspection, we refer readers to the 2013 "New Consortium" (NMC) and "EDUCAUSE Learning" annual reports that present emerging trends in educational technologies over the years to come, one of which is the massive online courses with free and online payment options.

Traditionally, university education has been based on a teacher-centred methodological model, with an emphasis on content delivery and its reproduction by students, lectures and individual work. Teaching based on Information and Communication Technology (ICT) requires a series of changes that lead to a breakdown of this model, but at the same time leads to advancing the quality of Higher Education (Aguaded, López and Alonso Meneses, 2010).

Considering current socio-technological developments, universities are engaged in work on the evolution of society, and cultural and technological trends, among others. However, they also face challenges related to pedagogy. To our understanding, this challenge consists in recognizing that learning and research involves designing and invigorating active and interactive virtual learning scenarios. The issue does not consist therefore in deciding whether or not to use some technological application but rather inventing collaborative and interactive learning scenarios that have social and scientific repercussions on university education. While online learning is gradually increasing in gradually increasing in many countries, e-learning both in private and in Higher Education is clearly are becoming obsolete to the implementation of new trends that MOOCs are leading in other countries.

In short, MOOCs arise from a philosophy that opens the way to learn. They should ideally be open, participatory, distributed and represent a lifelong learning network; they embody a means to connect and collaborate; they represent shared work (Vizoso Martin, 2013). They offer a solution for sustainable development of lifelong learning. In this sense, universities

should have a social responsibility today in opening up global knowledge immersed in collaborative virtual environments. Professionals in the educational field must therefore necessarily take on new challenges: they should act as techno-social facilitators fostering community social networks oriented towards cooperation, cultural cohesion and genesis of communities of shared intelligence, thus attempting to bridge the digital divide. Additionally, they should act as developers and managers of knowledge for sustainable development of the global digital ecosystem. In this sense, innovative mass and open virtual environments can provide new opportunities for learning, university research and innovation. Lastly, as noted by Stephen Downes (2008) in his classic writing entitled "The Future of Online Learning: Ten Years On": "Today, and for the last century, education has been practiced in segregated buildings by carefully regimented and standardized classes of students led and instructed by teachers working essentially alone. Over the last ten years, this model has been seen in many quarters to be obsolete. We have seen the emergence of a new model, where education is practiced in the community as a whole, by individuals studying personal curricula at their own pace, guided and assisted by community facilitators, online instructors and experts around the world. Though today we stand at the cusp of this new vision, the future will see institutions and traditional forms of education receding gradually, reluctantly, to a tide of self-directing and self-motivated learners. This will be the last generation in which education is the practice of authority, and the first where it becomes, as has always been intended by educators, an act of liberty".

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Chapter 2.
The MOOC Educational Model: Teacher and Learner Roles

> You are not expected to read and watch everything. Even we, the facilitators, cannot do that. Instead, what you should do is pick and choose content that looks interesting to you and is appropriate for you. If it looks too complicated, don't read it. If it looks boring, move on to the next item. The learning outcomes will, consequently be different for each person.
>
> Siemens *et al*., 2012

Introduction

It is crucial that students and future course developers understand the pedagogical development of these courses. Correct educational philosophy and an architecture that encourages participation will together improve the process of skill acquisition by students. In this chapter we review pedagogical models underlying these courses, se we can later learn to conceive them based on well-founded principles. Adopting appropriate student and teacher roles is critical to the current and future development of these courses. Understanding prevailing methodology in these courses should help future course developers or participants to improve their design and performance respectively. The pedagogical methodology and architecture of massive courses is pending redefinition and improvement to overcome current limitations. Therefore explanations on design are complemented with a review of controversies in Chapter 4 that should open the way to improvements. We also provide a typology of main MOOC-student profiles. We approach the difficulties in completing these courses and the reasons for their high attrition rates. We also provide examples of certifications so that students know what to expect upon course completion.

xMOOCs versus cMOOCs

The learning ideology underlying MOOCs was proposed many years ago in 1971 by Ivan Illich who advanced that any educational system should provide any person wanting to learn, with access to resources at any time in their lives; make it possible for all who want to share knowledge to find those who want to learn from them; and to create opportunities for those who want to present an issue to the public to make their arguments known (Illich , 1971). This vision seemed a utopia back then, but is possible to make real today thanks to communication and knowledge-sharing tools at hand in our digital world. Because of the tremendous impact of MOOCs, universities and institutions worldwide are beginning to contribute to this open movement by creating open platforms. Universal and free access, together with user-friendly audiovisual formats are part of the attraction of MOOCs: learning experiences that were previously inaccessible are now available to the general public. Two types of MOOCs have developed, cMOOCs and xMOOCs (Downes, 2012; Siemens, 2012; Hill, 2012).

The former –cMOOCs– are based on tasks and network learning, and the latter –xMOOCs– are based on content. cMOOCs based on distributed learning over networks are grounded in connectivist theory and its derived learning model (Siemens, 2005; Ravenscroft, 2011). In these courses, content is minimal and the fundamental principle of participation is learning over a network in a supportive context so that – with learner autonomy as the starting point–, participants search information, create and exchange within a shared learning "node". The theory is currently under scrutiny, but it does help to define a starting point for distributed learning through nodes based on the principles of autonomy, connectivity, diversity and openness (Downes, 2010). Nodes contribute to content and skills, as knowledge is constructed dynamically and globally. In this model, traditional-style assessment is difficult to implement; learning mainly focuses on the acquisition of skills thanks to conversations and contributions generated by a social network of learning.

Task-based cMOOCs center on student skills in completing different types of work (Winters, 2007; Siemens & Cormier, 2010). Learning comes under different formats but a number of tasks have to be completed to make progress. Tasks can be solved in multiple ways, but because of their compulsory nature, learners can only move on to the next learning stage if they have gained skills from the prior tasks. The essential feature consists in student progress thanks to different kinds of task or project completion. This type of MOOC is based on a blend of instruction and constructivism (Laurillard, 2007; Bell, 2011).

Content-based MOOCs, –xMOOCs– are those under the media spotlight. They provide a series of automated tests (Rodriguez, 2012) and fo-

cus on content acquisition and use assessment methods similar to that of traditional classrooms (though tests are more specific and standardized). Courses are usually given by scholars from internationally renowned universities, which is what makes them so appealing. The major problem with this type of MOOC is that students are taught massively, without any personalization of their learning, and the trial and error method in the assessment tests is outdated.

xMOOCs use a methodology centred on video simulation. Learning is autonomous, collaborative, and self-assessed. Key features are:

- Cost-free access and no limit to the number of participants.
- No certification for free participants.
- Instructional design based on audiovisual format supported by written text.
- Collaborative and participatory student methodology with minimal teacher intervention.

Current research considers that this new type of format actively promotes self-organization, connectivity, diversity and decentralized control of the processes of teaching and learning (DeWaard, et al, 2011;. Baggaley, 2011; Zapata-Ros, 2012). However these emerging learning systems must currently overcome many shortcomings to build a sustainable future such as: the economic management of participating institutions; accreditation of education offered, tracking of learning and authentication of students (Eaton, 2012; Hill, 2012). Along with these deficiencies, a number of issues need to be addressed, among which:

- Dispersal of content, conversations and interactions. Though dispersal is part of the essence of the MOOC, content needs to be organized and facilitated to participants. MOOCs call for "content curators" (people who search, gather and share information continuously), automating and optimizing resources, while bearing in mind that students themselves must be the ones to filter, aggregate and enrich the course through their participation.
- Absence of certification in some cases, which should lead to new innovative and flexible accreditation models of knowledge tailored to the needs of a labour market where professional profiles are constantly evolving.

In this sense, badges may be a promising choice. Badges can be defined as displays of skills or accomplishments, in iconographic and structured identification format, based on criteria making it possible for related agents and peer-to-peer structures to grant and circulate them.

- Activities must be designed for the purpose of acquiring new skills rather than directed towards reflecting on practice itself.
- MOOC learning requires not only a certain level of digital competence but also a high level of self-directed learning that MOOC students do not always possess.

It is common knowledge that institutional altruism does not alone explain this mass education movement. MOOCs enable free, quality, and global education, but in most cases they do not guarantee free accreditation (Eaton, 2012). This accreditation is where the business lies: official accreditation is only obtained after successfully completing parallel assessment (in addition to the cost-free option) and purchasing the certificate (in most cases).

To summarise, the following video gives a simple explanation of how a MOOC works: : <http://www.youtube.com/watch?feature=player_embedded&v=_vNWI2Ta0Kk>.

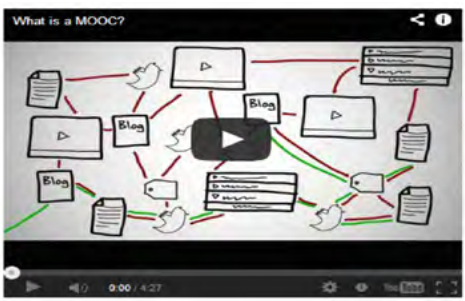


Figure 1

Video summary. What is a MOOC?

MOOC Pedagogical Design: Towards the Integration of a Comprehensive and Connectivist Model of Learning

> The fundamental element in our new framework is the knowledge matrix: where processes of knowledge construction within groups and individuals take place thanks to open access knowledge conduits and learning resources (OER, MOOCs, etc.)
>
> Zapata Ros, 2012

In non-connectivist MOOCs, a pattern is followed across almost all across almost all universities and institutions. To illustrate this, we have chosen a fairly complete course format delivered by "Miríada" (http://miriadax.net/) and developed by the UNED entitled "Mini modular educational videos: a critical element in the design of a MOOC".

We will now observe its structure and pedagogical architecture as almost all MOOC courses follow a structure similar to this one:

1. Home page:

- Promotional and descriptive video and course summary.
- Description, objectives of the course and its teachers.
- Course syllabus and duration.
- Requirements and estimated effort (time you need to dedicate to the course)
- Target learners.

Figure 2

Homepage of the Miríada Course

2. Progress page

- Corresponding contents module.
- Contents (Audiovisual and/or text printable).
- Task or activity to do.

Figure 3

Progress module of a Miríada course

3. Participation and collaboration features

- Questions and Answers.
- Forum.
- *Blog.
- *Wiki.
- *Twitter.

*These features differ across platforms.

Figure 4

Participation and collaboration features in a Miríada Course

The Role of a Pupil in a Mooc

We will now give some recommendations on how to have a successful MOOC experience.

The profiles of students who usually enroll or approach these courses vary: there are the onlookers who want to see what the course has to offer; others look for a specific skill or course to compensate the lack of a particular subject in their advanced studies; finally there are the mere observers who don't go beyond enrolling. In the majority of cases, skill-seekers are the ones who complete the course and develop the competencies or reach the objectives that were originally intended.

To take full advantage of MOOCs, first-time participants should follow four key guidelines illustrated in Figure 5 below.

- **Task 1: Identify gaps in academic and professional education that can be covered by a MOOC, or special learning interests not requiring accreditation.**

  Without sufficient motivation, students are unlikely to complete their selected courses. (Over 65% of students enrolled in a MOOC drop out).

  Accreditation is not the primary objective. Continuous training is where the potential of MOOCs lie, offering free and specialized learning applicable to academic, personal and professional contexts without the need for an official certificate. Earning a badge or the very acquisition of competence should be sufficient justification (e.g. initiation to App development: http://www.redunx.org/web/app-inventor/inicio).

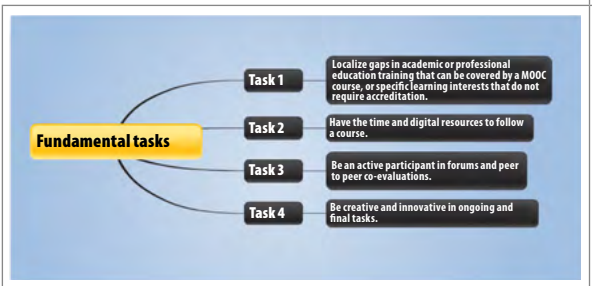


Figure 5

Basic student tasks to optimize a MOOC

Prepared by the authors: <http://www.mindomo.com/es/view.htm?m=2ba7d52a7ce84dcb8b9054cea372fb09>.

- **Task 2: Disposing of enough free time and sufficient digital resources to follow the course.**

  Students must dispose of the estimated free time as described in the course schedule. A major obstacle in keeping up with a MOOC –that often leads to dropping out– is not sticking to the schedule and therefore missing out on forum participation and peer to peer assessments.

  Students should make sure they use updated digital devices and appropriate software for viewing videos.

- **Task 3: Take an active part in forums and peer reviews**

  Learners should understand that true progress in the course is largely dependent on active participation and not necessarily on course contents. Participating in forums, re-working and interpreting written or audiovisual content are fundamental. Sharing knowledge, questions and suggestions is essential to make progress.

  One of the most striking features for first-time MOOC participants is having to assess fellow student work constructively, most of the time with the help of rubrics. There are no teachers present to make wise judgments on the qualities, faults and virtues of student work. Students are actively involved in this task themselves; teacher-tutors guide and rate these evaluations in view of improving proposed skills.

  For the time being, MOOC assessments are fairly mechanical and individual in nature. Self-correcting tests are proposed which currently reinforce individual work.

- **Task 4: Be creative and original in ongoing and final tasks.**

  Students should bring new structure to content as well as show creativity and originality in problem-solving and completing tasks. Their role is not to reproduce similar content in written or audiovisual media. Input based on "creativity" and "innovation" will constitute the student's main contribution to the course. If they share and cooperate with other students, the course will gain value and offer more content.

> Collaboration, communication, community, relations, connectivism, construction, conversation and cooperation are key factors in network learning. Essential course contents are the building blocks but the edifice of knowledge cannot hold without cement. Future MOOC participants should be aware that they themselves constitute the main asset of the course. (Vázquez Cano i Sevillano, 2011).

The Teacher's Role in Designing a MOOC

MOOC design should not only be user-friendly but also help to build skills and fulfil a number of professional or knowledge goals. Chosen platforms should be compatible with a variety of Web 2.0 social participation tools: blogs, wikis, forums, and microblogging, among others.

