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Special section: MOOCs: Game Changer or Passing Fad?

Sir John Daniel
Esteban Vázquez Cano
Mercè Gisbert Cervera
(coord.)

UOC
Universitat Oberta de Catalunya

une
University of New England

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MOOCs: Game Changer or Passing Fad?

The Future of MOOCs: Adaptive Learning or Business Model?

Sir John Daniel[1], Esteban Vázquez Cano[2] and Mercè Gisbert Cervera[3]

1. International Quality Group, Council for Higher Education Accreditation, USA | odlsirjohn@gmail.com
2. Universidad Nacional de Educación a Distancia (UNED), Spain | evazquez@edu.uned.es
3. Universitat Rovira i Virgili (URV), Spain | merce.gisbert@urv.cat

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Abstract

Currently, many MOOCs are designed as a collection of videos with a forum using some traditional distance learning models, but they do not promote adaptive and personalized learning. These features, together with the quality of the training process, must be the main challenges for the coming years.

These types of courses can have a formative role in higher education, not only in countries where MOOCs are already offered but also in less economically developed countries. To make this possible MOOCs must adopt different teaching strategies to promote personalized learning and offer some form of accreditation and certification.

The future of MOOCs can be understood if we approach it from five dimensions: the teaching model, monetization, certification, adaptive learning and MOOCs for developing countries.

Keywords

MOOC, adaptive learning, certification, higher education, teaching model, quality

El futuro de los MOOC: ¿aprendizaje adaptado o modelo de negocio?

Resumen

En la actualidad, muchos cursos MOOC se diseñan como si fueran una colección de vídeos a los que se añade un foro, lo que implica seguir un modelo de enseñanza a distancia tradicional sin promover un aprendizaje adaptado o personalizado. Aspectos como estos, junto con la calidad del proceso formativo, deben constituir uno de los principales retos de los MOOC en los próximos años.

Este tipo de cursos pueden desempeñar un importante papel formativo en la educación superior, no solo en países donde ya se está ofreciendo este tipo de formación sino en países en vías de desarrollo. Para hacerlo posible, los MOOC deben adoptar diferentes estrategias de enseñanza para promover un aprendizaje más personalizado que conlleve también algún tipo de certificación y acreditación de las enseñanzas.

El futuro de los MOOC debe pasar por afrontar cinco dimensiones prioritarias: el modelo pedagógico, los procesos de monetización, la certificación, el aprendizaje adaptado y los MOOC en países en vías de desarrollo.

Palabras clave

MOOC, aprendizaje adaptado, certificación, educación superior, modelo pedagógico, calidad

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Introduction

Higher education regularly speculates about how to accommodate more learners at lower costs and facilitate the spread of knowledge. Many possible scenarios include an important role for technology and online learning. Massive open online courses (MOOCs) could be an interesting strategy towards these objectives, even if these are not the goals of most institutions offering MOOCs.

MOOCs now have more than 5 million students worldwide, of which most are aged between 26 and 45 and have university degrees or previous higher education studies. MOOCs provide these students flexibility and free courses on a variety of themes. However, they are not accredited and the level of abandonment (drop out) from the courses is between 60% and 90% of students enrolled.

In this article we review five dimensions that can promote the quality and effectiveness of MOOCs as a contribution to higher education.

Trends and challenges to ensure MOOCs have a sustainable future

John Henry Newman, an English Roman Catholic cardinal, defined the post-Enlightenment university in *The Idea of a University* (1858) as "a place for the communication and circulation of thought, by means of personal intercourse, through a wide extent of country". But he warned that without the personal touch, higher education could become "an icebound, petrified, cast-iron university" (The Economist, 2014). That is a warning for MOOCs as well.

The MOOC world is evolving quickly with new pedagogical types and new users as the concept gradually matures. The MOOCs of the future will probably be different from what they are now as we see change on five dimensions: the teaching model, monetization, certification, adaptive learning and MOOCs for developing countries.

The MOOC teaching model

The xMOOC model that emerged in 2012 had not changed much by 2014, with completion rates and participation rates just as low as they were when concrete data on completion rates appeared in 2013 (Parr, 2013). Sadly, it seems impossible to run a cMOOC (a course based on the pedagogical principles of connectivism) today on one of the big provider platforms as the software tools do not allow for the type of interaction and collaboration among participants that characterize cMOOCs' teaching model (UNESCO, 2013; Gaebel, 2014). xMOOCs, however, have a fairly linear approach with clearly defined (learning) outcomes and quiz-type examination methods and lectures. This xMOOC model generates criticism about its influence on higher education. Many teachers consider that MOOCs cannot replace a teacher because learning has to be interactive. Furthermore, it does not allow for laboratory experiments, clinical practice or medical simulation (Bates, 2012; Daniel, 2012; Dillenbourg, et al., 2014; Hollands & Tirthali, 2014).

The xMOOC teaching model is essentially a collection of videos with a chat forum. Many teachers and researchers consider that the MOOCs' teaching model is nothing new since it is based on watching TV programmes —live or

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recorded— on the internet or thematic YouTube videos. A student can find quizzes, discussion groups and peer support on any theme through social media, forums, blogs, and many online portals. Do participants in stand-alone MOOCs gain useful skills and knowledge that can be applied in productive, real-world contexts (Hollands & Tirthali, 2014: 169)? Far from the hype that MOOCs will replace traditional universities, anyone who studies the evidence soon sees that MOOCs augment rather than replace formal educational models (Cann, 2013). For institutions that have been offering online and hybrid courses for many years, MOOCs represent more of an incremental step along a pre-existing trajectory than a major innovation.

MOOCs have to address fundamental questions, such as the following, about their teaching model to secure their future (Gaebel, 2014: 23):

- Can MOOCs solve the problems and dysfunctions in mass education resulting from an unfavourable instructor-to-student ratio?
- Can MOOCs even reverse the pattern of one (instructor) to many students toward "many to one" or "many to many"?

Without an adequate answer to these teaching challenges, MOOCs will probably not have a significant future.

The business model from "freemium" to "premium"

The financial framework of MOOCs is another major issue. Various approaches all have business models that are still under development. These models depend on how institutions are funded. For example, European universities are largely publicly funded and the question is whether they have the right to produce MOOCs and if the opportunity cost can be justified in the current funding squeeze (Gaebel, 2014). The costs of developing MOOCs can be high and the process demands commitment of personnel time and effort. Course design and delivery has shifted from a solo endeavour to team efforts including administrators in offices of digital technology, instructional designers, instructional technologists, videographers, and project managers (Hollands & Tirthali, 2014). In the United States, Coursera offers universities 6 to 15 per cent of the gross revenue generated by each of their MOOCs on its platform, as well as 20 per cent of the profits generated by the "aggregate set of courses" provided by the university (Kolowich, 2013a).

Another unresolved issue, at least in European universities, is how to remunerate teachers, tutors and professors or how to integrate their participation in MOOCs into their workload. The largest ever survey of professors who have taught MOOCs, conducted by The Chronicle (2013), shows that many of those surveyed felt that these free online courses should be integrated into the traditional system of credit and degrees and two-thirds believed MOOCs would drive down the cost of earning a degree from their home institutions. An overwhelming majority believed that the free online courses would make college less expensive in general (Kolowich, 2013b).

To make MOOC courses financially viable, different monetization approaches have been implemented. Testing and certification of MOOC participants, who for individual courses remain low in number and disseminated widely around the globe, is also a growing domain for specialist companies, such as ProctorU and Pearson. An edX representative recently announced the "post-MOOC" era as its members start experimenting with SPOCs – small private online courses with fixed enrolments (Fox, 2013).

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The question therefore is whether MOOCs can undercut the costs of other online learning models, while offering comparable or even superior learning quality. Coursera listed eight potential business models to try (Daniel, 2012).

- Certification (students pay for a badge or certificate).
- Secure assessments (students pay to have their examinations invigilated –proctored–).
- Employee recruitment (companies pay for access to student performance records).
- Applicant screening (employers/universities pay for access to records to screen applicants).
- Human tutoring or assignment marking (for which students pay).
- Selling the MOOC platform to enterprises to use in their own training courses.
- Sponsorships (third-party sponsors of courses).
- Tuition fees.

It seems that the business model is evolving from "freemium" to "premium" – much the same model that other social media start-ups have adopted. The model offers services and products that are initially free, and once a consumer base has been established, a fee is then charged for advanced or additional services and products. The premium model requires the MOOC start-ups to offer additional services for fees and these can include certification, licensing of course materials, and tuition for credit-based courses (Yuan, Powell, & Olivier, 2014).

Certification or/and accreditation

Certification is, after monetization, the most contentious issue with regard to MOOCs. Accreditation has two aspects for MOOCs. The first is that it opens the door to revenue from course fees. Second (and less discussed for the moment) is the issue of how learning is assessed, authenticated and valued by employers (BIS, 2013). There has been speculation whether higher education institutions will lose the monopoly on degree and credit validation, as other education providers start to issue badges and certificates, which are accepted by employers (Gaebel, 2014, Fain, 2014). In Europe, surprisingly, there has been no real discussion on whether MOOCs should earn credits, and whether they could be related to the instruments of the European Higher Education Area (ECTS, recognition of prior learning).

It is difficult to understand how MOOCs can change higher education if they do not award credits, whether in blended or in distance-learning mode – unless they involve new ways of validation which either complement or compete with existing credit systems (Gaebel, 2014). A report from credit rating agency Moody's on the income prospects of US higher education institutions points to MOOCs as an additional income source – provided they award credits (Moody's Investor Service, 2013).

In this context, the Massachusetts Institute of Technology (MIT) announced recently that it would offer certificates to students who passed a sequence of seven courses in computer science. EdX, the non-profit MOOC provider founded by MIT and Harvard University, calls such certificate programmes "XSeries", with the expectation that other institutions among its university partners will create certificate-bearing sequences of their own (Kolowich, 2014). Along these lines, the American Council on Education (ACE) endorsed five MOOCs for credit: "Bioelectricity: A Quantitative Approach," from Duke University; "Pre-Calculus" and "Algebra" from the University of California at Irvine, and "Calculus: Single-Variable" from the University of Pennsylvania. All five are offered through Coursera. The council

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argued that it had confidence in its process for approving the courses for credit. Each course was reviewed by two independent faculty members, who looked at a number of aspects, including the tests and anti-cheating measures, which, in this case, involved a remote monitoring service with ProctorU (Kolowich, 2013a).

This is very much in line with the prediction that MOOCs will morph into MOCCs (Mid-Sized Online Closed Courses) that would either provide learning support, assessments and credit for a fee, or be delivered through licensed provision in the context of a university.

Other researchers, such as Yuan and Powell in the JISC-CETIS report (March 2013), think that certification is not a significant issue. They argue that "most learners using MOOCs are people who already have a degree". In this case, whether the course carries credit seems less important than having evidence through certification that they have participated in a programme of learning that they can present to an employer as evidence of professional development.

Validation is probably a more pressing consideration than assessment, for which proven and applicable models exist. The MOOC learner is remote, unverifiable, and identified merely by an email address. Technology based solutions such as Coursera's Signature Track automated remote keystroke recognition engine may, according to Universities UK (2013), offer solutions to verify that the learner completing an assessment is who they say they are.

An answer to this dilemma may lie in Europe. Under rules designed to promote student mobility between EU member states, students can transfer course credits, at the discretion of universities, in any of the 53 countries that have signed the Lisbon Recognition Convention, "regardless of whether the knowledge, skills and competences were acquired through formal, non-formal or informal learning paths". Hans Klöpper, the managing director of iversity, points out that it is easy for students to assess MOOCs' quality, since they are open for all to see. Once students start to complete them in large numbers and clamour for recognition, it will be hard for Europe's universities to resist accrediting the best of them, he believes (The Economist, 2014). It would be interesting, as well, for states and federal education policymakers to adjust regulations to create pathways for MOOCs to be accepted for credit in high schools or to satisfy government-mandated continuing education for professionals (Hollands & Tirthali, 2014).

Adaptive learning

A possible, but still undeveloped, solution that will probably be available in the near future is to implement adaptive learning techniques to make MOOC courses more personalized. Course designers, managers, tutors, participants and policymakers of educational institutions might benefit from harnessing all the data MOOCs collect, and use them for improving educational activities, courses delivered, the learning experience as a whole and the investments of entire educational offers. Software agents could be designed to collect data automatically from the e-learning environment according to pre-defined indicators contained in a framework using advanced Educational Data Mining and Learning Analytics techniques and tools (Daradoumis, Bassi, Xhafa, & Caballe, 2013; Nguyen, Piech, Huang, & Guibas, 2014). Agents analysing the learner's profile could customize a course as follows: adjusting course content according to the participants' pre-requisites or educational background; changing course content according to the participant's location or country of origin, for example language, units of measure, currency symbol, seasons, etc.; and showing relevant case studies or further readings according to the country or region of origin/interest (Daradoumis, Bassi, Xhafa, & Caballe, 2013; Buffardi & Edwards, 2014).

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Linked to student performance monitoring via MOOC platforms is the increasing use of automated learning technologies. UUK (2013) provides an extremely useful summary of these emergent tools: analytics, sematic web technologies and virtual problem-based learning. Analytics enables better assessment of the quality of contributions and connections that a student may make during their time on a course, including outside of formal class structures. The semantic web technologies may enable programmes to identify resources of interest to students enrolled on a particular course in a more targeted and automated way, including, for example, location-specific learning opportunities. Virtual problem-based learning combines problem-based learning with techniques developed through computer games and other simulation programmes and can bring students and educators together from multiple locations.

In sum, there is not yet a substantial body of literature on the learning analytics of MOOCs (Clow, 2013). There is a need to develop sophisticated adaptive learning mechanisms that will require the establishment of MOOC working partnerships between educators, instructional designers, and programmers.

MOOCs for developing countries and in fragile contexts

MOOCs are not yet a hot issue for educational policymakers in most middle and low-income countries. To date, the MOOC movement has paid insufficient attention to the real needs in the developing world. There are many issues and challenges that MOOC providers and policymakers have to overcome in fragile contexts. In many developing countries, computer literacy is still underdeveloped; for example Sri Lanka has an adult literacy rate of 91% (UNICEF, 2013) but a digital literacy rate of only 20.3% (Department of Census and Statistics Sri Lanka, 2009) and in most developing countries there is simply inadequate technology infrastructure to support the systematic use of MOOCs in any substantial way. While MOOC providers produce high definition videos to satisfy developed countries' participants, due to poor connections these videos take a long time to download or fail to do so. These countries need more suitable engagement tools such as: lower resolution videos, offline "burst connectivity" tools, and offline reading and composition of replies (Liyanagunawardena, Williams, & Adams, 2013).

Even where the technology infrastructure is in place and affordable, to date most of the courses have been offered in English or Spanish. While this is now changing, it still represents a significant barrier to participation in MOOCs by the majority of learners. Most developing countries have local languages and people in these countries are rarely competent in an international language. This language challenge has been addressed by some companies, such as Coursera with its Global Translator Community (GTC) initiative, a programme designed to greatly expand the number of courses offering high-quality subtitle translations, but more efforts are needed in order to guarantee that language is not a barrier.

Furthermore, courses need a cultural adaptation to ensure the inclusion of all participants both in intellectual debates and in forums avoiding unacceptable cultural posts (Mak, Williams & Mackness, 2010). MOOCs offered in developing countries should adapt to the local setting and contextualize courses for the competencies and skills required in these countries. In this regard, some initiatives are emerging, such as the new pilot initiative in Tanzania with support from the World Bank, that seek to incorporate Coursera offerings as part of a broader initiative to help equip students with market-relevant IT skills. Employers in Tanzania complain that there is a mismatch of skills in the local labour market. There is a growing need for IT and ICT knowledge and skills necessary meet growing demand for technically skilled workers across Tanzanian corporations (Trucano, 2013ab).

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Finally, there are fragile contexts (war, refugee camps, etc.) where MOOCs could play an important role. For example, Dr. Mahmud Angrini, a Syrian doctor, explained how the U.S.-based learning portal Coursera, initially founded by two Stanford professors, changed his life. "Nowadays, I always tell my friends in refugee life: 'It is never too late to start again,'" he continues. "Someday, the war will end, and we will come back to our homes and our former lives to contribute to the reconstruction process in our country. To do so, we need to learn new skills, and this could only be achieved through continuing education. We can take advantage of the high quality courses that Coursera offers at no cost." (Curley, 2014).

Another interesting experience is the one developed by Barbara Moser-Mercer involving two refugees living in Dadaab Refugee Camp, Kenya, taking a MOOC offered on the Coursera platform together with the author (Moser-Mercer, 2014). Moser-Mercer suggests that MOOCs in these contexts need to consider offering suitable engagement tools for poor Internet connectivity areas with responsible pedagogical models that let learners interact with each other on the ground. In short, the humanitarian dimension of conflict zones requires that design, development and delivery of education respect International Humanitarian Law (Moser-Mercer, 2014: 121).

Therefore, some questions will need to be answered to determine what obstacles prevent access to and use of MOOCs among disadvantaged populations and how MOOCs may be used to promote improved economic, health and social outcomes in order to use them as a tool for development.

Conclusions

More than any other phenomenon this century, MOOCs have made higher education institutions reflect on how they should position themselves in a changing world. With some 4,000 MOOCs now on offer worldwide, the original models of cMOOCs and xMOOCS have evolved in many different directions – so much so that the term "MOOC" has probably outlived its usefulness. What we see now is the gradual expansion and the steady increase of quality of online teaching and learning for regular courses and programmes leading to credit and degrees. When we look back in ten years' time we shall judge that MOOCs were an important milestone in the evolution of higher education into the world of the Internet, rather than being significant for their own sake.

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About the authors

Sir John Daniel
odlsirjohn@gmail.com
Chair, International Quality Group, Council for Higher Education Accreditation (USA)

Sir John Daniel is a 40-year veteran of open learning and distance education, he was Vice-Chancellor of the UK Open University for 11 years and served as Assistant Director-General for Education at UNESCO.

#205 – 3133 Cambie Street
Vancouver, BC, V5Z 4N2
Canada

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Esteban Vázquez Cano
evazquez@edu.uned.es
Professor in the Department of Teaching and School Organization, Universidad Nacional de Educación a Distancia (UNED), Spain

Vázquez Cano has a PhD in Education and has published several books and articles about the rise of MOOCs and their implications for higher education. After 15 years as a teacher, principal and educational supervisor in Spain and the US, he now works in the Department of Teaching and School Organization at Spain's Universidad Nacional de Educación a Distancia (National Distance Education University, UNED).

C/Juan del Rosal, 14
28040 Madrid
Spain

Mercè Gisbert Cervera
merce.gisbert@urv.cat
Professor in the Department of Education, Universitat Rovira i Virgili (URV), Spain

Gisbert Cervera has a PhD in Education and has been a professor in the Department of Education at Tarragona's Universitat Rovira i Virgili for 25 years. She is a specialist in ICT applied to education and coordinates the Applied Research Group in Education and Technology and the inter-university PhD programme in Educational Technology.

Universitat Rovira i Virgili (URL)
Facultat de Ciències de l'Educació i Psicologia
Carretera de Valls, s/n
43007 Tarragona
Spain

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MOOCs: Game Changer or Passing Fad?

A Cluster Analysis of MOOC Stakeholder Perspectives

Ahmed Mohamed Fahmy Yousef[1], Mohamed Amine Chatti[2], Marold Wosnitza[3] and Ulrik Schroeder[4]

1. RWTH Aachen University, Germany | ahmed.fahmy@cil.rwth-aachen.de
2. RWTH Aachen University, Germany | chatti@informatik.rwth-aachen.de
3. RWTH Aachen University, Germany | marold.wosnitza@rwth-aachen.de
4. RWTH Aachen University, Germany | schroeder@cil.rwth-aachen.de

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Abstract

Massive Open Online Courses (MOOCs) are providing opportunities for thousands of learners to participate in free higher education courses online. MOOCs have unique features that make them an effective Technology-Enhanced Learning (TEL) approach. Institutions are offering a growing variety of MOOCs. Nevertheless, there are several crucial challenges that should be considered in the development of MOOCs, e.g., the drop-out rate of over 95% of course participants. One of the potential reasons for that is the complexity and diversity of MOOC participants. This diversity is not only related to the cultural and demographic profile, but also considers the diverse motives and perspectives when enrolled in MOOCs. This paper aims to cluster and analyze the different objectives of MOOC stakeholders to build a deeper and better understanding of their behaviors. Our main finding was a set of eight clusters, i.e., blended learning, flexibility, high quality content, instructional design and learning methodologies, lifelong learning, network learning, openness, and student-centered learning. This cluster schema creates a meaningful picture for the MOOC community.