A teacher or creator of massive content should follow five steps presented below (Figure 5):

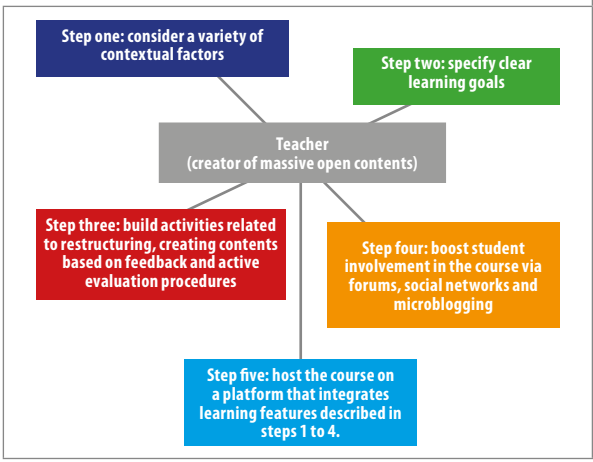


Figure 5

Different steps in building a MOOC

- **Step one: Consider a variety of contextual factors.**
  - What is the main objective of the course?
  - What do students expect from the course?
  - In what ways is course content related to target skills?

- **Step two: Specify clear learning goals.**
  - The pedagogical model must go beyond mere concept transmission and rote evaluation.
  - Course goals should include peer to peer collaborative work, and tasks that allow to practise the skills sought after.

- **Step three: Build activities for restructuring and creating contents based on feedback and active evaluation procedures.**
  - Students should be encouraged not only to view content, but also to restructure and build content, as part of the specific skills presented in the course objectives.

- The course design should include revision activities and formative assessment to verify not only conceptual content acquisition but also peer review and creative tasks using e-rubrics evaluation.

- **Step four: Boost student involvement in the course via forums, social networks and microblogging.**
  - Students are the most important actors, their participation and collaboration with other alumni/ae is the basis for building, generating and interpreting the content provided.
  - Students' thoughts must be shared and analysed by other course members: in "active participation" lies the main learning stimulus.

- **Step five: Host the course on a platform that integrates learning features described in steps 1 to 4.**
  - The platform should be able to host all essential elements for cooperative and interactive content including forums, chats, videos, written text distribution formats for printing or reading on screen. It must support various circulation formats such as epub, pdf, odt, as well as run and be viewed correctly on different devices (tablets, smartphones, etc.) to offer greater mobility and ubiquity of learning.

    One of the characteristics of MOOCs is the understanding that the evaluation of learning is not about testing for content acquisition. We say explicitly that the content is the "McGuffin" (suspense element that make characters progress in a plot, but is not of major relevance to the plot itself). –It is the thing that gets people together, gets them talking, gets them thinking in new ways. (Downes, 2012).

MOOC Dropouts: Causes and Possible Solutions

> We've gone from studying for a lifetime qualification to having a lifetime of learning. In this context, MOOCs represent a fertile ground for lifelong learning. While dropout rates are very high, it is a matter of time before participation settles down to normal levels.
>
> Martínez López, 2013: 8

A fundamental problem with massive open courses is high dropout rates. Before reflecting on possible causes, let us consider two of the biggest obstacles to the development of MOOCs. The first is the fact that MOOCs are cost-free. Prospective students are captivated by the wide range of courses on offer and the opportunity to learn something for free. This leads to hasty decision-making that ignores the requisites proper to any educational offering (sufficient spare time and prior knowledge of course subject). Another variable, especially applicable to the Hispanic community, is that even though many courses in Spanish are delivered by Spanish and Latin American platforms, the English-language MOOC movement is very powerful and has a wide range of tempting courses from reputed universities. Students should be fluent enough in English to understand and participate adequately, meeting the requirements of the course and task difficulty.

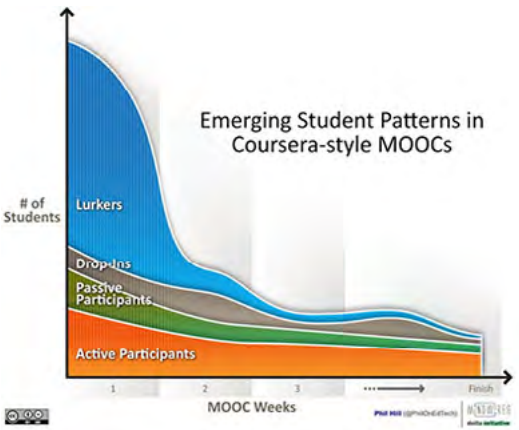
MOOC attrition rates usually reach around 90% of registered participants (undoubtedly a very high rate) which has given rise to abundant analyses. Authors such as Hill (2013) built a taxonomy of students registered in MOOCS and classified them according to the following profiles:

- **Lurkers**: lurkers make up the bulk of xMOOC participants. In most cases, they simply check out a few bits of the course; in fact many hardly go beyond registering.
- **Drop-ins**: are interested in specific parts of a course, which they look at while ignoring the rest.
- **Passive participants**: students who merely watch the videos and take some tests, without engaging into all its activities (blogs, forums, p2p, ...) makes available to them.
- **Active participants**: students that are totally committed. They participate in each and every one of the activities proposed by the teaching team, trying to make the most of this new learning experience.

The chart below gives a clear illustration of dropout rates (Figure 6). You can see the changes in the number of students as the xMOOC unfolds according to the above classification.

Figure 6

Evolution of the number of MOOC participants



Lurkers, lurkers everywhere

The surprising drop in the first week is mainly due to the lurker category. The author observes that students sometimes change category and never switch back until the end of the course. For example, a *drop-in* may become an *active participant* if particularly interested in some content, or an *active participant* may turn into a lurker if frustration has built up. Curiously, once the conversion takes place there is no going back. The author estimates lurkers represent 60% to 80% of all enrolled students.

After taking into account the two general factors above and the types of students who come, pry, follow and complete a MOOC, reasons for dropping out can be summarized in 10 key points listed below. They can make us think twice before enrolling in a massively open course (Figure 7).

1. **Time-consuming**: sometimes we enroll in a MOOC and discover only later that tasks and videos require more time than we were ready to spend. To avoid wasting precious time, check the course description before you enroll. It tells you estimated effort.
2. **Insufficient prior knowledge**: Many people enroll in courses that exceed their level of knowledge in the subject area. Introductory courses are best suited for beginners in any discipline. If you want to start off in statistics, look for a beginner course to acquire basic knowledge. You will then be able to progress to higher level courses. Identifying our interests and capabilities is a good way to know oneself and makes us consistent with our choices and decisions. The MOOC world is no different from everyday life in this sense.

Figure 7

Some reasons for dropping out of a MOOC

3. **Too basic**: sometimes we have high expectations because of the title of the course, the hallmark of the university that supports it, or the teaching team who leads it. In the end, our expectations are not met because the course is too basic or general, and does not provide that extra value we were looking for to improve our education or curriculum. Again, consulting the course description, introductory video and required or recommended materials can give us valuable clues as to what we can realistically expect.
4. **Fatigue of use**: MOOC methodology is based on viewing videos generally made in a master lecture style. Video viewing can be interesting or extremely boring. New MOOCs should move towards more comprehensive pedagogical models that integrate active student participation and cooperative and collaborative development. Videos have the advantage of being downloadable and displayable on any mobile device (smartphone or tablet). This makes it possible to follow the course over multi-platforms and allows ubiquitous learning across a wide range of contexts (most of the time these videos do not present a visual demonstration so they can be played in the car in mp3, while walking and carrying a smartphone, or from any other location that permits good hearing).
5. **Poor and chaotic instructional design**: the design of MOOCs is not always as neat as it should be, depending on the platform. Sometimes the interface is so simple and features so scarce, it feels like watching youtube with a few control tests rather than an interactive and participatory course. In other cases, the platform offers features such

as thematic, non-moderated forums where interventions are either over-abundant or too scarce, failing to provide educational quality.

6. **No collaborative or participatory work**: simple video viewing with no added features undermines the concept of community as well as of active and collaborative student work. This is one of the major problems to be overcome by current MOOCs to prevent growing disinterest among participants.
7. **Feedback from teachers and students**: there is usually no feedback on student development and contributions in massive open courses. One monetization proposal is to offer more personalized tutoring to compensate. Teacher feedback is necessary if you want these courses to achieve a minimum quality standard. Trusting that mere student participation will lead to active learning is fanciful. Moreover, high rate of participation makes tutoring and feedback unrealistic too. How can you provide follow-up and feedback to so many registered learners? This problem will require more productive functionalities consistent with the internal dynamics of the platforms and their IT architecture.
8. **Unexpected costs**: sometimes MOOCs generate hidden expenses like recommended books or certificates. Often students do not receive sufficient information prior to enrollment. The information provided at the beginning of each course should be as comprehensive as possible. Students would avoid unnecessary fees and teachers a high rate of fictitious registrations.
9. **Wandering students:** Many students marauder and end up enrolling in several courses out of curiosity, to check out their level and characteristics; they end up trying to complete one course while dropping out of the rest. This could be avoided by clarifying objectives and being explicit about main features and target skills in the initial video presentation.
10. **Learning vs. accreditation**: some students approach these courses to fill gaps in their resume, seeking to enrich their educational profile by using the appeal of a certificate from a prestigious university (Harvard, Stanford, etc.). Students should be aware that the essence of these courses is free education and not certification. Therefore accreditation, when offered, requires separate assessment that comes at an extra cost.

Final Thoughts

MOOCs are generally defined as distance learning courses designed for a large number of students (initially unlimited), that are worldwide, participatory and open (initially free). Pedagogical theory underlying MOOCs implies changes in the teaching model. The teacher does not exercise as

such, nor becomes a tutor. Participants are those who collaborate with each other, generating knowledge. The creation of a network between students and teachers, the provision of content and participation in forums and discussions form the basis of the learning process. What is most interesting about the MOOC concept and process of conceptualization is not its full potential, but precisely the complete lack of conceptual framework to provide consistency within the complex ecosystem where it takes place. The underlying theory –not fully put into practice as yet– proposes the creation of an individual cognitive circuit consistent with the dynamics of a complex network of learning.

MOOCs are still in consolidation phase and have a long way to go, therefore, there is no explicit set of skills and express competences. In a general assessment, Cobo Romani (2007:7) defines a set of skills for open models generally (thus applicable to MOOCs), complemented by a wide range of cognitive skills:

- Capacity for innovation
- Creativity
- Digital literacy
- Production of knowledge
- Ability to solve problems in different contexts
- Ability to continuously renew knowledge
- Ability to use different technological resources
- Smart use of information and knowledge management
- Collaborative behaviour
- Learning by sharing
- Ability to work in cooperative networks
- Inventiveness and intuition
- Adaptability to different contexts and environments
- Analytical thinking
- Ability to learn through experimental approaches (experiential learning)
- Ability to analyse and solve problems

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Chapter 3.
Creating and Participating in MOOCs

> Participation in the Information and Communication Society is no longer understood in terms of Internet access. In digital society, an individual's development follows two principles that derive from two descriptors proper to our complex networked world: creation and participation. An individual in the 21st century must be able to create and disseminate digital content as well as participate actively in the digital world. In this decade, an individual who is not able to create and participate in a network will clearly start to be at a social disadvantage.
>
> Vázquez Cano, 2013

Introduction

In this chapter we take a tour of main platforms and institutions offering to take and/or create MOOCs. A great number of MOOCs covering almost all areas of knowledge are available today. Some of these courses are completely free and offer a basic or advanced course generally without official certification. Others provide affordable courses and certification at a charge after evaluation of acquired skills. There is a very wide range on offer so the following review centers on main platforms to date. Every day new proposals are incorporated into the existing range but they closely copy functionality and structure of existing courses. In the final Annex, you can consult worldwide MOOC links and search engines to help you find the course of your choice.

Numerous proposals on the market allow you to not only follow but also create MOOCs with little IT knowledge. This facility allows teachers from all educational stages to create MOOCs themselves.

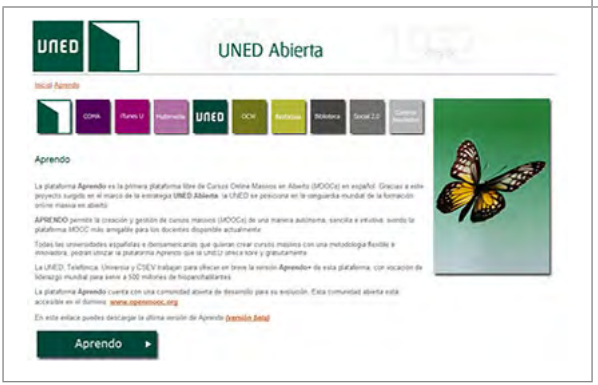
MOOC Platforms

Aprendo platform

http://portal.uned.es/portal/page?_pageid=93,25813991&_dad=portal&_schema=PORTAL

Figure 1

Aprendo platform homepage



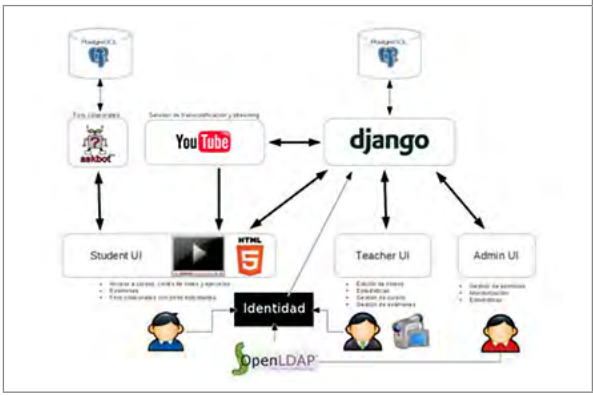
Aprendo is an open source software solution for the creation and management of massive online courses (MOOCs), whose software and development community are accessible at the OpenMooc site (<http://openmooc.org/>). It is promoted by Spain's National University for Distance Education (UNED), Telefonica, Universia and CSEV (Virtual Centre for Higher Education). Of note among the features of the platform, are its self-assessment activities and tools to assess progress and pace of learning. All Spanish and Latin American universities wanting to create their own massive courses using a flexible and innovative methodology can use the Aprendo platform provided by UNED openly and for free. This platform has an open-source development community.

You can download the latest version at: <https://github.com/OpenMOOC>. Its pedagogical architecture is presented below.

As shown in Figure 2, the platform is actively involved in new certification processes and integrated social networks.

Figure 2

Architecture of the Aprendo platform

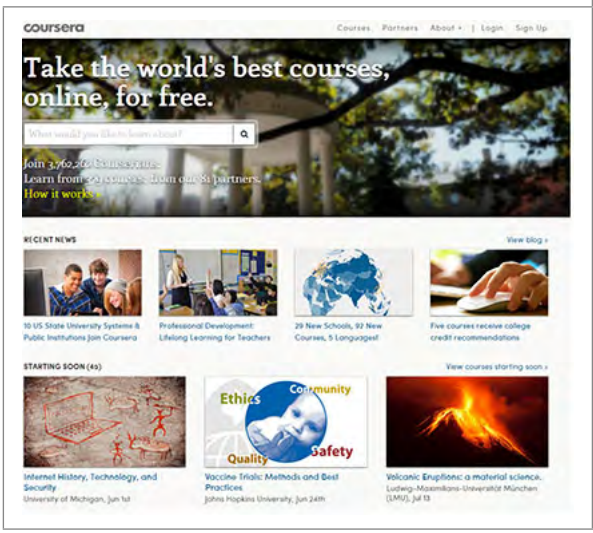


Coursera platform

https://www.coursera.org

Figure 3

Coursera platform homepage



Coursera was born in 2011 as an online education platform to provide free courses worldwide. Some of the world's top universities take part in Coursera, such as Princeton, Stanford, Brown or the Berklee College of Music, among many others (the full list can be consulted at coursera.org/

universities). The courses are free, mainly in English, and cover a variety of topics. There are courses in biology, business, computer science, economics, humanities, medicine, music, physics, history, etc. Many of them are introductory while others require a certain degree of knowledge in the subject area.

Registration on the page is free. Once registered, you can view all available courses and enroll in any one you want. Some have a starting date, others are scheduled. A week before the course starts (or days, depending on the teacher), a welcome email is sent to you giving a brief explanation on how the course will unfold. A virtual course is enabled so students may become familiar with different sections. These vary, but they are usually built along the following design:

- *Class Schedule/Course Calendar*: the weekly course schedule is described here. It also indicates objectives of the lesson, videos or recommended reading, tests or assignments, etc.
- *How the course works/Course Information*: explains how the course unfolds.
- *Video Lectures*: Videos recorded by the teacher with explanations on each topic. Each video lasts on average 15 minutes and each lesson contains several video lectures.
- *Quizzes/More to learn*: knowledge tests.
- *Writing Assignments*: assignments are read and delivered here.
- *Discussion Forums*: forums where students (up to 70,000 or more in each course), teachers and support staff can meet and discuss.

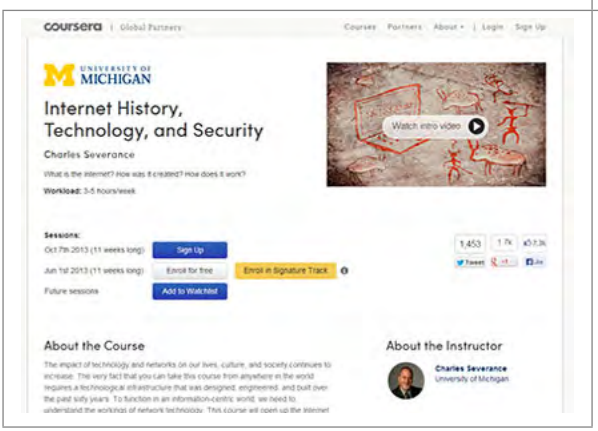


Figure 4

Homepage of a typical Coursera course

Study groups by language, country or interests often form, for example groups of Spanish-speakers or groups of homeschoolers.
- *Frequently Asked Questions*: This section contains important information, such as recommended reading or whether or not a certificate of course completion will be delivered.
- *Join a Meetup*: for students from all over the world to meet up.
- *Subtitles*: the course provides English subtitles to help understand videos, but some pupils altruistically add subtitles for other languages. Different sections adapt to the teacher's way of working, but all courses have a similar structure.

Some courses require intensive study. You have to watch the videos, undertake suggested reading, perform tests, write essays (in English) and comment on peer assignments. Given the large number of students, tests are reviewed on a peer to peer basis, and students themselves must contribute by reading and commenting the work of others. Generally a lot of good will goes into helping students who are not proficient in English. Courses may last between 4 to 11 weeks, and ideal workload is 8-10 hours per week, although students organise their study time as they wish.

OpenClass platform

http://www.openclass.com/open/home/index

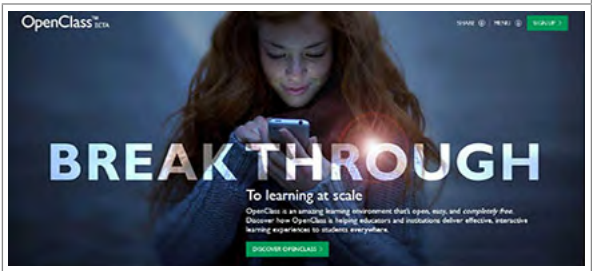


Figure 5

Homepage of the OpenClass platform

OpenClass is a free platform launched by Pearson Publishing. It is cloud-based so it requires no installation or maintenance from potential users. Two notable features of OpenClass are its integration with Google Apps for Education and the fact that it is completely free of charge.

The platform has all specific LMS functions to be able to manage courses. It uses the latest and most effective social network technologies to foster collaboration and communication between students, teachers and institutions. It is also built for mobile devices, with the goal of making it easier to connect from anywhere. A new application has even been built

especially for iPad. At present, it is optimized for U.S. educational institutions, and although its main characteristic is its integration with Google, it also offers the possibility to create courses directly from the platform and provides spaces for students to collaborate. The aim of OpenClass is to foster communication between students, teachers, institutions and administrations dedicated to worldwide education. This learning environment is not devoid of criticism though as many believe Pearson is in fact pursuing business interests.

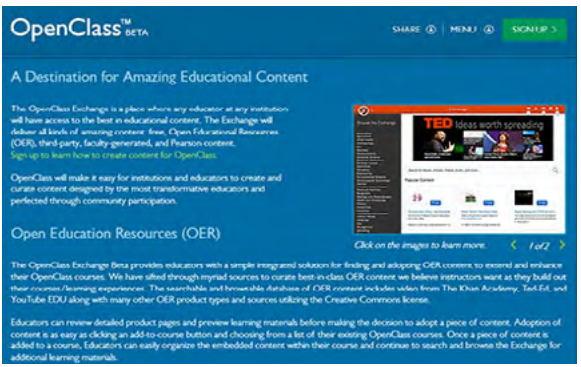


Figure 6

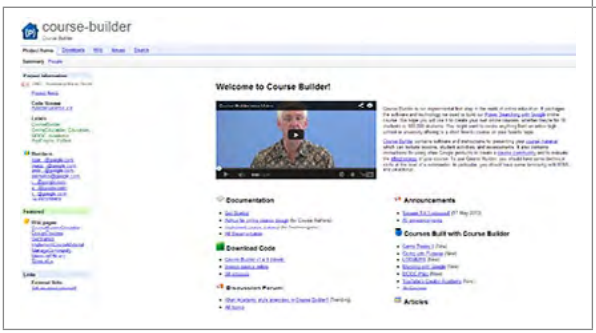
Sign-up page in the OpenClass platform

This MOOC platform is mainly based on Open Educational Resources (OER). It therefore provides openly licensed and developed free learning and teaching materials that can also be found on other MOOC platforms and websites on the Internet.

Course Builder platform

https://code.google.com/p/course-builder/

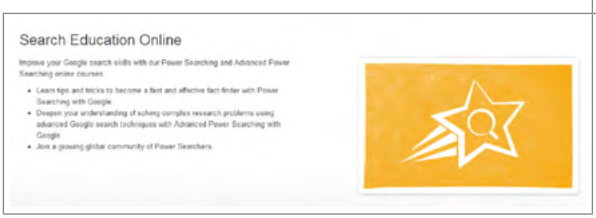
Figure 7



Download page of Course-builder system

Google Course Builder began as an experiment at Google to create a MOOC called "Power Searching with Google". Following the success of this course, and of MOOCs generally, this tool has been increasingly developed by Google and other entities (it is open source) and its use has been extended by some successful initiatives such as "UniMOOC – Aemprende"(<http://unimooc.com/landing/>). The software was developed by Google for its "Inside Search" (<http://www.powersearchingwithgoogle.com/>) course.

Figure 8



Philosophy and objectives of Course-Builder

It is available to anyone in the community wanting to build a platform. Specifications in Course Builder warn ahead that the capacity is 10 to 100,000 students, although the Google course received over 270,000 students. One must bear in mind that Course Builder is not easy to install. You must have some knowledge of programming, particularly in:

- Creation of materials for both online courses and face to face teaching.
- Knowledge of HTML.

- Knowledge of Javascript (especially arrays, objects, and regular expressions).

It is also recommended (but not required) to be familiar with Python and App Engine as these two technologies are those used to install the software on your server. This tool is highly recommended for both companies and universities wishing to enter the world of MOOCs (e.g. the UniMOOC course at the University of Alicante is made with Course Builder).

Figure 9

UniMOOC course and requisites to install Course-Builder

Lore platform

http://lore.com

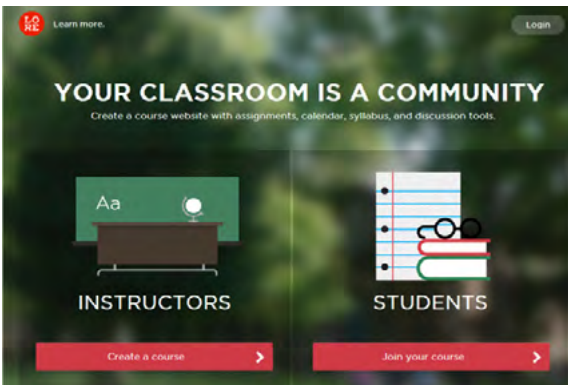


Figure 10

Homepage of the Lore platform

Lore is defined as a community of observers, covering all disciplines, countries and ages. It can be described as a platform for learning within a new space for education, which you can explore. Its slogan reads: "*We need* a *place* where *everyone can freely teach* and *learn*–where *we can invent new ways* of *educating*, and refresh the *best* of the *past*".

This platform –formerly known as "Coursekit"– was launched in July 2012. The new version is not just an update, but an entirely new architecture built in the first half of 2012. Its CEO and co-founder, Joseph Cohen, said the goal was for Lore to become a global interconnected community website for teachers and students. Some new features were introduced such as user-friendly design. Its main characteristics can be summarized as follow:

- *Advanced design of profiles*: Teachers and students are given a personal profile showing their background, academic achievements and aspirations (as an integrated portfolio relating to other profiles). New profiles resemble a cross between "about.me" and profiles of popular social networks such as Facebook, LinkedIn or Google+. Users can add their resume, links to websites or blogs. The profile also shows the person's status in the educational world. It works quite well for students looking for an internship or a job because you can add your profile URL to your CV or, in some cases, replace your complete resume with the Lore profile.

- *Take open and global courses*: the second major change is that instructors can open their courses to the world. The general public can now audit open courses similar to those on platforms like Udacity or Coursera. This is useful when contents become a commodity, which is what happens with platforms or services. The other big change is that a context can be created around the content. In the case of Lore, the value of this context is its community. It has an Academic Groups section. The community starts off with a course's instructor and students, but does not end there. Like on Facebook, students can talk and interact with others outside the course or school.

Since its launch over a year ago, more than 600 teachers have registered with Lore, some of them from prestigious universities such as Harvard, Princeton and Stanford. To finish, Lore is free to use and will always remain so according to the website. A mention in the Help page says: "Lore is totally free (and always will be).We have great investors who enable us to focus on building great products for students and instructors without having to charge". Another issue raised is the business model and whether contents should come at a charge (Paypal is clearly behind this). Their reaction to the prospect of making money is as follows:

"Our business model is very different from other providers of learning management systems; they are not directed to schools as a whole, but rather to individual courses. It comes down to the idea that a platform with millions of students and teachers is invaluable, because it could be exploited to distribute contents and software. There are many possibili-

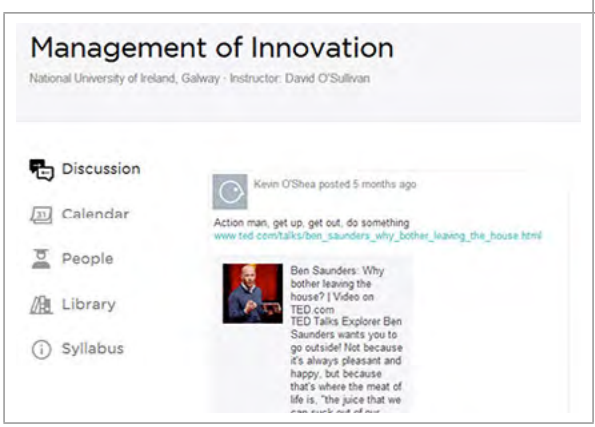


Figure 11

Example of the start of a course on the Lore platform

ties for the future, but for now our focus is on building the platform and providing a great experience."

Canvas platform

https://www.canvas.net

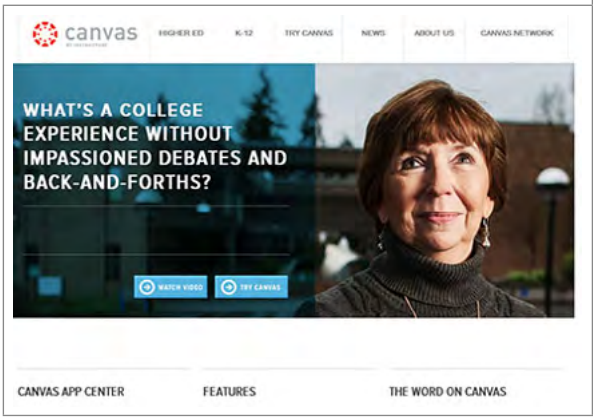


Figure 12

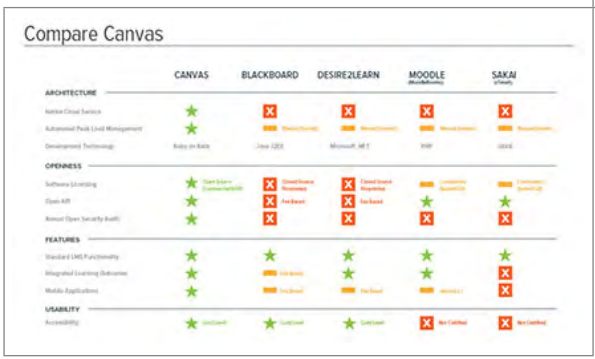
Homepage of the Canvas platform

Canvas Network has a motto that says: "Open online learning, defined by you." This open online course network provides teachers, students and institutions with a place and a platform to define the world of online learning in a way that makes sense to everyone. One of its features is the ability to create your own MOOC courses. The materials can be created in different languages and can be accessed from various devices, including mobile devices. It also lets users create and receive messages through social networks and SMS.