Keywords

Massive Open Online Courses, MOOCs, stakeholder analysis, clustering, lifelong learning

Análisis de clúster de perspectivas de participantes en MOOC

Resumen

*Los cursos en línea masivos y abiertos (*Massive Open Online Courses, MOOC*) proporcionan oportunidades ilimitadas para la participación de miles de estudiantes en cursos de enseñanza superior en línea. Los MOOC tienen características únicas que los convierten en un método efectivo del aprendizaje electrónico, en concreto el aprendizaje mejorado por tecnología (*Technology-Enhanced Learning, TEL*). Numerosas instituciones ofrecen una creciente variedad de MOOC. Sin embargo, existen múltiples retos que deben ser considerados al desarrollar MOOC, por ejemplo, la tasa de abandono de*

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*participantes en los cursos es del 95%. Una de las posibles razones para ello es la complejidad y la diversidad de los participantes en los MOOC. Esta diversidad no está solamente relacionada con el perfil demográfico y cultural, sino también con los diversos motivos y perspectivas que los usuarios tienen al inscribirse en MOOC. La intención de este artículo es agrupar en clústeres los objetivos de los participantes en MOOC y analizarlos para lograr una mayor comprensión de sus comportamientos. El principal resultado es el descubrimiento de ocho clústeres: aprendizaje mezclado (*blended learning*), flexibilidad (*flexibility*), contenido de alta calidad (*high quality content*), diseño instruccional y metodologías de aprendizaje (*instructional design and learning methodologies*), aprendizaje a lo largo de la vida (*lifelong learning*), aprendizaje en red (*network learning*), apertura (*openness*) y aprendizaje centrado en el estudiante (*student-centered learning*). Este esquema de agrupamiento en clústeres crea una visión significativa para la comunidad de participantes en MOOC.*

Palabras clave

cursos en línea masivos y abiertos, MOOC, análisis de participantes, agrupación, aprendizaje a lo largo de la vida

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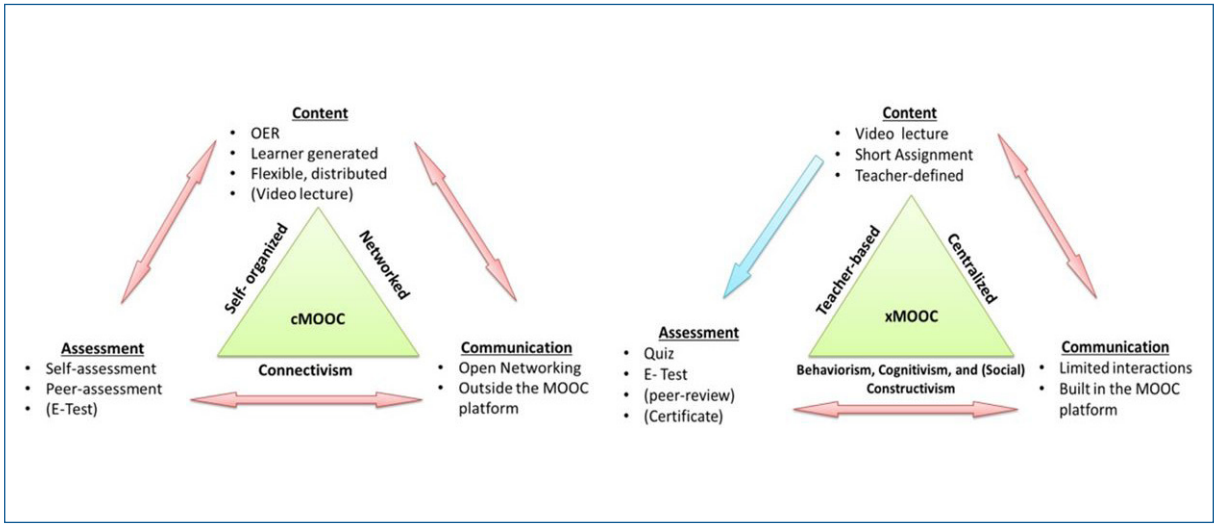
1. Introduction

In the past few years, there has been increasing interest in Massive Open Online Courses (MOOCs) as an innovative form of Technology-Enhanced Learning (TEL) in higher education. MOOCs are leading the new revolution of TEL, by providing new opportunities to a massive number of learners to attend free online courses from anywhere in the world without any entry requirements (Liyanagunawardena, Adams, & Williams., 2013). The current MOOC-related literature has categorized MOOCs into two main types: "cMOOCs" and "xMOOCs" (Daniel, 2012). cMOOCs provide a space for self-organized learning where learners can define their own objectives, present their own ideas, and collaboratively create and share knowledge. cMOOCs enable learners to build their own networks via blogs, wikis, Google groups, Twitter, Facebook, and other social networking tools outside the learning environment without any monitoring from the teacher (Kruiderink, 2013). On the other hand, for universities and educational institutions, the choice about how to use the MOOC environment to educate thousands of learners is more related to content-based xMOOCs that provide limited communication space between the course participants (Gaebel, 2013). Unlike cMOOCs, communication in xMOOCs happens within the platform itself.

cMOOCs build upon connectivism, proposed by George Siemens as a new learning theory for the digital age. Connectivism aims to build knowledge through interaction in learner networks and views learning as a network forming process (Siemens, 2005; Downes, 2006).

On the other hand, xMOOCs are mainly driven by behaviorism and cognitivism theories with some *social* constructivism components that focus on learning-by-doing (i.e., experimental, project-based, or task-based) activities. Figure 1 shows the key concepts of cMOOCs and xMOOCs.

Figure 1. Key concepts of cMOOCs and xMOOCs (Yousef, et al., 2014a)



Recently, new forms of MOOCs have emerged. These include smOOCs as small open online courses with a relatively small number of participants (e.g., COER13) and blended MOOCs (bMOOCs) as hybrid MOOCs including in-class and online mediated instruction (e.g., OPCO11). Figure 2 shows the different types of MOOCs and their underlying learning theories. (Coates, 2013; Gaebel, 2013; Yousef, et al., 2014a).

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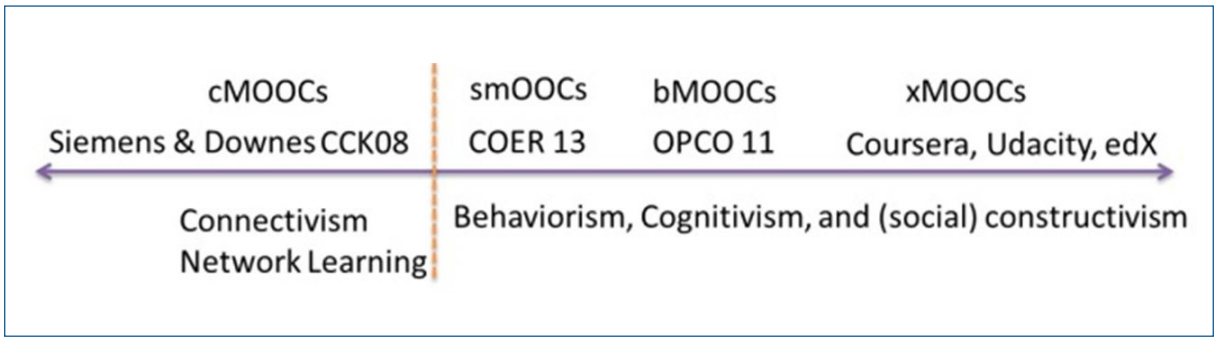
Figure 2. MOOC types (Yousef, et al., 2014a)



Connectivism and Connective Knowledge (CCK08) was the first cMOOC offered in 2008 by George Siemens and Stephen Downes at the University of Manitoba based on connectivism. This course attracted more than 2,200 informal participants from all over the world. The success of CCK08 led elite United States institutions, i.e., Stanford University, Harvard, and MIT to offer free online courses in 2011 called "extension MOOCs" (xMOOCs). These courses are quite different from cMOOCs. They follow behaviorism and cognitivism learning theories, which consider all learning experience as a result of the impact of human action with the environment (Daniel, 2012, Yousef, et al., 2014a). In 2013, E-teaching.org in Germany organized the Collaborative Online Course on Open Educational Resources (COER13), with a relatively small number of participants (i.e., less than 1,000 registered). This model, called smOOCs, entails cMOOC collaborative network interactions but uses the structure of xMOOCs by providing weekly instructional videos, reading materials and relevant web resources for each unit (Yousef, et al., 2014a; Arnold, Kumar, Thillosen, & Ebner, 2014). The Open Course (OPCO11) is an example of a bMOOC which represents a new MOOC model that aims to bring in-class (i.e., face-to-face) interactions and online learning components together. bMOOCs are in their infancy and there are different approaches for designing and embedding bMOOC environments in the higher education landscape.

Regardless of the several debates, both for and against MOOCs, the fact is that MOOCs have succeeded in attracting thousands of participants worldwide per course. Despite their increasing popularity, MOOCs suffer from several limitations. Several studies have reported a high drop-out rate averaging 95% of course participants, as well as other pedagogical problems concerning assessment and feedback (Hill, 2013). One of the potential reasons for that is the complexity and diversity of MOOC participants. This diversity is not only related to cultural and demographic attributes, but also to the diversity of motives and perspectives when enrolled in MOOCs. This raises a serious question about the different patterns of MOOC stakeholders and their perspectives when participating in MOOCs. Thus, there is a need to analyze and cluster the interest patterns of MOOC stakeholders. This paper is an endeavor to:

1. Raise the importance of considering the different patterns of MOOC stakeholders.
2. Cluster the different patterns of MOOC stakeholders to build a deeper and better understanding of their behaviors.
3. Analyze MOOC stakeholder perspectives.
4. Highlight some future research opportunities in the area of MOOCs that should be considered in the development of MOOC environments.

In light of these goals, this paper is structured as follows: Section 2 describes the research methodology and how we collected the research data. In Section 3, we present details of the clustering analysis results of different MOOC

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stakeholder patterns. Then, in Section 4, we discuss the results of MOOC stakeholder motives and perspectives. Finally, Section 5 gives a summary of the main findings of this paper and highlights new opportunities for future work.

2. Methodology

This study follows the action research methodology. Action research is an interactive inquiry process that allows researchers to examine the results of several research phases in a collaborative context with data-driven collaborative analysis to understand the underlying identified problem (Heller, 2004). The study consists of three phases. Firstly, we designed a survey to collect and identify different goals from MOOC stakeholders when they participate in MOOCs. Secondly, we transcribed and analyzed the survey data using different concept mapping analysis methods. Thirdly, we discuss the main characteristics of each MOOC stakeholders cluster.