Different functionalities are available when designing the course, among which: creating a course from scratch or using pre-defined design templates; including a system for level assessment; video embedding; audio and graphic sources; video and chat integration; creating groups or learning teams; monitoring student activity in real time or integrating a calendar such as 'Google calendar', 'iCal 'or 'Outlook 'calendar.

If you decide to create a course in Canvas, you can choose to create the material by registering with your own free account or make prior tests to check course potential by using a pre-configured account (without registering, although this procedure does not allow you to save the changes you made in the project). With Canvas you can create courses or materials directed to any student profile.

Figure 13

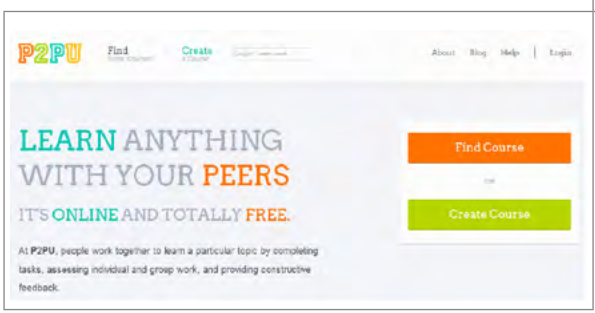


Comparative chart of the Canvas platform functionalities

P2pU platform

https://p2pu.org/es/

Figure 14



Homepage of the P2PU platform

Peer 2 Peer University (P2PU) is an online community of open study groups for short courses at university level. In order to enable "learning for all, by all, on almost everything," P2PU creates small groups of motivated students and supports the design and facilitation of free courses. Currently the project is in pilot phase, and offers scheduled courses that run for six weeks.

Each course contains a curriculum, materials, and a schedule. Learning takes place in small groups of 8 to 14 people and is based on the co-evaluation of content among students. Ultimately, the goal is to become a platform for anyone who would like to organize, design and deliver courses. P2PU has partnerships with companies such as Mozilla that have already created schools on the P2PU platform such as "School of Ed" and

"School of Webcraft". Novelties P2PU has to offer are first of all, the fact that it offers courses in many languages including Swedish, Dutch and Chinese, in addition to Spanish and English; second of all, it has 15 new courses, among which one on Content Curation, another on Screencasts and even one on web writing.

P2PU has the support of the Hewlett Foundation, the Shuttleworth Foundation and the University of California at Irvine.

Udacity platform

https://www.udacity.com

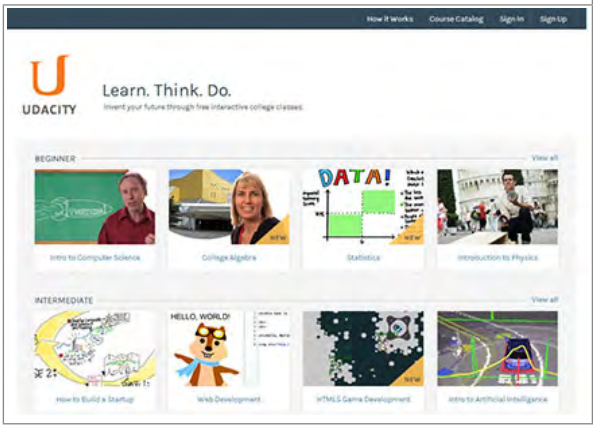


Figure 15

Homepage of the Udacity platform

Sebastian Thrun was a renowned German professor of artificial intelligence at the University of Stanford. After giving a successful online course in 2011 called "Introduction to Artificial Intelligence", he became fully aware of the potential of this new form of free and interactive education. More than 160,000 people participated in the course, a far cry from Thrun's 500 or so annual college students.

That encouraged him to leave his position at Stanford and found together with David Stavens and Mike Rokolsky, a free online university called "Udacity" that started in early 2012 with an introductory course on search engines. Since 2012 Udacity has gradually been incorporating more courses related to different knowledge areas. Some courses, with an eminently scientific and technical background, are divided into four main categories: Business, Computer Science, Mathematics and Physics that

are themselves divided into three levels of difficulty: beginner, intermediate, advanced.

All courses have open registration meaning students can enroll in one or more courses at any time after they've started. Courses consist of several units comprising video conferencing and integrated tests to help assimilate ideas and to properly understand knowledge progressively acquired. Udacity does not issue any official diploma such as those granted by traditional universities. At the end of the course, students receive a certificate of completion signed by teachers which specifies the level of achievement. Main features are:

- *Simplicity*: the interface is simple and consists mostly of videos and options to navigate between themes and lessons.
- *Integration*: progress within a lesson or in the overall course, can be consulted and very pleasantly unfolded by way of coloured bars in the "My Courses" section. Discussion panels are inserted under the videos, to keep up with questions and comments in the community on any given issue.
- *Adaptive Design*: because courses are frequently accessed from mobile devices and computers with different screen sizes, a "responsive" design feature adapts the size of the browser window. It has also been optimized for faster loading and lighter interaction.

Figure 16

Page describing the Udacity concept

We should remember that the initial Udacity proposal, like that of other similar platforms, was based on a knowledge transmission model to reach a greater number of people.

UnX platform

http://www.redunx.org/web/guest/home

Figure 17

Homepage of the unX platform

unX is a Latin American and Spanish community that gives all entrepreneurs a collaborative and open learning environment. It is part of the initiatives of "UNED Abierta" (Spain's Open Distance Learning University). unX is the first Latin American community focusing on digital enterprise to provide all participants with an entirely open collaborative, training and learning environment. This online community is based on a social website and open learning platform where courses are delivered in Spanish and Portuguese by different universities. unX offers a large choice of openly accessible online courses (MOOCs), including the free use of educational resources. Open education initiatives proliferate in the English-speaking world, for example Coursera, P2PU, or Edx. The original aim of the unX project is to reach the Latin American world, and turn Spanish and Portuguese into leading languages in open online learning to support professional development in the digital era. The unX project got started with the collaboration of the CSEV (Virtual Centre for Higher education) and

Figure 18

Courses on offer in unX

prestigious institutions such as Spain's National University of Distance Education (the "UNED"), Telefónica, Banco Santander and Universia. Renowned universities such as the Massachusetts Institute of Technology (MIT) – have joined in to offer courses.

From the beginning Unx has been welcoming contributions from all players in the educational and technological domains willing to enrich this project and its broad Latin American and Spanish reach.

UniMOOC platform

http://unimooc.com/landing/

Figure 19

Homepage of the UniMOOC platform

UniMOOC was built with with Google Course-Builder and specializes in entrepreneurialism. It is sponsored by Spanish Universities such as the Menéndez Pelayo University, the University of Murcia and the University of Alicante.

UniMOOC is created by and for entrepreneurs based on the MOOC model. It is openly accessible and brings together two trends that are currently upturning the world of the internet: learning and entrepreneurship. Lessons are given by successful entrepreneurs, educators, researchers and experts who want to share their knowledge in order to build a culture of entrepreneurship in addition to presenting the keys and tools to successfully undertake online.

UniMOOC AEmprende is a collaborative project originally driven by the Institute for International Economics of the University of Alicante, with participation from different organizations. It is aimed at enterprising and innovative people wanting to reinvent themselves, to professionals who wish to contribute more to their work, or to individuals wishing to start a personal project.

edX platform

https://www.edx.org/

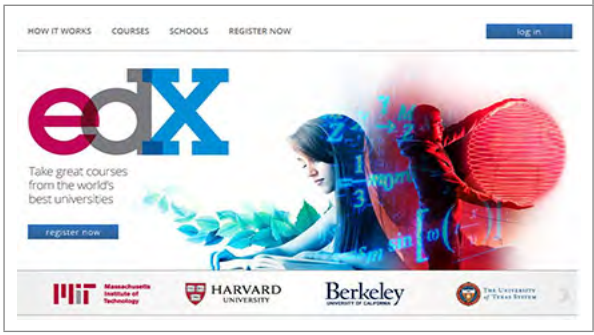


Figure 20

Homepage of the edX platform

The MIT (Massachusetts Institute of Technology) launched the edX platform in partnership with the prestigious Harvard University. The OCW courses, now offered by most universities around the world, provide access to university-level materials over the web, cost-free and free of copyright. They do not account for distance learning however because they do not lead to certification or achievement accreditation. They do not provide access to other community tools such as forums, nor do they enable communication with teachers who give the same courses face to face.

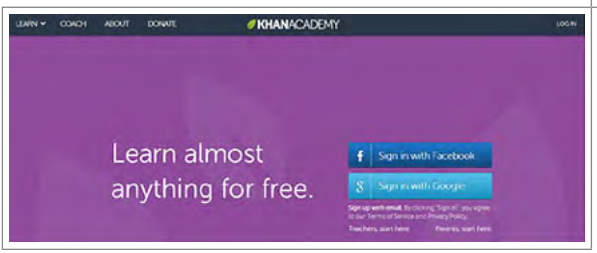
Courses on the other hand are free, and allow students who show sufficient skill to obtain a certificate of achievement, albeit at a modest charge. The open-source platform supporting the courses is especially designed for online learning and includes discussion groups, collaborative learning wiki tools, online laboratories and assessment tools, so students become aware of their progress during the course and set their own pace of study.

edX is especially designed for students from these universities, to expand their knowledge and dispose of the latest tools for distance learning. Nonetheless, MIT and Harvard University courses have in fact become available worldwide. This is so, because in addition to being a platform for distance learning, it is also intended as a tool for studying the learning process itself, i.e., to research how students learn and how technology can facilitate teaching both in the classroom and in distance learning contexts.

Khan Academy platform

https://www.khanacademy.org/

Figure 21



Homepage of the Khan Academy platform

The Khan Academy (Khan Academy) is an educational non-profit organization created in 2006 by Salman Khan (an American teacher, electrical engineer and IT specialist). With a mission to "provide high quality education to anyone, anywhere", the website provides a free, online collection of approximately 2,400 micro classes in video tutorial format stored on YouTube, covering different subjects: maths, history, finance, physics, chemistry, biology, astronomy and economics. One of the main missions of Khan Academy is to foster autonomous education, where students can learn more interactively and at their own pace. They also dispose of software to perform exercises, so they can continue learning. Thanks to the magic of online volunteering, a growing number of courses are being translated into an extensive number of languages. In the video below, the founder explains the philosophy underlying his project: <http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html>.

Figure 22

Explanatory video by the founder of Khan Academy

Udemy platform

https://www.udemy.com/

Figure 23

Homepage of the Udemy platform

Udemy is a new platform for managing online courses. It is an online service where you simply sign in or access directly with your Facebook account to start creating courses, selecting their corresponding categories and subcategories, and indicating the level of access, which can be public access or expressly limited to invited users.

You can upload materials, such as PowerPoint presentations, videos or audios; create articles; import documents from other sites, as well as create live sessions using tools for interaction with others. The main advantages of this platform include:

- For the learner: a wide range of courses (there are more than 5,000) for all budgets, some are free and the rest are generally inexpensive.
- All courses have a homogeneous interface design and, in addition, Udemy has released an app for the iPad.
- Reliable shopping. Courses have to meet quality requirements and get approved by Udemy before being uploaded to the platform. Currently around 60% of instructors requesting approval are accepted. Udemy also provides information on functionalities of their courses, among others: sales video; detailed course description; course shares on social networks; number of students having taken the course; their grades; their testimonials and reviews; prerequisites to take the course; instructor name and biography; information on whether or not there is a reimbursement guarantee and its terms and the time you have to access course materials.

- For teachers: free course hosting, though Udemy takes a 30% commission on every sale your course makes, when the buyer is a Udemy visitor. If you sent the buyer yourself through a customized affiliate link, they only charge 15%.
- Your course gets a meticulous design, a predefined structure for its content and an interface specifically conceived to facilitate learning. As a result, attendants will have an improved course experience.

Udemy receives over 500,000 visits each month, and has about 400,000 users (according to GigaOM). There is an affiliate program so that others can advertise and sell your courses for a fee. Udemy does not have exclusivity on your course. The course may be sold elsewhere at the same time and property of course content is maintained. Udemy offers great potential, as shown by its sales figures:

- A quarter of the instructors will close the year with revenues of at least $ 10,000 obtained from selling their Udemy courses.
- The 10 highest earning instructors in 2012 totalled $ 1.6 million in sales. For example, Victor Bastos earned about $ 325,000 in a year, with his web development course. David Nightingale made $ 31,000 in four months with his black and white photography course. And the most interesting case of all is that of Miguel Hernández (a Spaniard) of Grumo Media: in his course promotion video, he claims to have earned $90,000 in a single year.

Case study: Miguel Hernández of Grumo Media

Miguel Hernandez is the founder and CEO of Grumo Media, a company specializing in creating videos that explain in a concise, clear and entertaining way the products and services offered by other companies. In other words, they create videos to better sell your products or services, both to draw investment to your startup and to attract future customers. Miguel Hernández currently gives 6 Udemy courses, five in English and one in Spanish. All six courses accounted by June 2014 for a total of 5,924 students, and the cost of his courses ranges from $97 to $297. The latter being the most successful course (How to Create an Awesome Demo Video for Your Business) with 2,400 students. Despite being Spanish he is giving courses in English. His English is not perfect but that does not stop him from reaping significant success from his courses (and his company). Miguel clearly shows that “Yes You Can”.

Miríada platform

http://miriadax.net

Figure 24

Homepage of the Miríada platform

In Miríada X we can find MOOCs from 1232 universities in 23 Latin American countries and Spain, among which, for example, the Carlos III University of Madrid, the Polytechnic University of Valencia and the Polytechnic University of Cartagena. As usual, each course is organized into modules to make it easier for students to follow them. These modules include publications, lectures and audiovisual material narrated by teachers in charge. Forums let you ask questions and engage with other members of the community. Each module ends with evaluation and some courses require an end assignment.

Organization and duration of the courses

In the top menu of the webpage, under the "cursos" section, you can see what courses are available with the dates and duration of each. To make it easier to find a particular course, an index on the left organizes them into subject areas.

For teachers

If you are a university professor and you want to know what tools Miríada X can offer to create your own MOOCs, you need to request access to the platform by email to: <info@miriadax.net>.

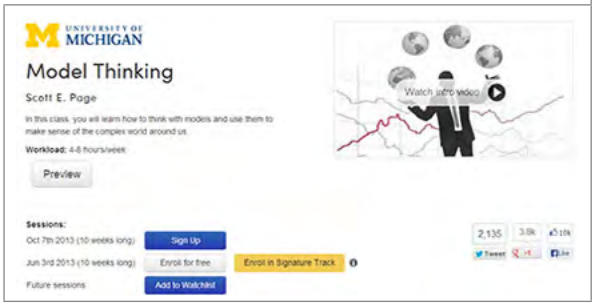
Figure 25

Examples of a Miríada platform module

Which Courses are most successful?

Success depends on course subject and other internal and external aspects related to design and content. As an illustration, Coursera published its ranking of registrations as of April 2013. It is interesting to take a closer look at subjects and formats in this ranking to deduce possible reasons of popularity. Below we describe the basic features of these courses. For further information on each course follow the web link.

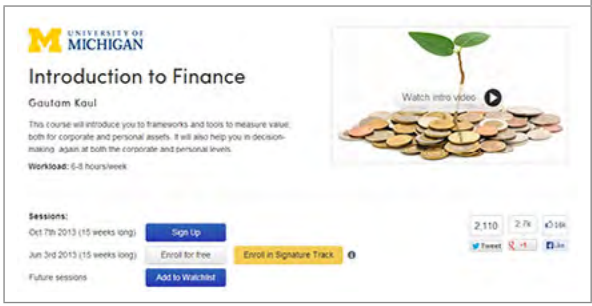
- Model Thinking (University of Michigan)
  https://www.coursera.org/course/modelthinking



Registered pupils: 202,360

Duration: 10 weeks (4-8 hours of dedication a week)

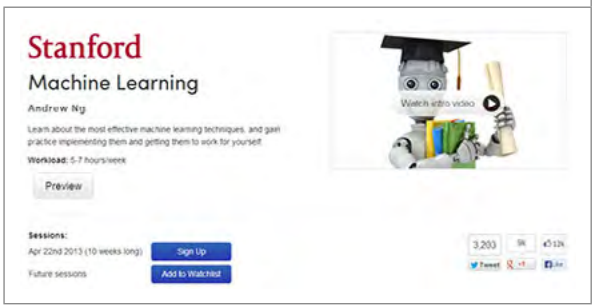
- Introduction to Finance (University of Michigan)
  https://www.coursera.org/course/introfinance



Registered pupils: 199,668

Duration: 15 weeks (6-8 hours of dedication a week)

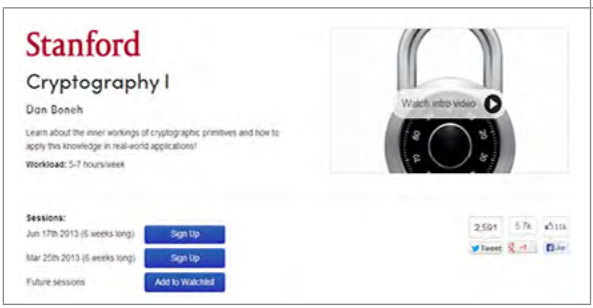
- Machine Learning (Stanford University)
  https://www.coursera.org/course/ml



Registered pupils: 182,670

Duration: 10 weeks (5-7 hours of dedication a week)

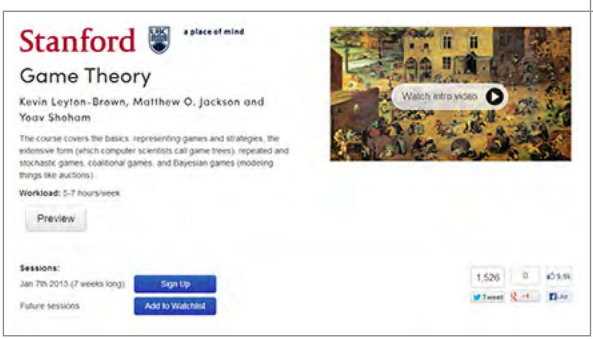
- Cryptography I (Stanford University)
  https://www.coursera.org/course/crypto



Registered pupils: 178,915

Duration: 6 weeks (5-7 hours of dedication a week)

- Game Theory (Stanford University)
  https://www.coursera.org/course/gametheory



Registered pupils: 174,104

Duration: 7 weeks (5-7 hours of dedication a week)

The next 5 courses in number of enrollments in Coursera were:

- Think Again: How to Reason and Argue (Duke University).
  https://www.coursera.org/course/thinkagain
- Learn to Program: The Fundamentals (University of Toronto).
  https://www.coursera.org/course/programming1
- A Beginner's Guide to Irrational Behavior (Duke University).
  https://www.coursera.org/course/behavioralecon
- Data Analysis (John Hopkins University).
  https://www.coursera.org/course/dataanalysis
- Introduction to Philosophy (University of Edinburgh).
  https://www.coursera.org/course/introphil

What Accreditation do you obtain?

Students' experiences during the courses are one of the best ways to assess their features. In the next section we reflect on different types of accreditation obtained from different MOOC platforms.

Miríada Certificate

http://miriadax.net/

Miríada provides the following certificate:

Figure 26

Example of certificate from the Miríada platform

You can see on this certificate the platform's logo, the student's name, and as you may have noticed, it uses the word "participated" instead of "completed" or "passed". What does "participated" refer to? In MiríadaX own words, it signifies having completed at least 80% of the course. In Miríada courses, each module is divided into a number of sections, so if you complete them all, you reach the much coveted 100%. The problem is that each section, regardless of its nature, contributes the same amount to the total. That is, if a module has 20 sections, each one equals 100% / 20 = 5%. Be it a video, an intermediate test, a final exam, or a simple introductory text, each contributes equally to the final percentage. So what is the problem? In several courses, it is possible to achieve a higher percentage than 80% in modules by simply pressing the Next button, and without actually inspecting the contents of the videos. Furthermore, as evaluations are essentially performed via multiple choice tests over multiple attempts, passing is relatively easy. What value can you give to these

certificates from an academic or professional viewpoint? Probably a symbolic one.

Moreover, neither the name of the university nor teacher appear in the certificate. Miríada makes the following comment on this issue:

> This recognition does not establish, in any way, that the designated person is a student enrolled at the university responsible for the course in Miríada X. Nor does Miríada acknowledge any credits or diplomas, degrees or accreditations of any sort by the university.

Coursera Certificate

https://www.coursera.org/

Coursera provides the following certificate:

Figure 27

Example of certificate from the Coursera platform

Coursera also warns ahead about the type of accreditation granted. For example, the course with the largest amount of enrollments –"Model Thinking"– makes the following statement:

> PLEASE NOTE: The online offering of this class does not reflect the entire curriculum offered to students enrolled at the University of Michigan. This statement does not affirm that this student was enrolled as a student at the university of Michigan in any way. It does not confer a university of Michigan grade; it does not confer university of Michigan credit; it does not confer a university of Michigan degree; and it does not verify the identity of the student.

More explicitly, this implies:

- The course content may not be identical to that offered at the original university.
- The fact that you've taken the course does not mean you've been a student at the university.
- Accreditation is not delivered by the original university.
- Completing the course does not confer you credit at the original university.
- Taking the course obviously does not grant you a degree from the university.
- The certificate is issued without verification of student identity.

Other Certificates: edX and Udacity

A recent edition of the course you can take on the edX platform: 6.00x: *Introduction to Computer Science and Programming*, provided the following diploma:

Figure 28

Example of certificate from the edX platform

However the *Web development* course by Udacity for example, grants the following diploma after completion:

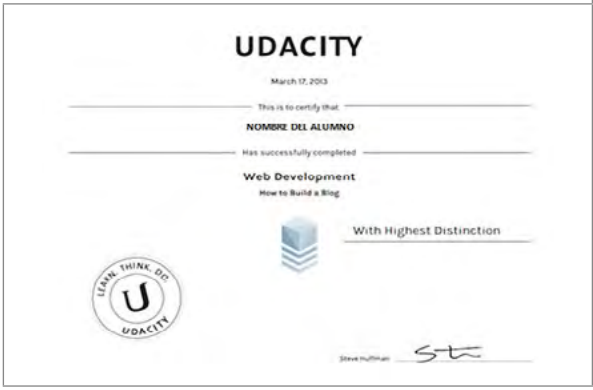


Figure 29

Example of certificate from the Udacity platform

As you can see in all of these diplomas, the teacher's name and signature are included, as well as the institution where they are currently appointed (except in Udacity). There are significant terminological differences: "participated" does not mean the same as "successfully completed", nor is mentioning "I participated in a course on web development" the same as to say "I have successfully completed a course on web development given by **Steve Huffman**, creator of Reddit himself" (<http://en.wikipedia.org/wiki/Steve_Huffman>).

Final Thoughts

Unquestionably, open education offers endless resources to model and offer information in course format; it leads to a vast catalogue of courses where we can pick those that particularly motivate us or complement our education. MOOCs open up new opportunities for development in Higher Education. It is our duty to explore, analyse and integrate the most interesting proposals in the development and learning of present and future generations. The sheer range of MOOC courses and platforms is reaching a pedagogical saturation point and they will possibly start to drift towards more sustainable models.

We cannot provide an in-depth analysis of all platforms and courses on offer. When taking or giving a MOOC, an ever-expanding array of pos-

sibilities lays in front of us. Our choice naturally depends on the course's context and resources at hand. In addition to the sample of platforms presented here, you can also consult the following:

- **Energy University** offers free online educational courses, with more than 200 courses on energy issues and efficiency, helping to identify, implement, monitor and improve efficiency. Courses are offered anytime, anywhere, at your own pace and available on demand. You can choose between two certification options: Data Centre Associate and Professional Energy Manager (PEM) that provide the training and skills needed to enrich your curriculum and expand career options. You can supplement your training with education credits by more than 18 organizations that signed up.
- **FutureLearn** is the first free multi-institutional platform for open online courses in the UK. It will increase access to Higher Education for students in the UK and around the world, offering a wide range of high quality courses through a single website. It has associated with the British Library, the British Council and the UK's top 17 universities. Futurelearn is a private company owned by the Open University.
- **Crypt4you** is an innovative educational project from "Aula Virtual" ("Virtual Classroom") set up by the Thematic Network of Cryptography and Information Security at the Polytechnic University of Madrid. It offers a new format for free online collaborative education, which will provide lessons in cryptography and information security every fortnight. Each new subject offered in these courses consists in a set of lessons to be published on the website of the project every two weeks. Its authors are researchers and teachers who are members of this thematic network. The goal of Crypt4you is to become the gold standard of the Virtual Classroom for information security in the Spanish language.
- **Stanford Free Classes** – From Quantum Mechanics to the Future of the Internet, Stanford offers a variety of free courses. Stanford's "Introduction to Artificial Intelligence" has been very successful. Check out the links to Stanford Engineering.
- **UC Berkeley Free Courses** – From General Biology to Human Emotion, Berkeley offers a variety of courses. See: Berkeley Webcasts and Berkeley RSS Feeds .
- **MIT Free Courses** – Check out MOOC MIT RSS feed. See also: MIT Open Courses .
- **Duke Free Courses** – Duke offers a variety of courses on iTunesU.
- **Harvard Free Courses** – From IT science to Shakespeare, students can now obtain Harvard education.

- **UCLA Free Courses** – Check out over 220 free courses on offer each year.
- **Yale Free Courses** – Open Yale, the school offers "free access to a selection of introductory courses taught by distinguished teachers and scholars at Yale University. The objective of the project is to expand access to educational materials to all who wish to learn.
- **Carnegie Mellon Free Courses**.
- **ITunesU Free Courses** – Free Apple app that offers students access to all course materials in one place. The application can play video and audio conferences, read books and view presentations.

Webgraphy

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See more at:

<http://www.thinkepi.net/los-moocs-viables-inquietantes-y-consistentes>.
<http://infinitasdimensiones.blogspot.com.es/2013/03/como-son-los-certificados-de-miriadax.html>.

Chapter 4.
Towards a Sustainable Model of Mass and Open Education

> I want and visualize and aspire toward a system of society and learning where each person is able to rise to his or her fullest potential without social or financial encumbrance, (...). Where they are able to form networks of meaningful and rewarding relationships with their peers, with people who share the same interests or hobbies (...). This to me is a society where knowledge and learning are public goods, freely created and shared, not hoarded or withheld in order to extract wealth or influence. This is what I aspire toward, this is what I work toward.
>
> Downes, 2011

Introduction

The MOOC movement has focused so far on implementing xMOOCs, which represents an encapsulated learning model rather than a commitment to participation, collaboration and competence learning. In fact the movement has to overcome a number of difficulties to be sustainable in the future, among which: instructional design; economic management or "monetization"; certification of the education offered; monitoring of learning and training; authentication of students; "Americanization" of the movement, and its approach to skill-building. This chapter tackles major controversies, difficulties and challenges faced by this mode of learning.