2.1 Survey Design

The data analyzed here were gathered from an open-ended question at the beginning of a two page Likert-scale questionnaire about the quality of MOOCs, in order to collect feedback from different MOOC stakeholders concerning the objectives behind participating in MOOCs. The first part of the questionnaire consisted of questions related to the participant's demographic information, experience in TEL, and the main open-ended question was "**What are your goals/objectives when participating in MOOCs?**" The second part of the questionnaire consisted of closed-ended questions that aimed to identify specific criteria that needed to be considered when designing and implementing MOOCs. The preliminary results of the criteria analysis are discussed in (Yousef, et al., 2014b). In the paper at hand, we focus on the analysis of the responses to the open-ended question above in order to cluster the different MOOC stakeholder perspectives.

We invited a wide sample of MOOC stakeholders to participate in the survey. A total of 205 completed the survey (107 learners who had participated in one or more online courses and 98 professors who had taught at least one MOOC). Only 158 respondents answered the open-ended question from the first part.

2.2 Participants

The demographic profile of this survey was divided into professors (as MOOC providers) and learners. More precisely, the participants were as follows:

- **Professors:** 76 professors who had taught a MOOC completed this survey: 41% from Europe, 42% from the United States and 17% from Asia.
- **Learners:** 82 learners participated in the survey. A slight majority of these learners was female (53%). Of the learners, 14% were aged between 18 and 24 years, 23% between 25 and 29, nearly 13% between 30 and 34, 13% between 35 and 39, and 37% over 40. About 36% were Bachelor's students, 40% Master's, 12% PhD, and 12% at high school and other levels. All of them had taken one or more online courses, and 92% had prior experience with MOOCs. These learners came from 41 different countries and cultural backgrounds in Europe, United States, Australia, Asia, and Africa.

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2.3 Limitations

This survey may not be generalizable due to the limited number of participants who responded to this survey. Despite the low response rate, the heterogeneous profiles and goals of the respondents makes our sample valid in this field. The analysis of the collected dataset provides a major step forward in the understanding of MOOC stakeholder perspectives.

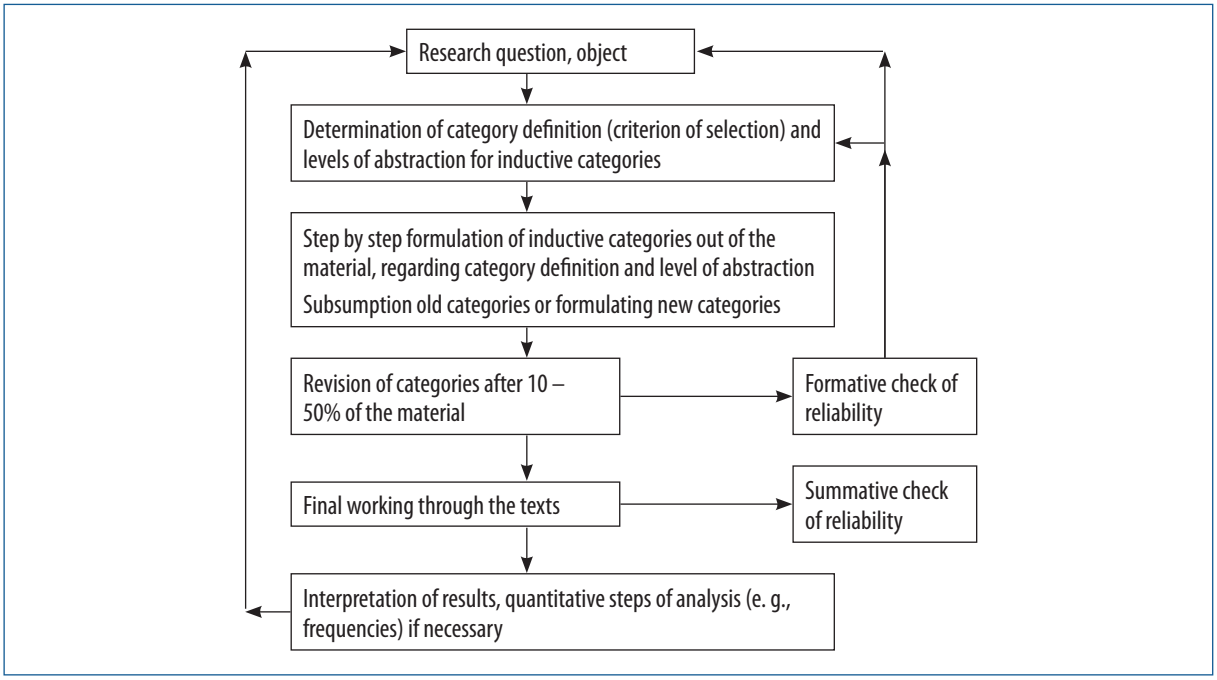
3. Data Analysis

We received 158 responses (N = 158) to the main open-ended question "What are your goals/objectives when participating in MOOCs?", reflecting different MOOC goals and perspectives. Our initial intention was to split up the analysis of the survey results based on the learners' and professors' perspectives and analyze the interest patterns within these two groups. After analyzing the results, we found, however, that there is no significant difference between the two groups. Thus, we decided to merge the two groups and analyze the whole dataset to highlight the main clusters of MOOC stakeholder perspectives. We used the inductive category development method for applying qualitative content analysis (Mayring, 2003). We then applied the Leximancer concept analysis approach (Smith & Humphreys, 2006) and the Nvivo 10 cluster coding similarity approach (Richards, 1999) to perform an automatic analysis of the conceptual content of the survey answers. In the following sections, we give a detailed report of the results from the analysis phase.

3.1 Inductive Category Development Method

Mayring's qualitative content analysis method was developed in the 1980s to analyze open-ended surveys and interviews transcripts (Mayring, 2003). This inductive category development included six iterative steps as shown in Figure 3.

Figure 3. Inductive category development method (Mayring, 2000)



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We started applying the inductive category development method by formulating an initial description of the meaning of a cluster and writing a memo about it. We then created an initial version of the categories around the core terms: *hybrid learning, design, flexibility, quality of content, lifelong learning, collaborative learning, openness, and student-centered learning*. Within a feedback loop we discussed the definition of each category to ensure that we had a similar understanding of the category meanings. After that, two experts who have experience with MOOCs and who had been working independently from each other started mapping all the survey responses to these categories. The result of this step was two lists of categories marked with the text segments that are very relevant to each category. We confirmed those lists by applying the inter-rater reliability statistical formulas to measure the agreement achieved. Table 1 shows the results of inter-rater reliability between the two experts based on Cohen's kappa and Krippendorff's alpha.

Table 1. Results of the inter-rater reliability test between the two experts

Coding	Percent Agreement	Cohen's Kappa	Krippendorff's Alpha	N Agreements	N Disagreements	N Cases
Expert 1 & Expert2	87.3%	0.848	0.848	138	20	158

The Cohen's kappa and Krippendorff's alpha coefficients for inter-rater reliability are 0.848, thus indicating a high level of agreement (87.3%) in the mapping of the responses to the categories.

3.2 Leximancer Concept Analysis Approach

In addition to the manual inductive category development method, we leveraged the Leximancer concept analysis tool to perform the clustering analysis of the survey responses. Leximancer is an automated text mining method that extracts the main concepts from the survey responses. In Leximancer, concepts are not merely keywords, but focused clusters of related, defining terms as conceptualized by the text author (Leximancer, 2013). The procedures behind Leximancer are based on Bayesian statistical theory, where fragmented pieces of evidence can be used to predict what is actually happening in a system (Smith & Humphreys, 2006).

Leximancer assisted us in analyzing and clarifying the quantitative findings of the textual content from the survey responses and illustrating them as concept dimensions of MOOC patterns through the processes of (1) conducting semantic concept retrieval of MOOC stakeholder objectives, (2) viewing concept maps of objectives in graph format, and (3) clustering the concepts into piles to show how they are related to each other (Cretchley, Gallois, Chenery, & Smith, 2010; Smith & Humphreys, 2006; Watson, Smith, & Watter, 2005).

In order to upload the survey data into the Leximancer system, we created a CSV file with the 158 survey responses. A concept map was automatically generated by extracting the most important concepts from the MOOC stakeholder objectives. The algorithms used to generate this concept map do not only analyze well-structured text, but also text where the stakeholders used dot points or short answers. This concept map illustrates a deeper look at how objectives are related to each other, as shown in Figure 4. Each concept on the map represents some of the MOOC stakeholder objectives reported in the survey. Each concept has a colored text that indicates the relationship of this concept to other concepts with the same color in the map. The colored lines do not only consider the relationship among the same concepts group (i.e., with the same cluster), but also the intersections between different concepts groups.

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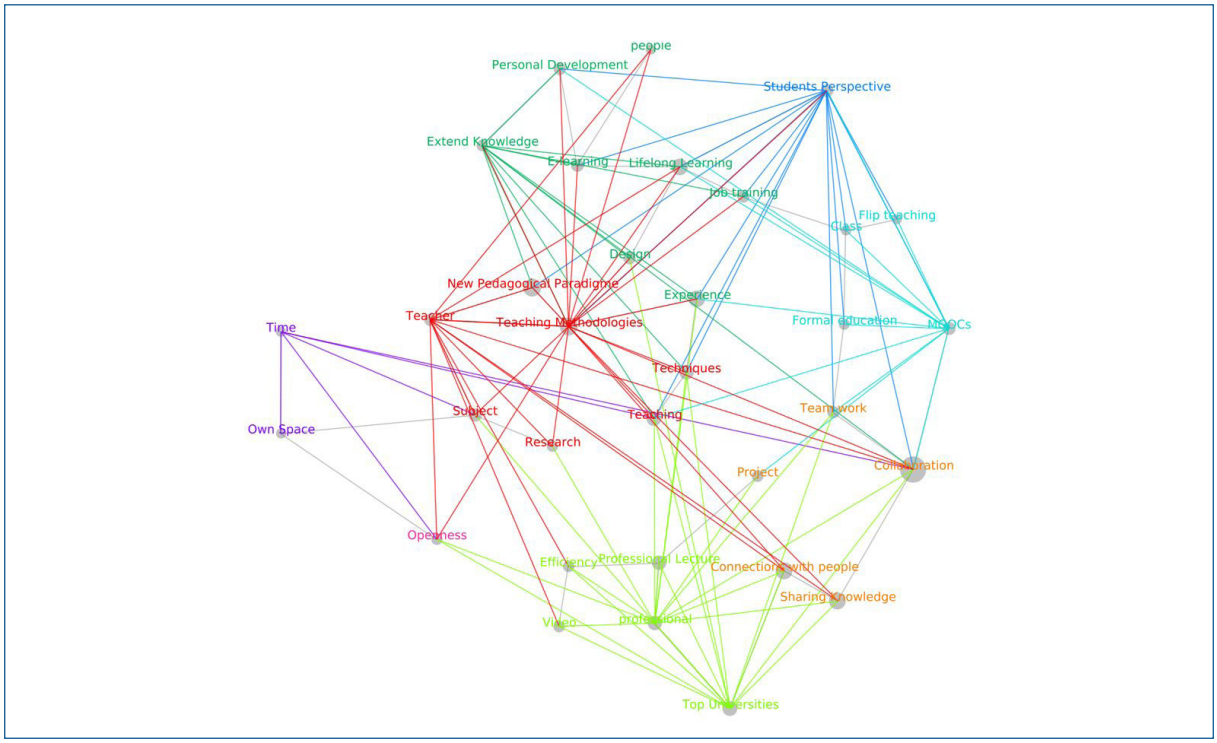
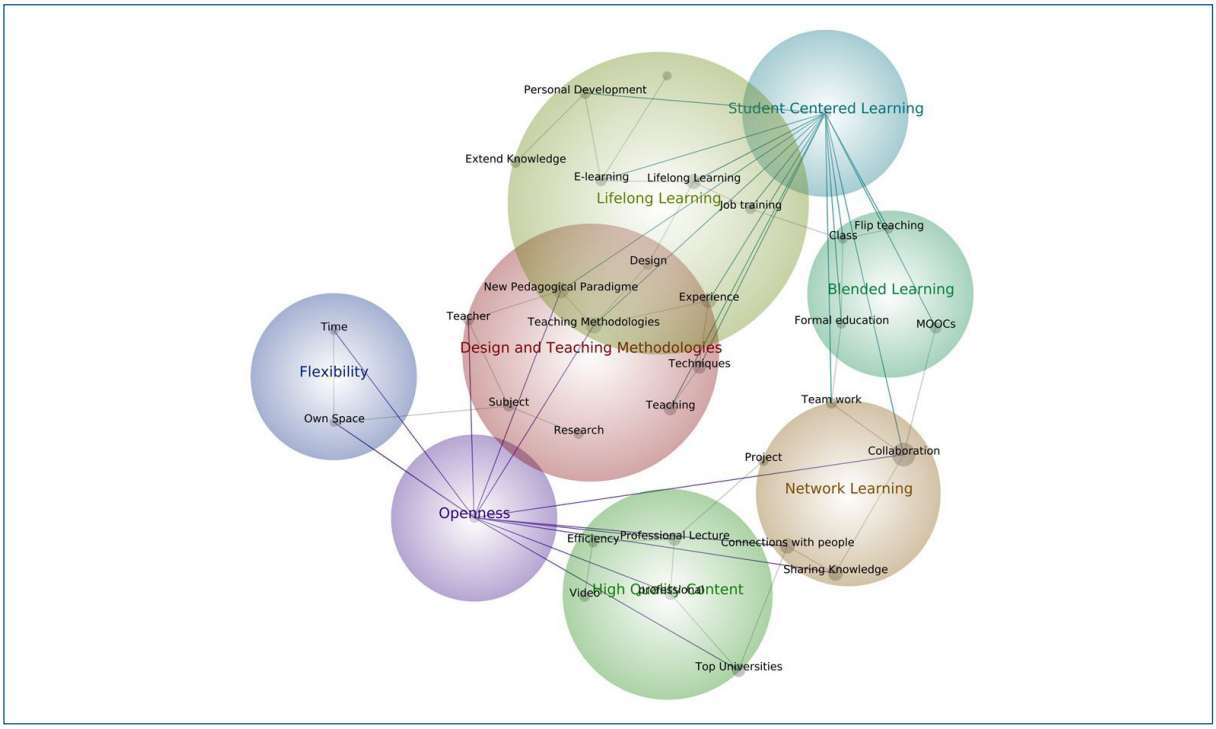
Figure 4. MOOC objectives concept map generated by Leximancer



In a next step, Leximancer groups related concepts that co-occur with other concepts in the map. As a result, similar concepts are clustered together, as illustrated in Figure 5.

Figure 5. Clustering of MOOC stakeholder objectives



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The final step in the Leximancer analysis is to identify the label that best represents each cluster. In order to attach significant labels to the clusters, we checked the concept labels that the Leximancer system proposed and combined them with the category labels that have been used in Mayring's inductive category development analysis in Section 3.1. As a result, the following eight clusters were identified: *blended learning, instructional design and learning methodology, flexibility, high quality content, lifelong learning, network learning, openness, and student-centered learning*.

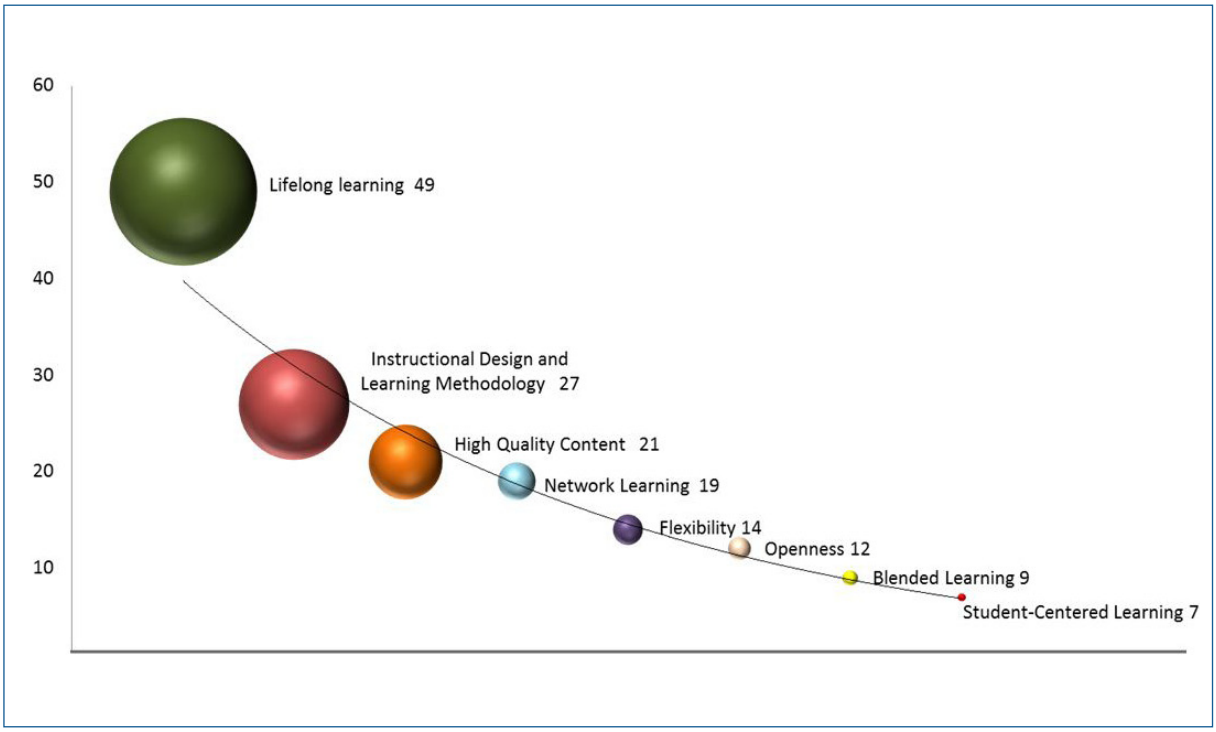
We validated the clustering results by applying the inter-rater reliability coefficient between the mapping of the responses to the cluster labels provided by the two experts and Leximancer. Table 2 shows the results of pairwise percent agreement, pairwise Cohen's kappa, and Krippendorff's alpha. The high Cohen's kappa and Krippendorff's alpha coefficients for inter-rater reliability (0.893) reveal an accurate clustering of the responses.

Table 2. Results of the inter-rater reliability test between the two experts and Leximancer

Coding	*Avg. Pairwise Percent Agreement*	*Avg. Pairwise Cohen's Kappa*	*Krippendorff's Alpha*	*N Cases*
Expert 1 & Expert 2 & Leximancer	91.139%	0.893	0.893	158

Figure 6 shows the different patterns of MOOC stakeholders (i.e., their goals when participating in MOOCs). As a next step in the analysis, we investigated the relationship among these clusters by applying the Nvivo 10 cluster coding similarity approach (Richards, 1999).