Not All that Glitters is Gold

Higher education is becoming a global activity and it appears the trend will continue to grow. After the initial boom of open and mass courses, analyses, questions and criticisms are beginning to surface around different aspects of the model, among which: their pedagogical design (Ward, 2011; Hardesty, 2012); monetization processes (Kolowich, 2013); authentication of participants (Hill, 2012: Young, 2013) and course cer-

tification (Daniel, 2012). These matters significantly affect the underlying philosophy wanting to promote "free and massive" courses. When courses start to resemble simple video viewing sessions upon which a series of self-assessment questions are built and revenue is generated by issuing certificates without identity authentication... what model are we actually talking about? The answer may be a traditionally behaviourist model in which knowledge is transmitted by one person –the instructor– and that same knowledge becomes the object of systematic and repetitive questions to check its conceptual assimilation by we-don't-really-know-who. If we then obtain a certificate by paying an amount of money, we can again question what kind of model this is. Could it be we have before us a monetized-capitalist model hiding behind apparent institutional altruism, anxious to generate a new emerging market for buyable certificates while waving the banner of free education?

The philosophical-pedagogical model underlying the original MOOC proposal is a different concept and so it should be, as the alternative is a traditional and impoverished model of e-learning. In a world of PLEs, LMS and Youtube, it makes little sense to develop and organize MOOCs on an insufficiently informed and faintly collaborative pedagogical design. Adopting this critical stance, we will now discuss the controversies and difficulties faced by the MOOC movement and propose alternatives for a more sustainable and conciliatory learning architecture in conformity with its original educational principles.

MOOCs: Network Turbocapitalism or Educational Altruism?

The direction taken until now has been based primarily on the xMOOC model. To our mind, this design must move towards a more sustainable course model; one that is indeed massive and open but that is also more collaborative, interactive and based on the development of professional and academic skills. Probably this kind of training should serve to generate skills that the university system is not alone to provide: *professional skills*. Skills essentially enable individuals to perform a particular action in conformity with certain standards, allowing them to develop a business or profession. University curricula are too rigid to consider emerging skills derived from the changing society in which we live, where today's skills are not necessarily valid tomorrow.

A significant gap exists between the rapid changes in the labour market and workers' personal subjectivity. Anxious workers proceed to build a set of skills that are considered important at a given time, but may become obsolete soon after (Alonso Fernandez and Nyssen, 2009). MOOCs could be used as a reference to cover this need for ongoing professional devel-

opment, arising from our post-Fordist society. Moreover, some authors criticize the fact that many of these skills are in fact acquired through an educational market, separate from the university world, leading towards progressive commodification (Brunet and Belzunegui, 2003) and increased costs: the "rat race" of skill accumulation ends up generating huge inequalities by setting a very high price to learning that guarantees access to quality jobs (think of the famous MBAs –Masters' of Business Administration). Workers are thus constantly under pressure to update their subject area knowledge and undergo continuous training. The fact that MOOCs are cost-free can help overcome these difficulties related to our economic, educational and productive system. They can also bring a solution to the demand for skills adapted to emerging market models. For this to happen, these emerging training systems must overcome many shortcomings to build a sustainable future, among which: instructional design; business model or "monetization"; educational accreditation; monitoring of learning and student authentication (Eaton , 2012 , Hill, 2012; Touve, 2012); the "Americanization of the movement" (McDonaldization of Education) and a skill development approach.

Towards New Pedagogical Design

Design of activities should be thoughtfully based on practice itself and the acquisition of new skills rather than on teaching content and its assessment. Many of these courses offer no more than a traditional class segmented into 15-minute audiovisual presentations where student competency level is diminished as it depends almost exclusively on rote and conceptual learning accompanied by mechanical "trial and error" assessment.

Added to this is the difficulty to channel dispersed content, conversations and interactions. Dispersion is part of the essence of MOOCs, but contents must be organized and facilitated to participants. MOOCs need content curators and new systems of self-assessment, automating and optimizing resources while remembering that students must also filter, aggregate and enrich the course themselves. Learning in a MOOC requires not only that participants have some level of digital competence but also be capable of self-directed learning which is not always the case.

Monetization

Another challenge for the design of these courses is their financing and subsequent business model. At present, universities are beginning to sign

agreements with companies for initial financing of open platforms and courses, but these investments are not made for free, and general strategies are set up to monetize these initiatives, among which:

- Certification (students pay for a course certificate or badge).
- Certified assessments (students pay for assessments to be reviewed, corrected and for feedback on their achievements and errors, to improve their training and learning).
- Student data (universities or companies pay for student-related data, to know their academic profile, and thus target advertising campaigns).
- Personalized tutoring (students pay to receive more personalized tutoring while the course unfolds).
- Sales of courses (development of thematic courses and platforms to be sold and integrated into other more widespread platforms).

The two most used options are certification and matchmaking students with companies looking for qualified employees (Young, 2012). Universities have most control over the processes of certification and payment for personalized tutoring, but both present problems. As far as certification is concerned, one of the main paradoxes of xMOOCs design is that for the time being universities do not recognise learning credits for validation in official studies. This trend is changing in some universities like Colorado State University's Global Campus and some European universities (Lewin, 2012). Another field to explore is profit made from recommended course bibliography, a source of income for many authors (Howard, 2012; Vázquez Cano, 2013). It has also been shown that books that show a sample online do better in sales over the web (Athabasca University Press, 2012).

Authentication of Participant Identity

Cheating, plagiarism and impersonation represent other major problems that should steer the design of MOOCs (Wukman, 2012). Work is mainly individual, but is sometimes done in pairs or collaboratively. However official or non official certificates are granted on an individual basis. Some feel that this is not an issue as certification is not a priority, but this is now changing with certification fees.

Recent progress has been made towards creating digital profiles including photos and digital signatures, although digital profiles that would supposedly authenticate participants also come at a price; Coursera raises a cost of $30 to $100 (Young, 2013; Fain, 2013).

McDonaldization of Education

We also run the risk, as pointed out by Jason Lane and Kevin Kinser (2013), of turning learning into a process of Americanization of education and culture. These courses were probably originally intended to give a worldwide reach to the American learning model, institutions and teachers. Current Higher Education philosophy is characterized by multiculturalism and pluralism as an identity basis in the creation of univsersity profile competences. Americanization seems to go against these principles and presents another challenge to overcome in the near future: adapting the MOOC movement to cultures, languages and cultural needs of different world regions.

Certification

Certification is a main pillar as it affects other parts of MOOC architecture: monetization; student authentication; etc., and contradicts the initial concept that was merely about learning and not accrediting. The way forward should be reconceptualizing the model towards ways of accrediting knowledge that would be more innovative, flexible and tailored to the needs of a labour market in constant evolution and growth as far as professional profiles are concerned. In this sense, badges may be a promising choice. Badges can be defined as displays of skills or accomplishments, in iconographic and structured identification format, based on criteria making it possible for related agents and peer-to-peer structures to grant and circulate them.

For these reasons, some teachers and researchers have come to question the validity of MOOCs as learning tools because of their poor instructional design (Armstrong, 2012). Another emerging problem is high dropout rates. An illustration of this is the course offered by MIT entitled "Circuits and Electronics" that attracted 155,000 students from over 160 countries. Out of the original number of enrollments, only 23,000 students took the first module, 9000 made it to half the course and 7157 completed the course. Of these, 340 students (including a 15 year old Mongolian) obtained the highest score in the final exam. These outcomes should make the creators of MOOCs reflect on instructional design. They should think of giving students a more active role, and modify evaluation test formats. Let us recall that the basic competences on which the EHEA is built are not reflected in the methodology and evaluation system used in these courses. They move away from the collaborative and creative work advocated by Higher Education designs and required for labour market professional skills.

Accreditation using Open Badges

A problem the education system has been dragging on for years is knowledge certification. Certification has always involved extremely long, costly and inefficient bureaucracy both for institutions and learners. Consider the cumbersome procedures involved in validating degrees in foreign countries, or the piles of paperwork and qualifications required from teachers who are competing for positions in certain universities. These rigid bureaucracies have hardly changed over the years, even though the social context has changed and the Internet has revolutionized information exchange.

Moreover, there has been a fundamental change in education over the last two decades as a huge amount of new learning spaces are opening with the popularization of the Internet. In recent years, endless possibilities have emerged for self-directed learning, teacher-student encounters in online contexts, or peer to peer learning to name but a few examples. All of these instances, however, have hitherto remained largely outside what is considered serious, formal education. Thus, when looking for work, almost all actors involved tend to overvalue "official titles" awarded by universities or centres accredited by ministries, and the skills and knowledge acquired over the Internet are undervalued. However, these informal skills carry enormous weight in our new economy and society. Peer-to-peer production communities, typical of this era, are based purely on the ability of each person to make contributions to a project. In this context, while "traditional" training and education may contribute (sometimes a lot), it is not the standard by which the capacities of individuals are measured.

Even so, certifications can still be useful in many contexts. They are definitely necessary in some cases to know people's skills, or to have some standardized criterion to tell if someone is qualified for a particular job. But for this to be feasible today, certifications must take into account new types of learning spaces, and adopt a flexible, portable and non-bureaucratic format for accrediting knowledge. To summarize, certifications are a form of communication, they are symbols that allow us to say who we are and get recognition from the community. For this reason, just as communication has become more horizontal and democratic, certifications must also be reborn under a new, more democratic paradigm, based on equality, on the recognition of specific contributions and on the trust inspired by communities and institutions. In a proposed definition (Dominguez and Gil, 2011), a badge is a symbol or an indicator of achievement, ability, quality or interest. From geolocation games, to processes to assign evaluations to actions and skills, many processes use badge award systems for setting goals, motivating behaviour, representing achievements and communicating success in many contexts.

A badge system becomes a new form of accreditation and certification, where proving skills can reveal achievements and capabilities of interest to internal and external evaluating agents. The badge system also gives students more control over their own learning and proof to give it credit. It provides them with great autonomy for job searching, comparing their knowledge with others, or finding other communities of practice in which to improve their skills. Badge-based skill accreditation systems (VV.AA., 2011) are particularly suitable for online learning environments.

In these spaces learning not only occurs during school time, but extends to many other contexts, experiences and interactions. Learning is not merely an isolated or individual concept, but it becomes inclusive, social, informal, participatory, as well as creative and lifelong. Therefore, it is not enough to think of learning as an investment of time in a particular scenario at a certain stage, but rather that students are active participants and also producers in a learning process driven by interest. The concept of "learning environment" refers not only to a class or online space, but covers many areas in larger environments, distributed network connections extensible over a period of time and flexible space (Siemens, 2006). And through these learning environments, students are offered multiple ways to acquire skills and perfect their abilities through open, transparent processes and remixable tools, multiple resources and procedures. In this type of connected learning, borders are broken and barriers are down. The educator's task is to support students so they reach their full potential. Currently, several projects are flourishing to integrate Open Badges with Facebook, Twitter, Linkedin, WordPress, Moodle, Drupal, Joomla and many other services and applications. Of course, the success of Open Badges depends on there being a large community of users and developers who sustain the certifications ecosystem. So far, the response from the educational community has been extraordinary, and forums and discussion groups are generating the most diverse initiatives to foster Open Badges. This is because Open Badges undoubtedly solves an eternal evaluation problem for teachers, learners and institutions as commented earlier. The initiative also presents two desirable features: it is open and collaborative.

The Mozilla Open Badges Model

Mozilla Open Badges is a Mozilla Foundation project, fruit of the collaboration between institutions and many people. According to its website Open Badges is intended for "the recognition of skills and achievements that happen online or outside the education system." Specifically, digital badges are badges or medals awarded by a person or institution A to

a person or institution B, for a specific achievement. In addition, these badges are portable, since people who have earned badges can display them on various websites. Last but not least, anyone wanting to know about someone else's achievements can click on the appropriate badge and be directed to the website of the issuer, which gives further details.

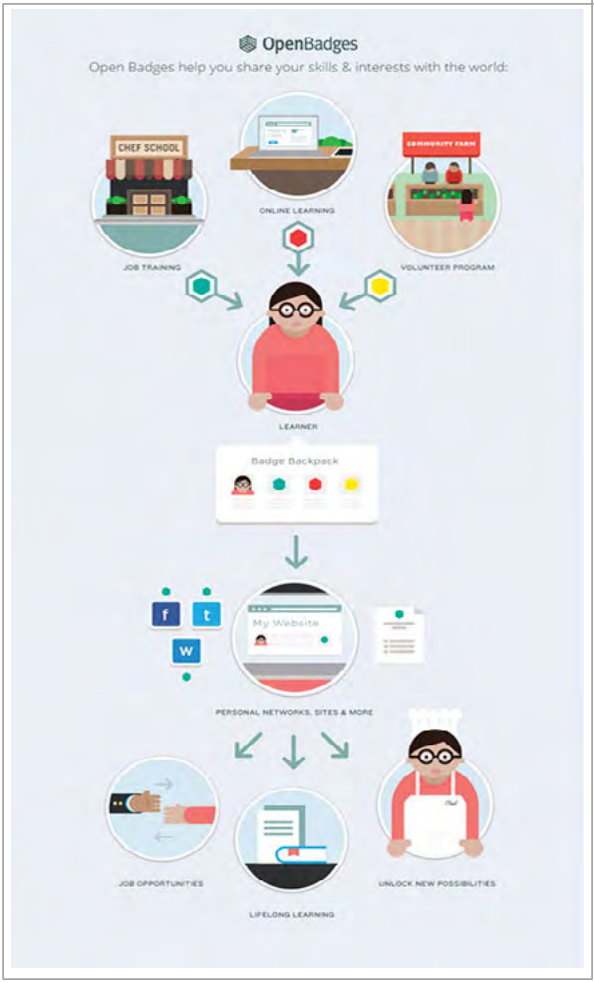


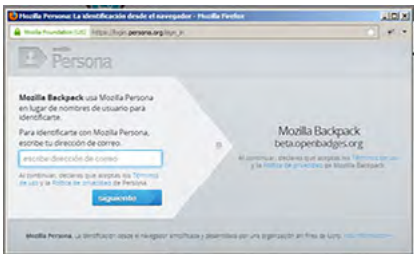
Figure 1

Open Badges model

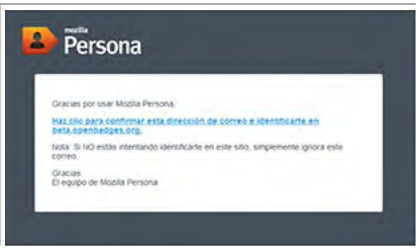
Next, we present the "Mozilla Open Badges" access system so that once you have taken courses in MOOC platforms, you can upload badges you have earned (<http://www.openbadges.org/>).

1. Registering with the Mozilla platform

You need to sign into "Mozilla Persona". To do this, you must enter the same e-mail address you used to sign into the corresponding MOOC platform.



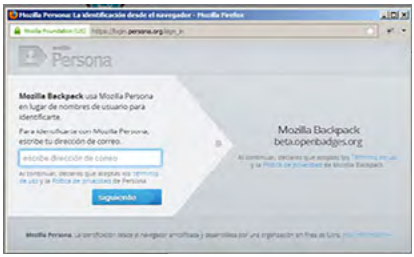
2. Confirm your email address



3. Access to Mozilla Backpack

4. Enter your data in the form

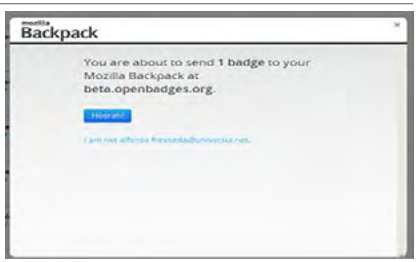
Once you have created an account in Mozilla Persona, enter your data in the form displayed and click on *Next*



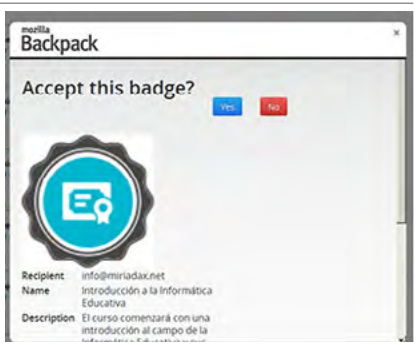
5. How to export the badge from the MOOC platform to Mozilla Backpack

Almost all MOOCs that provide badges allow them to be exported. To do this, locate the link: "Export badge to Mozilla Backpack".

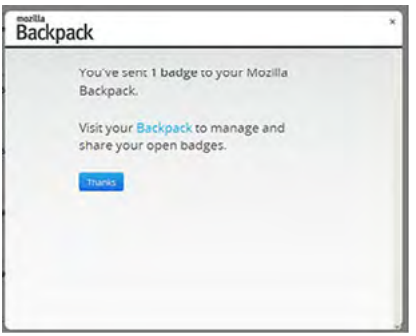
Next, to confirm you are sending the selected badge, click on the appearing button: *Hoorah!*



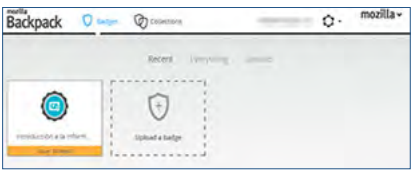
You are then asked to accept to send the badge from the MOOC platform to Mozilla Backpack



Click on the *Thanks* button



Your badge is now available on the platform for sharing.



More than 600 companies have joined the Mozilla Open Badges initiative, and are collaborating with the platform so that users obtain recognition for corresponding skills or achievements and can share them. As we have seen, the platform enables you to:

- Store, organize and share recognition of knowledge and skills obtained in courses, whether online or offline.
- Provide recognition for the knowledge and skills you teach: if you are an educator, with "Mozilla Open Badge" you can standardize the knowledge you teach using these badges.
- Make the badges you've earned known on the web. You can share them over social networks, employment sites, websites, blogs...
- Companies, educational institutions and other organizations can check the skills of Mozilla Open Badge users.

Opinions on MOOCs

In this section, we echo evaluations and considerations put forward by recognized researchers and teachers on the MOOC movement. These discussions are very useful for anyone approaching the movement from a creative and participatory perspective. The joint and participatory thinking that inspires the open knowledge movement should also serve as a reference point for analysing the reality of the whole picture. You can add to some of these reviews on the following website: <http://www.americalearningmedia.com/>.

Constanza Donadío

Journalistic editor of "America Learning Media"

Throws some interesting rhetorical and thought-provoking questions concerning the model and its future: (@americalearning) is this old wine in new bottles? Is it just one more marketing initiative, allowing educational institutions to attract more and more students from a larger number of countries, and once a critical mass of users has been reached, a sustainable business model will have to be found (for example, paying for the certificate only)?

Tony Bates

Chairman and CEO of "Tony Bates Associates Ltd

Considers that if top universities like Stanford or MIT actually attributed credits to students who succeeded in exams, and then awarded them full degrees, the model would be different. "But these elite universities continue to treat MOOCs as a philanthropic form of continuing education, and until these institutions are willing to award credit and degrees for this type of program, we have to believe that they think that this is a second class form of education suitable only for the unwashed masses" he notes, critical, in an article published in "America Learning Media" (<http://www.americalearningmedia.com>).

Davide Savenije

Dutch specialist, member of the editorial team of "Education Dive"

Indicates in Education Dive (<http://www.educationdive.com/>) eight challenges that MOOCs should soon face: are MOOCs a bubble about to burst? Where will the money come from? How can we detect students who cheat? Should MOOCs lead to qualifications, badges, credits or degrees? Do they compete or collaborate with universities? Will MOOCs

address students with special educational needs? Will they recreate the campus experience?

Albert Sangrà

Director of "eLearn Centre" – "Universitat Oberta de Catalunya" – Open University of Catalonia – Spain

It is still a little early to assess the real impact of these initiatives beyond the media noise. So far, we can say that the business world is disembarking on a new shore (of technology and contents) in Higher Education, which associates e-learning merely with access to content, based on a very traditional and fairly obsolete behaviourist paradigm; where the process of quality assurance relies entirely on the prestige of the institutions that support it, but who do not then recognize any credits obtained at their universities.

Miguel Morales

Director of e-Learning at the Galileo University of Guatemala

I believe that from the universities' point of view, it can become a powerful marketing tool, used to position a brand (the university), to publicize a product (an academic program), obtain greater reach, etc. However, I do not think they will be "open" for long.

Roberto Hernández Soto

Professor at the Open University of Catalonia – UOC, and expert in corporate training (Spain)

It is common knowledge that MOOCs are turning into yet another marketing initiative allowing universities to attract users from an increasing amount of countries. Moreover, once the platforms are created and a critical mass of users is reached, the next step will be to set up a sustainable MOOC business model. Of course, this is a great opportunity for universities as they have a growing need for self-financing due to decreasing public funding.

From the educational point of view, I do not think that initiatives based on the distribution of content through video presentations (with some additional resources in some cases) and in checking the assimilation of concepts through short questions, multiple choice tests or standardized exams contribute anything meaningful. Simply, these initiatives called xMOOCs reduce the participant to a mere consumer of information (usually decontextualized) and greatly limit the possibility of interaction and collaboration with teachers and other participants.

Toni Ramos

Director of Operations at Eureca Media – UOC Group (Spain)

As a teacher, I think it's fantastic that spaces can be provided where people can grow and build knowledge, and if education is democratized in the process...that's even better. We can't stop the tide, why should we hold back this new wave of learning?

José Marcos Cardozo Horcasitas

Virtual University System of the Autonomous Universityof Hidalgo (UAEH) of Mexico

MOOCs are necessary for our society, to the extent that these e-learning tools can conveniently and easily solve regional illiteracy.

Fernando Santamaría González

Online trainer and consultant on design issues in open learning ecosystems

xMOOC format and philosophy, and everything that revolves around it, is having a powerful impact. In the coming years, universities the world over will have to change perspectives on education and open up to the intricate outside jungle through agreements and synergies to avoid isolation and an agonising death. Potential added values of universities, such as their students, will be able to move to any university in the world at a derisory cost. This does not mean however that xMOOCs will remedy educational inequalities.That is an altogether different matter.

Luis Lombardero

General Director of the e-Learning Bureau Veritas Business School (Spain)

My opinion on the impact of the MOOC movement in Latin America, based on my limited knowledge of this continent –with 120 million young people, an important part of which are still lowly skilled according to the latest report of the ILO-, is that I think it will have a positive effect of the expansion of the e-learning education format and will give many people the opportunity to access knowledge, which is very important.

William Bowen

Emeritus Chairman of Princeton University

William Bowen, in his new book *Higher Education in the Digital Age*, believes that the price of college tuition should drop. In this process, online training courses can be a much cheaper alternative for quality learning. He also notes that MOOCs can increase faculty productivity by enabling teachers to dedicate more fruitful time to attending students rather than repeating contents.

Pamela Tate

Chairman/CEO of the Council for Adult and Experiential Learning

If MOOCs want to truly represent disruptive innovation they must relate to competences, official studies and future work. It's no use to accumulate hours of learning if they don't go hand in hand with acquisition of skills. If they do, certification and recognition will be fully valid no matter which MOOC platform was used.

Towards the Concept of Sustainable MOOCs

MOOCs should adopt both a theoretical and competence-based orientation. This dual perspective is rarely found in courses offered on global platforms. This double orientation aims at offering a model of technical, measurable and transferable skills while additionally providing other options for the development of competences that promote critical thinking (Barnett, 2001).

The key concept adopted in this framework of university action is the use of methodologies and instruments that encourage the transfer of skills to personal, social, academic and professional contexts, and thus create the basis for lifelong learning (Villa and Poblete, 2007, Cedefop, 2010, Allen and van der Velden, 2012).

We should add that in the current economic climate all experts say the proper way to overcome this crisis is to adopt smart digital technologies to develop productive and efficient economic models in which technological innovation drives growth and increases productivity levels (Network Society Report –"Informe la Sociedad en Red"–, 2011, issued by Spain's Ministry for Industry, Energy and Tourism). If we want to preserve the philosophy underlying MOOCs, we must move towards a format that integrates the best of x-cMOOCs while overcoming the limitations and interests of the current MOOC model.

The new MOOC model that we could call sustainable MOOC, "sMOOC" or "Googlelized MOOC" rests on the creation of large platforms where different universities and educational institutions would offer quality open and massive courses. These courses would be designed according to significant multicultural contextualization and professional and academic learning needs (Azevedo, 2012). The Google model, with its many quality and free applications is based on "powerful" advertising monetization strategies. This model, that is free for the user and monetized for developers, can progressively be exported to this type of learning. The model should be oriented towards the acquisition of skills and competencies rather than towards certificate obtention.

It must be made possible to apply what is learnt to different social, personal, academic and professional contexts. Design must not only be attractive but also build-up skills and fulfill a number of objectives in a knowledge area or profession. Platforms that host the courses should be designed to include various 2.0 social participation tools: blogs, wikis, forums, microblogging and self-creation of digital content.

We could call "sMOOC" a sustainable MOOC designed for massive and open courses, that would reflect a philosophy stemming from the 12 practical points below. It would overcome current pedagogical deficiencies, monetization, certification and authentication problems:

1. Courses given by specialists and professors from relevant institutions in each country.
2. Completely free courses (or at a minimal cost no higher than 50 euros) not involving monetization of accreditation and that can optionally provide free badge-type certification. This aspect makes it unnecessary to check the authenticity of course participant identities.
3. Courses with a highly collaborative pedagogical design for students using audiovisual and written resources. For this, platform design should be redirected towards self-creation of digital content and work organized into self-managed and collaborative projects.
4. Courses with multilingual access. This is one of the main factors that explain poor dissemination in emerging and not so emerging countries. Creating videos using speech synthesis is an affordable solution requiring just basic IT knowledge.
5. Accessible over diverse formats and devices (tablets, smartphones, etc.) to foster ubiquity and portability.
6. Course integration via downloadable App onto smartphones and tablets to access a greater number of potential users in countries with limited technological resources. This takes into account that smartphones are one of the digital devices with highest levels of market penetration worldwide.
7. MOOCs created by companies to train future workers with specific skills required in all production or business contexts.
8. Possibility to monetize the design, development and tutoring of the courses through the intervention of the companies themselves. These companies can make and deliver courses on self-owned or external platforms, or pay for developers to design contextualized training in less developed professional skills in formal Higher Education.
9. Possibility of sponsorship (advertisers who subsidize part of the costs of the courses through the use of Internet "banner" type advertising).
10. Final demonstration of the possibilities and skills gained through the course by its expert creator. Competence learning cannot be achieved

solely through peer to peer collaboration. An expert needs to contribute final examples and precise guidelines on common mistakes and tips for improvement.
11. Participation in the design and processes of monetization from other academic institutions and scientific research institutes such as scientific journals and large groups in the fields of Communication and IT.
12. Creating a branch of supportive MOOCs for the specific education of disadvantaged groups, emerging and developing countries.

Moreover, platforms that support MOOCs must be redefined and improved technologically. They would gain by following the recommendations proposed by Christian A. Estay-Niculcar in his blog (<http://cestay.wordpress.com>):

1. **Nature and purpose of the course**. Well delimited and defined educational objectives taking into account that MOOC participants come from different academic and professional backgrounds (if any). They also vary in their learning interests, culture, language, and they have different viewpoints on dedication to study and interests.

    - Add: always indicate the course's objectives.
    - Modify: MOOCs always say they offer certification, but it is a good idea to indicate what the variants of accreditation are (of participation, for completing non-assessed activities, for completing assessed activities, for realizing a project, or for a high grade –usually a certificate with distinction– for achieving the highest grade or for the most interesting project –which usually obtains honours–, etc.).

2. **Dynamism.** Participant diversity makes it necessary to offer highly flexible, visual, and dynamic learning within an informal space. The most popular courses with the highest completion rates are often those that motivate students most and let them be creative.

    - Add: more videos available online. They should be short, directed and for specific purposes. For example, make them watch a movie extract and analyze determined concepts. Or produce a collective video of a work team where everyone presents themselves or presents their project.
    - Modify: introducing more collaborative work. But take care with peer reviews: they must be organized around very clear rubrics while leaving some flexibility to reviewers.

3. **Web 2.0.** It is important to foster learning using the Web 2.0.

    - Add: Twitter and Facebook accounts, Youtube channels, etc. with some control but avoid internal accounts.
    - Modify: present assignments in blogs created by students themselves. Use wiki tools to co-create concepts. Put all the dynamism proper to Web 2.0 into play and keep it alive.

4. **Debate and discussion.** Forums are the most popular tool in any environment. Many believe that letting forums freely create themselves is a way to promote learning, creativity, etc. It is true that more information is varied, more probability there is of conceiving, enriching and copying ideas. However when there are more than 100 forums and each one consists of more than 20 contributions, it gets complicated. It's better to analyse forums and assess whether they are really necessary.