Figure 6. Number of participants in each cluster (N=158)



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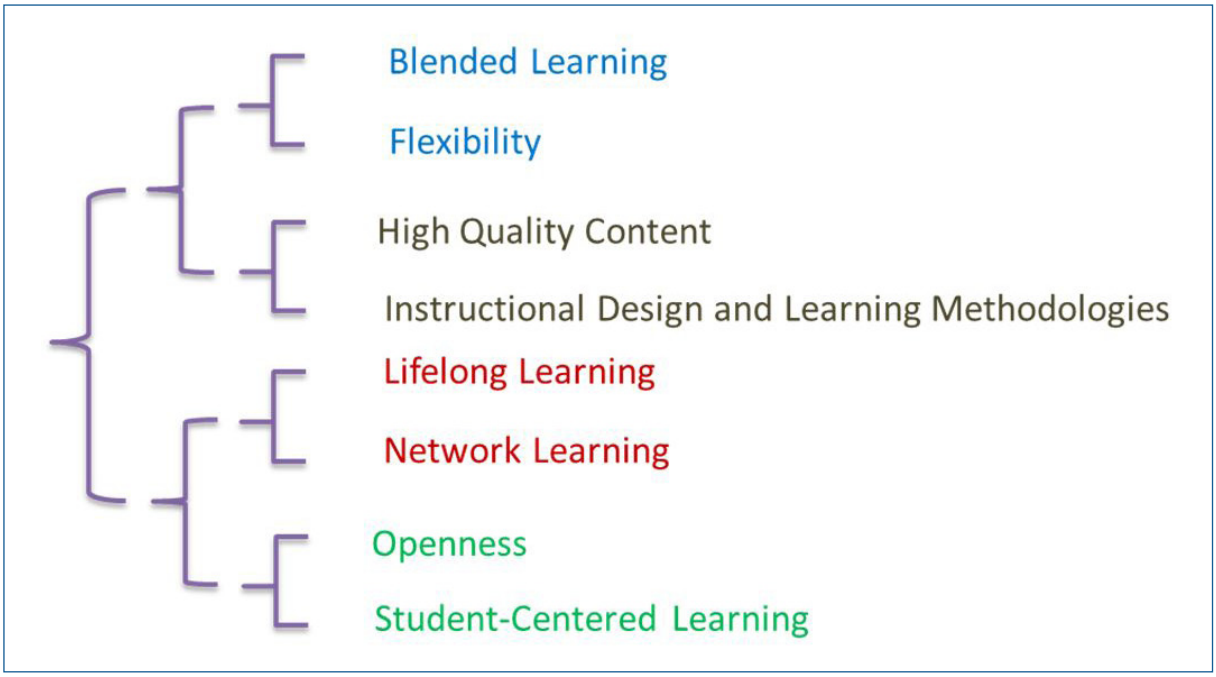
3.3 Nvivo 10 Cluster Coding Similarity Approach

A similarity metric is a statistical method used to calculate correlation among clusters. The Nvivo 10 cluster coding similarity approach allows the clustered data to be analyzed in terms of similarities in attribute values based on Pearson's correlation coefficient, Jaccard's coefficient, and Sørensen's coefficient (Bazeley & Jackson, 2013; Richards, 1999).

We provided the final eight clusters of MOOC stakeholders and the responses associated with each cluster as input to Nvivo 10. We then applied the coding similarity metric to measure the similarity between these clusters. The result was a horizontal diagram that shows similar items on the same branch and dissimilar items on different branches, as shown in Figure 7.

Figure 7. MOOC stakeholders cluster coding similarity



There is little work that attempts to find the relationship between stakeholder motives when involved in MOOCs and the type of MOOC itself. The result of the cluster coding similarity provides the opportunity to detect potential relationships between stakeholder objectives and MOOC type. As shown in Figure 7, the blended learning, flexibility, high quality content, and instructional design and learning methodologies clusters are tied together in the first branch. This grouping reflects the main features of xMOOCs characterized by a replication of traditional educational practices driven by formal learning institutions. xMOOCs have predefined course structures, focus on the provision of high quality content, and follow teacher-led instructional design methodologies. Moreover, xMOOCs provide flexible access to a wide range of learning materials and offer the opportunity to bring together online and face-to-face learning.

On the other hand, lifelong learning, network learning, openness, and student-centered learning are grouped together in the second branch. This grouping reflects the main characteristics of cMOOCs. Unlike xMOOCs, which

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focus on formal learning, cMOOCs are often used to support open, networked, self-organized, and lifelong learning. This kind of learning tends to be experimental, spontaneous, and free from rigid curricula; thus offering new opportunities for personal development (Fernández, 2013).

Table 3 summarizes the relationship between stakeholder perspectives when involved in MOOCs and MOOC type. Besides xMOOCs and cMOOCs, we present possible stakeholder perspectives in smOOCs and bMOOCs, driven by Figure 2 and the characteristics of these MOOC types as discussed in the literature (Coates, 2013; Gaebel, 2013; Yousef, et al., 2014a).

Table 3. Relationship between stakeholder perspectives and MOOC type

Clusters	*cMOOCs*	*xMOOCs*	*smOOCs*	*bMOOCs*
Blended Learning	-	√	(√)	√
Flexibility	-	√	-	√
High Quality Content	-	√	√	√
Instructional Design and Learning Methodologies	-	√	-	√
Lifelong Learning	√	-	(√)	(√)
Network Learning	√	-	(√)	(√)
Openness	√	-	(√)	(√)
Student-Centered Learning	√	-	√	(√)
√ Completely (√) Partly – Very limited supported				

4. Discussion

Our study aimed to cluster and analyze the main stakeholder objectives behind participating in MOOCs. In the previous sections, we presented the details of the clustering analysis of MOOC stakeholder perspectives. In short, the main perspectives include blended learning, flexibility, high quality content, instructional design and learning methodologies, lifelong learning, network learning, openness, and student-centered learning. In this section, we focus on the discussion of the clustering results by performing both a quantitative and qualitative analysis.

4.1 Quantitative Analysis

Figure 6 shows the clustering results and the number of participants in each cluster. Nearly one third of MOOC stakeholders (49 out of 158) consider lifelong learning as the main objective behind their participation in MOOCs. Of the participants, 30% were interested in instructional design and learning methodologies, and high quality content. The remaining clusters, i.e., network learning, flexibility, openness, blended learning, and student-centered learning include relatively fewer participants.

The high number of participants assigned to the lifelong learning cluster can be explained by the demographic information in the survey. In fact, the majority of the respondents (82%) were adults aged over 30 years, where 46%

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were over 40. This finding is in agreement with Liyanagunawardena et al.'s (2013), de Waard et al.'s (2011), and Hill's (2013) findings, which showed that most of the participants who have participated in MOOCs are adult learners over the age of 30, and are often referred to as lifelong learners.

4.2 Qualitative Analysis

The aim of the qualitative analysis is to build a deeper and better understanding of MOOC stakeholder perspectives. This can help MOOC providers in designing and implementing successful MOOC environments that address the different goals of their participants. In the following sections, we discuss the stakeholder perspectives in each cluster.

4.2.1 Blended Learning

Blended learning has become an important TEL model by integrating online and traditional face-to-face learning (Yousef, et al., 2014c). In our study, 5.7% of MOOC stakeholders reported that their primary goal for participating in MOOCs was to enhance their classroom learning and to improve relationships with teachers and peers. Some representative objectives in the cluster are: "enhancing capabilities", "acquiring better study habits", and "getting used to new technologies for learning", "try to reduce the effort of the teacher with students in his class without losing quality", "to experiment interactivity at a distance and integrating MOOCs with traditional classes", and "to support face-to-face learning with Technology-Enhanced Learning" .

4.2.2 Flexibility

One of the successful factors in MOOCs is flexibility (Mackness, Mak, & Williams, 2010). Along that line, 9% of MOOC stakeholders reported that the major reason for their participation in MOOCs was the ability to access information and resources at a time and a place convenient to them. Some objectives included in this cluster are: "learning at my own pace", "diversity of learning material", and "communicate with peers synchronously as well as asynchronously across space, time, and pace".

4.2.3 High Quality Content

This cluster reflects the significance of high quality content to empower and engage people around the world to participate in MOOCs. High quality content was a major goal for 13% of the participants. Some of the objectives in this cluster are: "to learn from the best universities all over the world", "to gain experience from top universities", and "get free online courses from the world's leading universities".

4.2.4 Instructional Design and Learning Methodologies

The instructional design and learning methodologies cluster represents 17% of MOOC stakeholders. The focus in this cluster is on a pedagogical design that can engage learners to attend courses, and on technological design criteria that can make MOOCs more dynamic. Participants in this cluster mainly aimed to investigate new learning methodologies and to research innovative instructional design approaches. Some representative objectives are: "provides some scaffolding for learners", "learn complementary techniques", "to promote a new pedagogical paradigm for personal knowledge management", and "learning how to develop and organize effective MOOCs or flipped classrooms", and "how to investigate some new component of assessment methods".

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4.2.5 Lifelong Learning

MOOCs open doors for new lifelong learning opportunities (Kop, Fournier, & Mak, 2011). This cluster stresses the advantage of MOOCs for those who are working full-time or have taken a break from formal education. Of the stakeholders, 31% consider lifelong learning as the main objective behind their participation in MOOCs. This high number reflects the fact that people are tending to learn through MOOCs for their personal or professional interest rather than obtaining an official academic degree. Representative objectives for this cluster are: "self-improvement for career advancement", "professional development", and "MOOCs open the mind to expand my horizon and ongoing learning for job requirements".

4.2.6 Network Learning

This cluster reflects the original concept of early cMOOCs launched by Downes and Siemens (CCK08), which are based on connectivism. In the network learning model, learners are allowed to network together for developing, discussing and exploring alternatives, and for sharing responsibilities for their learning. Of the participants, 12% had network learning as a major goal behind their participation in MOOCs. Some representative objectives are: "working cooperatively in groups", "share goals, ideas, resources, activities" and "supporting each other".

4.2.7 Openness

This cluster reflects the 4Rs that characterize openness, i.e., Reuse, Revise, Remix, and Redistribute (Peter & Deimann, 2013). Openness also refers to accessing open educational resources (OER), e.g., course notes, PowerPoint presentations, video lectures and assessment, thus providing a learning experience to a vast number of participants around the globe regardless of their location, age, income, ideology, and level of education, without any entry requirements or course fees. This cluster represents 7.6% of MOOC stakeholders in our study. Some representative objectives are: "provide materials that are easy-to-update", "the most important one, all of the courses are free", "how I learn with OER".

4.2.8 Student-Centered Learning

Student-centered learning puts the learner at the center of the learning activity (Chatti, 2010). Student-centered MOOCs focus on the interests of the learners rather than teachers and providers. They provide a space for learners to be active participants in the learning process and to get mutual support. In our study, only 4.4% of MOOC stakeholders mentioned student-centered learning as a goal. Representative objectives in this cluster are "put myself in the shoes of a student", "learn in a semi-organized structure as opposed to an organized 'school' system", "self-regulated", and "self-reflection on the learning process and the impact of different learning designs from a learner perspective".

5. Conclusion and Future Work

MOOCs are an innovative form of Video-Based Learning (VBL) in the sense that they provide opportunities to a massive number of learners to attend free online courses around the globe. However, the high drop-out rate averaging 95% has been frequently noted in MOOC-related literature. One of the potential reasons for that is the complexity

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and diversity of MOOC participants. This diversity of MOOC participants is not only related to the cultural and demographic profile, but also to the motives and perspectives when enrolled in MOOCs. This paper aimed to cluster the different patterns of MOOC stakeholders in order to build a deeper and better understanding of their behaviors. To the best of our knowledge, this paper represents the first attempt to cluster MOOC stakeholder perspectives.