    - Add: less forums but more focused ones, and someone should synthesize the knowledge they contain from time to time.
    - Modify: encourage participation in forums and count contributions and "likes".

5. **Multimedia.** Video is a wonderful medium to transmit knowledge, but is usually used to provide unidirectional classes, as in traditional face to face classrooms. Chats have been introduced, but not everyone can take part in them (because of schedule and connectivity issues), and sometimes they are not well designed (no defined topic, poorly conducted, unclear language, bad sound, etc.).

    - Add: Videos should be downloadable and professionally made (avoid filming a real class). Teachers must be given instructions for the video presentation. They should add a new video at least once at each new course edition to discuss experiences proper to the current issue. It is also good to add other multimedia options, not only Google opinion polls for examples, but also simulators, opinion documents from GoogleDocs, etc.
    - Modify: Short videos per topic by teachers, complemented with online videos of cases and examples illustrating concepts. Add text transcriptions; insert translations into other languages or the presenter's own language to the videos. Add and offer links to additional resources or the teachers' slides. Videos should last between 5 to 15 minutes. Chats should be programmed at appropriate time schedules or extra chats on the topic should take place.

Set a schedule, timetable and means for publishing the chat online after it has taken place, also leave a chat summary available. Avoid saturating with too many short videos, long videos (even if there are fewer), or with too many weekly chats.

6. **Individual/group participation.** Participation is essential in MOOC courses. Peer reviews are often most popular, but they can be exhausting if students have to work with rubrics containing 5-6 dimensions weekly and every dimension requires 3 levels of assessment. Worthy of note is that in some well designed courses, these reviews showed to be unnecessary, as participation was very high and results satisfactory.

   - Add: Feedback for peer to peer assessment, or else avoid including this type of evaluation.
   - Modify: Peer reviews should be shorter, or reduced to a minimum.

7. **Evaluations**. Evaluations are a difficult issue. Today they are at the heart of official university diplomas, and they are important for the future of MOOCs. Moreover, course creators are teachers who have the habit of including exams, tasks, assignments, projects, etc. But is this really necessary? We will not discuss the issue here. Let's remember that they are being used, and the most common are online tests with automatic revision. As mentioned earlier, rubrics are being introduced.

   - Add: correction guidelines in the case of tests. Students must be informed on the number of times they can repeat a test and whether questions will be different each time. Tell students how much time they have to complete the test, how loosely they can apply rubrics and standards of good behaviour when commenting on activities and providing feedback.
   - Modify: adapt rubrics not only according to what there is to measure, but also taking into account that reviewers' experiences differ, and a flexible approach is needed. Remember that a certain amount of students will come from different cultural and linguistic backgrounds.

All previous considerations require a system of constant control and supervision of learning, while foreseeing that it is financially and organizationally impossible to attend hundreds or thousands of students. So all the previous points should be subject to frequent analyses to ensure that they do not entail impediments to learning nor lead to dropping out. This would hinder the next edition of the course. In this regard it is important

to gather true statistics on student behaviours, rates of completion, drop-outs, participation, etc.

Final Thoughts

The MOOC movement has revolutionized lifelong learning. Free and massive are the two qualities that make this type of learning different from traditional e-learning. For this movement to progress and move beyond a passing fashion, it needs to be reconceptualized to become a truly established, sustainable model with chances to last.

We believe that while MOOCs are able to provide an excellent learning experience, they are still insufficient in themselves as an educational experience. They still lack some of the key components required for this purpose (e.g. strong evaluation, verifiable/certifiable learning, proper interaction with instructors or facilitators, collaborative work, interactive, effective development of transferable skills and its cost). This mode of learning is in danger of becoming a McDonalds type business, that would Americanize education and culture. This process of Americanization is another challenge to overcome by adapting the MOOC trend to cultural and linguistic diversity proper to different regions and socio-cultural contexts, moving away from a learning encapsulation model.

Future development of these courses should entail new pedagogical approaches based on more sustainable processes where multiculturalism, pluralism, multilingualism and "soft" monetization processes represent, among others, key issues on which to build sustainability of the learning model. Other successful models such as that developed by Google in monetization processes can be an interesting path to explore.

Lastly, the need for professional skills in emerging technological markets and networks makes this model all the more relevant, as it allows for constant update, something that much constrained university curricula cannot provide. It also presents opportunities for researchers, teachers and enterprises from educational or professional worlds to disseminate their academic and scientific work in new ways.

We are searching for courses that satisfy our interests with two models: one that is encapsulated, canned, aimed at checking the assimilation of content and easily assessable by conceptual self-evaluation. The other model makes us participate, collaborate and cooperate and thus go beyond mere content-learning offered in the former model.

These latter MOOCs will make Steve Carson's words come true: "Some courses are open as in door. You can walk in, you can listen for free. Others are open as in heart. You become part of a community, you are accepted and nurtured".

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To Conclude

> Massive open online courses may be the new source for reflection and cognitive recreation, the new habitats for communication and innovation in digital university ecosystems and the seed of massive new learning scenarios among members of the university campus.
>
> Vázquez Cano; López Meneses; Méndez *et al*., 2013: 5

There are no units or means of measure for knowledge. If they were to exist, they would have to apply to the quality, impact and scope of the consequences of knowledge. These aspects can only be appreciated long after production,... if ever. This means that factors favouring the production of knowledge, such as education, and circulation of pre-existing knowledge, must use systems or methods of assessment other than those used for other types of goods.

Once knowledge is produced, it can be endlessly and easily copied or reproduced at no cost. This changes its nature as a commodity. The value of owning knowledge does not rest in a production sample but in the matrix of knowledge. However this matrix has now adopted a different support from the rest of the knowledge supports that have existed until now. Partly for this reason, general costs of transaction of "knowledge goods" are low. Moreover the nature and distribution categories of knowledge differ from that of previous goods.

MOOCs can be understood as learning ecosystems where interrelated components or subsystems, that can be educational, human, training-based, social and technological, interact between themselves. Emotional, cognitive, economic and psychological elements converge in these subsystems, which in turn are related to economic and productive systems. In this way, many subsystems of technological and non-technological behaviours, rules, and norms co-exist in the learning environment. These spaces should therefore be characterized by continued collaboration and cooperation in a flexible, interactive, open mode. They should seek to improve the skills of participants as well as continuously update the subject area of the course. Together with Internet interconnectivity

and data persistence that registration provides, two factors that did not exist before are now part of the equation: extension of education throughout life, and access to global multimedia learning content.

Current MOOC architecture can be seen as disruptive innovation in Higher Education, but the current MOOC ecosystem must substantially improve towards efficient management mechanisms; it will be some time before models are designed and implemented that impose greater participation, collaboration and skill acquisition.

For now, we believe that MOOCs should be set up as very low cost alternatives to intellectual recapitalization and improvement of interpersonal skills for unemployed university graduates.

Moreover, universities should see MOOCs as a strategic incentive and a competitive outlet for institutions that have distinct talents, but whose academic degrees, geographical location and public budgets are hard to defend in times of economic crisis, cost containment and rethinking of the university system.

Therefore, the role of the teacher or creator of massive courses should adapt itself and take on new facets of creator, writer, actor, instructor and even sales person rather than as a lecturer with a manual authored by him/herself or by someone else, in a face to face classroom.

In addition, one of the biggest challenges for MOOCs –that have until now mostly originated from U.S. universities– is to customize course contents to a diverse global audience with endless combinations of language, education, motivation and cultural inheritance. Those who criticize the system fear that packaged education from a small number of elite institutions in Western countries will end up dominating it all and the variety of learning modes existing in different countries will not be reflected.

However, the best initiatives may perhaps not even come from technologists. Right now, in Rwanda, a non-profit organization called "Generation Rwanda" is starting an ambitious experiment, probably the first of its kind: an entire university based on MOOCs. The pilot phase began in 2013 and its ultimate goal is to create a college for 400 people in Rwanda in which MOOCs provide lessons while teachers guide students through discussions and problematic sections.

Forthcoming proposals will probably continue to shake the world of MOOCs. Perhaps most surprising of all is that a few years ago only a select few could create a MOOC and now we all can. The tools are here, what we need now are ideas.

Universities are also under reconstruction. In a 2013 report on Spanish universities entitled: "Proposals for the reform and improvement of the quality and efficiency of the Spanish university system" decisive conclusions are drawn: *Spanish universities need thorough reform.*

A series of recommendations to rethink all fundamental aspects are provided: governance of universities, selection of faculty, economic management and outcome evaluation, all aimed at improving the efficiency of universities. The current university system in Spain is made up of 50 public universities and 31 private ones, comprising 236 campuses, which together serve a million and a half students. The MOOC movement in Coursera alone accounts for more than 4 million students. Universities must meet challenges stemming from two important upheavals: globalization and information technology. Outcomes are still unpredictable, the following concluding remarks may shed some light on the future:

- University demand has rapidly become global and tends to cross borders, at least as far as proposals from top institutions are concerned.
- Technology allows developing high quality affordable courses with massive enrollment of students, and powerful learning and assessment tools.
- Free registration and access to all materials is revolutionary in that it allows students to "try" a lot of courses at no initial cost.
- Possibility of income lies in accreditation, not the sale of content, courses, etc.
- Advances in online teaching methodology make it possible for an online course to offer as much or more quality than a classroom course, given the potential of available ICTs.
- Digital culture already predominant in digital native students is taken advantage of.
- Strength through unity (in the case of Coursera). Demand is channelled via the reputation and prestige of Harvard + MIT + Berkeley. Concentration of supply and the university "brand" are imposed.
- The conventional university model may enter a certain crisis (bubble + crisis of the model), from which we deduce the need to "reinvent" and specialize universities, as well as create platforms that coordinate them and define attractive products.
- The rest of the world needs to experience and give a rapid response to a phenomenon that was born in the United States and that is referred to as "The Crisis of Higher Education" even in the MIT Technology Review.
- It is especially important to undertake a comprehensive strategy that embraces cultural and linguistic regions such as that of the Latin American sphere.

To finish, the nine points below bring together the most relevant and challenging aspects of the MOOC movement.

1. A MOOC is a learning opportunity rather than an opportunity to pile up ongoing course certificates. Students should approach these courses with the primary intention of learning.
2. The direction MOOCs are taking should be corrected to gradually include student participation cooperatively and collaboratively, in both the development of the course and its ongoing and final assessment.
3. A MOOC should be based on the delivery of quality contents that are developed, assimilated, restructured and applied through a technological platform capable of integrating tools for management, tracking, interaction, content validation, certification, etc.
4. We should work towards a more sustainable MOOC. Current MOOCs still require a global learning process where students, teachers, tutors and managers acquire a level of theoretical and practical competence in the networked teaching-learning process. Massive network learning requires new dynamics and skills from participants in the network. Not only is a basic command of digital literacy required, but also applied and educational use of digital tools for creating content.
5. MOOCs currently have a very high dropout rate (close to or above 85%). Selecting appropriate courses corresponding to participant interests and the design of increasingly interactive, participatory and less mechanical courses will foster implication and completion.
6. MOOCs may be a turning point in the global educational landscape but a commitment to digital literacy and providing infrastructure to the poorest countries deprived of resources are necessary to make this source of learning accessible to everyone.
7. Course monetization processes are a challenge for companies and managers who must implement "friendly" systems for users, making sure not to break the fundamental principle of this model: "a quality education, that is free and massive", otherwise the movement will result in an educational business opportunity which the world is already full of.
8. Will we be able to study a full university degree under this model in the future? Yes, possibly, but probably not for free.
9. The MOOC model is exportable to all types of education. A MOOC can be created by teachers from nursery, primary and secondary or high schools, encouraging students to interact and develop skills while other teachers elsewhere in the world may experience it and apply it to their classes.

As a closing remark:

[...], we wish to take part in this rising socio-educational movement as it promises many potential learning opportunities. However challenges and difficulties lay ahead requiring thought and scientific research. We must stop this movement from becoming the commodification of certificates unrelated to real intellectual progress, and transform it into the seeds of the comprehensive education of Homo Digitalis.

Vázquez Cano, Méndez, Román y López Meneses, 2013: 62

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Annex

Interesting Webgraphy

Brief explanation on MOOCs.

- <https://www.youtube.com/watch?v=7w32R_APQmI (Unimooc)>.
- <https://www.youtube.com/watch?v=_vNWI2Ta0Kk>.
- SCOPEO Focus Group MOOC: present state of affairs, possibilities, challenges and future, <http://www.youtube.com/watch?v=c0vVAF1BaPU>.

MOOC bibliography

- <http://allmoocs.wordpress.com/bibliography-organized/>.
- <http://bit.ly/12I7xbr>.
- <http://www.downes.ca/me/articles.htm>.

MOOC courses directory

Spaces to find online courses and MOOCs, by searching the most popular online education platforms (Coursera, edX, Udacity, Canvas, MIT, Class2GO...).

- <http://myeducationpath.com/courses/>.
- <http://www.class-central.com/>.
- <http://www.mooc.es/>.
- <http://noexcuselist.com/>.

Learning about MOOCs...

TUTELLUS. This is a collaborative Spanish platform gathering over 4,000 video courses and MOOCs from universities, business schools and users from Spain and Latin America. We can attend any of the recommended MOOCs or give video courses, webinars or classes in our city, while having access to countless free courses listed in the platform.

- <http://www.tutellus.com/aprende>.
- <http://www.tutellus.com/universities/home/>.

International MOOCs

- <http://miriadax.net/es/home>.
- <https://www.coursera.org>.
- <https://www.edx.org>.
- <http://www.openuped.eu/courses>.
- <http://www.mooc2degree.com/>.
- <http://www.udacity.com>.
- <http://www.udemy.com>.
- <http://www.iversity.org>.
- <http://bit.ly/17ghmPg>.
- <https://www.open2study.com>.
- <http://futurelearn.com>.
- <http://www.redunx.org/web/general-navigation/aprende>.
- Llista de MOOC...: <http://bit.ly/11m6sQL>.

Mooc aggregators

- <http://www.class-central.com>.
- <http://www.openculture.com/free_certificate_courses>.
- <http://infinitasdimensiones.blogspot.com.es>.

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Index