We conducted an online survey in order to answer an open-ended question **"What are your goals/objectives when participating in MOOCs?"**. We received 158 responses from learners and professors. We applied different concept mapping analysis methods in order to analyze the survey responses. The clustering resulted in a set of eight groups. The cluster with the highest number of participants is lifelong learning (49), followed by instructional design and learning methodologies (27), high quality content (21), network learning (19), flexibility (14), openness (12), blended learning (9), and student-centered learning (7). The computation of the similarity between the clusters, which indicates the relationships between the same, resulted in two bigger clusters. One reflects the characteristics of xMOOCs and contains blended learning, flexibility, high quality content, and instructional design and learning methodologies clusters. The other reflects the characteristics of cMOOCs and contains lifelong learning, network learning, openness, and student-centered learning. According to this clustering, the number of participants with goals related to cMOOCs (87) was found to be slightly higher than those interested in xMOOCs (71). However, most MOOC implementations continue to focus on xMOOCs that follow a top-down, controlled, teacher-centered, and centralized learning model. Attempts to implement bottom-up, student-centered, really open, and distributed forms of MOOCs (i.e., cMOOCs) are the exception rather than the rule. Thus, we need to put more emphasis on the implementation of hybrid MOOCs that can combine the advantages of both xMOOCs and cMOOCs to meet the goals of a wide range of participants. This might be a solution for reducing drop-out rates in the current MOOCs. Our future work will investigate a set of specific criteria related to each cluster. These criteria would help us in designing successful hybrid MOOCs reflecting different stakeholder perspectives.

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About the authors

Ahmed Mohamed Fahmy Yousef
ahmed.fahmy@cil.rwth-aachen.de
Learning Technologies Group (Informatik 9), RWTH Aachen University, Germany

Ahmed Mohamed Fahmy Yousef is an assistant researcher of education technology in the Learning Technologies Group (Informatik 9) at RWTH-Aachen University, Germany. He holds a BA in Education Technology from Cairo University, Egypt (2002) and an MA in Instructional Technology (E-Learning) from Ain Shams University, Egypt (2008). His research focuses on Video-Based Learning (VBL), Learning Management Systems (LMS), Massive Open Online Courses (MOOCs), blended learning, interactive multimedia and usability issues, instructional design, network and collaborative learning, assessment strategies for hybrid learning, and learning analytics.

Lehr- und Forschungsgebiet Informatik 9, RWTH Aachen
Ahornstrasse 55
52074 Aachen
Germany

Mohamed Amine Chatti
chatti@informatik.rwth-aachen.de
Learning Technologies Group (Informatik 9), RWTH Aachen University, Germany

Mohamed Amine Chatti holds a Diploma Degree in Computer Science from the University of Kaiserslautern, Germany (2004) and a PhD Degree in Computer Science from RWTH Aachen University, Germany (2010). He is an assistant professor of Computer Science in the Learning Technologies Group (Informatik 9) at RWTH Aachen University. His research focuses on web information systems, Technology-Enhanced Learning, and knowledge management.

Lehr- und Forschungsgebiet Informatik 9, RWTH Aachen
Ahornstrasse 55
52074 Aachen
Germany

Marold Wosnitza
marold.wosnitza@rwth-aachen.de
Professor of Pedagogy and Education, RWTH Aachen University, Germany

Marold Wosnitza is a professor of education at the RWTH Aachen University. He is managing director of the institute of Education. His research interests include assessment, self-assessment, impact of emotions in social online learning, Collaborative and Cooperative Learning and Working and Teacher Motivation and Resilience.

Eilfschornsteinstr. 7
52056 Aachen
Germany

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Ulrik Schroeder
schroeder@cil.rwth-aachen.de
Learning Technologies Group (Informatik 9), RWTH Aachen University, Germany

Ulrik Schroeder is a professor of Computer Science at RWTH Aachen University, Germany. He heads the Learning Technologies Research Group. He is also the head of the Center for Innovative Learning Technology (CIL) and the director of the School Laboratory for Computer Science (InfoSphere) at RWTH Aachen University. His research interests include assessment and intelligent feedback, mobile learning, gender mainstreaming in education, and computer science teacher training.

Lehr- und Forschungsgebiet Informatik 9, RWTH Aachen
Ahornstrasse 55
52074 Aachen
Germany

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MOOCs: Game Changer or Passing Fad?

Self-motivation challenges for student involvement in the Open Educational Movement with MOOC

Brenda Jeanett García Espinosa[1], Gloria Concepción Tenorio Sepúlveda[2] and María Soledad Ramírez Montoya[3]

1. Tecnológico de Monterrey, Mexico | brenda.jgarciae@gmail.com
2. Tecnológico de Estudios Superiores de Chalco (TESCHA), Mexico | gloria_cts@yahoo.com.mx
3. Tecnológico de Monterrey, Mexico | solramirez@itesm.mx

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Abstract

This article attempts to answer the questions: What are the challenges, problems and obstacles of involving less self-motivated students in MOOCs and how do they relate to their learning connectivism? The correlations between connectivism and contextualized learning through a formative experience of the Open Educational Movement was analyzed in order to propose strategies that result in greater perseverance, active participation and retention of less self-motivated students in MOOCs. A mixed method approach was used to survey students, interview students and coordinators, and analyze relevant documents. The findings were classified as (1) Challenges: self-motivation, self-regulation abilities, extra time invested, release requirements, goals and inductive activities before the course opening, unsatisfactory identification of students, difficult activities, feedback monitoring and a platform incompatible with balancing its use with that of social networks; (2) Problems: limited information and communication technology skills, difficult feedback research in forums, uncertain peer feedback when not theory-based or scaffolded by teachers, scarce theoretical support in evidence portfolios and a lack of means to help low self-motivated or self-regulated students; (3) Main contextual obstacles: some students cannot count on their employers' support or continuous technology access, some students basic wellbeing needs are not met, and inability to contextualize learning; (4) Connectivism: students' motivation in the MOOC content and their expanding knowledge networks. Based on these findings, a MOOC design requirement template aimed at supporting students' self-motivation and self-regulation through connectivism is provided.

Keywords

self-motivation, open education movement, MOOCs, e-learning, connectivism, contextualized learning

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Retos de automotivación para el involucramiento de estudiantes en el movimiento educativo abierto con MOOC

Resumen

Este artículo indagó la siguiente cuestión: ¿cuáles son los desafíos, problemas y obstáculos para involucrar a los estudiantes menos automotivados en los MOOC y cómo se relacionan con el conectivismo de sus aprendizajes? El objetivo fue analizar las correlaciones entre el conectivismo y el aprendizaje estudiantil contextualizado, en una experiencia formativa del movimiento educativo abierto, con el fin de aportar estrategias que generen mayor perseverancia de estos estudiantes, participación activa y retención estudiantil. El método de estudio fue mixto, con aplicación de encuestas a estudiantes, entrevistas a alumnos y maestros, así como el análisis de documentos significativos. Los hallazgos se clasificaron en: (1) Desafíos*: requerimiento de habilidades de automotivación, autorregulación y tiempo adicional por parte de algunos alumnos, difícil monitoreo de retroalimentaciones y actividades, falta de liberación anticipada de requerimientos, objetivos y actividades de inducción, deficiente identificación de alumnos observadores e incompatibilidad entre la plataforma y el uso de redes sociales; (2)* Problemas*: baja apropiación tecnológica de participantes, difícil búsqueda de retroalimentaciones específicas en los foros, portafolios de evidencias sin fundamento teórico y falta de recursos de ayuda para estudiantes de baja automotivación y autorregulación; (3)* Obstáculos*: falta de apoyo de los centros de trabajo para los participantes del MOOC y de acceso continuo a recursos digitales, incumplimiento de las necesidades personales básicas de los estudiantes sobre bienestar y el no contextualizar nuevos saberes; (4)* Conectivismo*: motivación de los participantes en sus contenidos e incremento de sus redes de saber. Con base en estos hallazgos se aporta una plantilla con requisitos de diseño de MOOC, enfocado a la automotivación y autorregulación estudiantil mediante el conectivismo.*

Palabras clave

automotivación, movimiento educativo abierto, MOOC, e-learning*, conectivismo, aprendizaje contextualizado*

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1. Context and theoretical framework

The subject of formative open practices has been promoted through the Open Educational Movement by adding Open Educational Resources (OER). In the 1990s, courses, resources and materials, as well as institutions' scientific and academic production were rarely open; however, in recent years, new practices, fields of knowledge, educational practices and lifestyles have emerged, and we have seen the rise of technologies that support formative experiences such as e-learning, the Open Education Movement, the integration of OER and informal learning through communities of practice (Olcott, 2013; Sangrá & Wheeler, 2013).

In the midst of change, OER have been integrated into connectivism through MOOCs, with inquiries about participants and e-learning models involving formative practices. For example, in MOOCs, student retention is less than 10% (Carr, 2013), which raises interest in studying the challenges faced by its participants. Hence, this study was based on satisfactory learning, self-regulated behaviors and differentiated teaching techniques in MOOCs.

Analyzed studies concerning student behavior in e-learning reveal that a combination of various learning styles produce better academic achievement and motivation (Contreras & Lozano, 2012), that e-learning encourages metacognition and self-regulation (Farias & Ramírez, 2010), and that there is a need to study the developing skills required in MOOCs and knowledge contextualization problems (Ramírez, 2013). Furthermore, motivation is linked to the self-determination shown by students who perform well academically and demonstrate autonomous commitment behaviors such as self-regulated learning, goal definition and self-motivation regulation, all of which are guided and constrained by their context (Wolters, Pintrich, & Karabenick, 2003). This connection has been achieved by the theory of self-determination, which includes the students' satisfaction of the psychological demands of autonomy, ability and affinity. It should also be taken into account that learning motivation occurs by covering the basic needs of organization, distraction reduction and the identification and contextualization of important information (Niemiec & Ryan, 2009; Ormrod, 2005; Sangrá & Wheeler, 2013).

Several studies have been conducted to meet these academic requisites: (1) Niemiec and Ryan (2009) suggested providing various significant bases and minimizing pressure for autonomy, assigning challenging tasks, ensuring important feedback for ability and conveying affection and respect for affinity; (2) Shroff, Vogel, and Coombes (2008) analyzed skill perception, feedback and choices that affect students' self-determination, and; (3) Fisher and Baird (2005) discovered that social networks produce affinity among students, thereby escalating their intrinsic motivation.

It is also worth mentioning that MOOCs require an enrolment and an educational platform to mobilize knowledge by OER. Since they require high regulation, they can be used individually, but in order to prosper, contributions must be shared among colleagues. They are accreditable interinstitutionally if evidence of learning is evaluated and approved; their methodology and design depends on the participants, subject, objective and program (Sangrá & Wheeler, 2013). They are classified as *cMOOCs* when they are exclusively based on connectivism (students determine their commitment), or as *xMOOCs* when they are delivered by a university (Downes, 2012; Evans, Burritt, & Guthrie, 2013). It is important to note that one of the professors for the MOOC used in this study also assumed command of the first one used in Latin America (Ramírez, 2013).

Connectivism joins MOOCs because collaborations develop online materials that produce knowledge according to personal needs (Coughlan & Perryman, 2013; Olcott, 2013). Hence, knowledge must be stored in networks by

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virtue of the digital advances that have boosted the amount of data available (Downes, 2012; Siemens, 2005; Sangrá & Wheeler, 2013).

With this background, this article presents the nature and dimension of a study aimed at analyzing the main challenges, problems and obstacles of involving less self-motivated students in MOOCs, and examining the correlations present between connectivism and contextualized student learning. The starting point of the research sought to answer: What are the challenges, problems and obstacles of involving less self-motivated students in MOOCs and how do they relate to their learning connectivism? Our objective is to find ways to yield strategies that produce a greater persistence by less self-motivated students in MOOCs and increase overall active participation and student retention.

This article describes a study based on a MOOC that was conducted for one month and was taught by a prestigious Mexican university. The university has fueled the Open Educational Movement in Latin America by creating e-books, a DAR repository and a Temoa indexing system, and by training researchers and offering online courses through its virtual university (Ramírez, 2013). The MOOC was on the topic of the Open Educational Movement. More than 20,400 people from 52 countries enrolled on it. Of these, 5% remained active with assistance from 25% of the initial teacher assistants (800 volunteers). The MOOC included administrative forums that promoted connectivity and granted access to a program with participation instructions, self-assessment rubrics and teachers' OER that required student review in order to develop and distribute digital learning evidence (Ramírez & Burgos, 2013a; 2013b). Finally, the students were required to develop an electronic portfolio (e-portfolio) for evaluation by their peers.

2. Research method

The study was based on mixed method research starting with a quantitative approach and followed by a qualitative one, in which the latter had an exploratory design and greater importance (Creswell & Plano, 2011; Onwuegbuzie, Burke, & Collins, 2011; Tashakkori & Teddlie, 2003). In pursuance of inquiries, a triple entry table was developed and ideal sources of information were noted. Its data was corroborated against the selected theoretical framework. Thus, an interview and an observation grid were designed. Using the triangulation technique, the information was verified, granting validity to the qualitative data (Valenzuela & Flores, 2012).

In this context, a pilot test was deployed to ensure reliability of the qualitative data collected. The validity of the interviews was obtained by promoting acceptance and trust among the interviewees, whose responses were transcribed in order to be analyzed using associative member checking. Meanwhile, fingerprint analysis included an observation grid, with categories and subcategories of unit analysis attaining validity by determining object characteristics, and with the results of statistical records analysis by examining figures, thereby making a new observation (Giroux & Tremblay, 2009; Valenzuela & Flores, 2012).

Moreover, the MOOC organizers applied massive surveys and context (used in self-evaluations) and learning rubrics (used in the final peer evaluation) authenticated by a group of experts. Their reliability was given by the active participants' stability; thus, the figures obtained were processed in graphs, statistics and electronic spreadsheets to validate reports (Creswell & Plano, 2011).

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3. Identification of samples

The MOOC studied initially had two teachers, two coordinators, 800 teacher assistants, OER, activities and instructions in order to develop and disseminate knowledge evidence. Its finite and discrete population served as a sample for the quantitative analysis and consisted of 5% of the students who actively participated in the standardized surveys designed by the MOOC organizers (Ramírez & Burgos, 2013c).

On the other hand, the qualitative, non-probabilistic, atypical sample was based on metainferences and on the stratification of the population. It was consolidated by the representativeness and availability of the sample. This included two coordinators, four volunteer students, and three of each of the following objects: OER, products and interactions in social networks and forums (Collins, 2003; Valenzuela & Flores, 2012).

4. Analysis and results

The massive surveys revealed student activity in the MOOC (Table 1). Although it was evident that the course had been clearly outlined, its demands were complex for some, which correlated with their low information and communication technology (ICT) appropriation and/or their poor command of English (Table 2). On the other hand, peer evaluation, which is common in MOOCs because of their size (Martin, 2012), consisted of participants mutually giving numerical ratings according to their perception of the last evidence portfolio. Since this was the only grade collected, the marks were statistically analyzed. This analysis showed a single mode and only one peak (Table 3), and resulted in a grade bar chart (Figure 1) with a leptokurtic distribution, negative skew and positive kurtosis with a curve asymmetry to the right, where the variance revealed minimal grade dispersion (Aiken, 2003; Molina & Rodrigo, 2009; Valenzuela, 2006), as the grades were mostly high.

Table 1. Student activity in the MOOC

People		*Description*
Number	*Percentage*	
17,550	88%	Began the MOOC immediately after enrolment
16,450	82%	Performed no activities and did not accredit the course
1,100	5%	Mean that carried out weekly activities
802	4%	Conducted the final evaluation (peer evaluation)
868	4.3%	Accredited the course
543	3%	Delivered weekly activities and final evaluation

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Table 2. Highest student incidences on skills and technology appropriation

Classification	Percentage	Description
ICT appropriation by respondents	76%	Have e-learning experience
	42%	Possess knowledge regarding online information credibility
	41%	Have advanced ICT skills (70%-80%)
	38%	Possess intermediate knowledge (50%-60%) on OER development
Students' skills	49%	Describe themselves as self-taught
	39%	Members with basic English skills (30%-40%)

Table 3. Peer evaluation results

Measures of					Coefficient of		
Central Tendency			Dispersion				
Mean	Median	Mode	Standard deviation	Variance	Bias	Kurtosis	Variance
8.18	9	10	2.03	4.11	-1.89	4.74	0.50

Figure 1. Peer assessment score bar chart

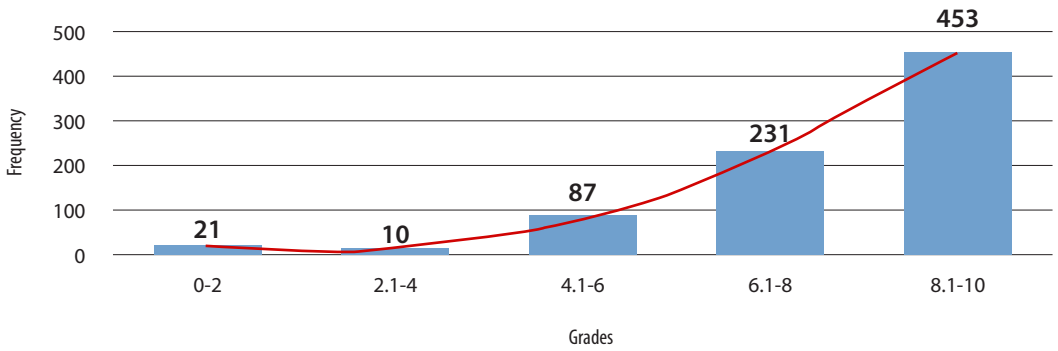

Table 4. Most commonly mentioned student problems relating to the use of knowledge acquired within the MOOC

Percentage	Description
63%	The status of their workplace with respect to the Open Education Movement is zero or beginner
30%	It is hard for them to adapt an OER created in a language other than their own
22%	It takes them a lot of time to adapt another author's OER for use in their educational practice
16%	OER created by other people/institutions do not address the issues that they need to address
10%	OER created by other institutions cannot be applied in theirs

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It is also important to mention that connectivism's collectivity increased the scope of the students' personal networks of knowledge, which was evidenced when they shared portfolios (appreciated by 63%), information in forums, and established working groups in social networks, perceiving 43% affinity. This is because in connectivism, knowledge is stored in networks. Given the amount of information flowing nowadays, such networks may include communities of learning with collaborative social ties to create constructivist knowledge (Downes, 2012; Fisher & Baird, 2005; Siemens, 2005).

A low percentage of accreditations (Table 1) was detected as a result of partial ICT appropriation (Table 2), on the grounds that certain skills are required on MOOCs (Ramírez, 2013) which most of the enrolled students did not possess (Mupinga, Nora, & Yaw, 2006). Disparities between the MOOC's purposes and student expectations discouraged the latter. To avoid this, the course must distinguish its objective, subject, format, program and type of participants, and in this fashion, organizers must choose adequate ICTs to meet students' goals and have a broader reach (Ransdell, 2009).

The low quality of peer feedback demotivated students. The large number of participants did not allow everyone to have a teacher assistant, and those who were available were not permanent or lacked adequate expertise. Although students should receive accurate and meaningful comments (Shroff, Vogel, & Coombes, 2008), the size of the MOOC group merits observations among peers, which may be imprecise (Martin, 2012).

Students who do not contextualize new knowledge are discouraged. In this course, 63% of the participants worked in a low ICT appropriation environment (Table 4). In spite of people's self-determination, their contexts limit them (Wolters, Pintrich, & Karabenick, 2003) and, in order to inspire motivation, information must be contextualized (Ormrod, 2005).

Self-motivation can be encouraged in MOOCs if they include attractive subjects, appropriate assessments and connectivism. This was noticeable when the students found the latter, meeting their own and the MOOC's OER goals through connectivism, and situating new learning (Niemiec & Ryan, 2009). Nonetheless, students who were technologically behind used the MOOC inductively. Its autonomy allowed learning customization and provided tools for academically weak students to improve their understanding.

MOOCs instigate self-regulation when their members set goals to complete strenuous tasks using self-assessments, rubrics and instructions. The self-motivated students' commitment allowed them to learn and organize their learning by focusing on important information. Virtual activities reinforce self-regulation (Farías & Ramírez, 2010) and reflective qualities, making it crucial to offer tools that encourage them, since in most cases they can be assimilated (Contreras & Lozano, 2012; Wolters, 2010).

The MOOC's educational platform has an impact on the generated learning. One can learn more and quicker with the user-friendly environment of *cMOOCs*, if data validity is discerned; otherwise, only the formality of *xMOOCs* will be reliable. Finally, educational platforms may become confusing if they control all activities, since formal systems are not necessarily required to disseminate knowledge (Downes, 2012).

5. Discussion and conclusions

This section presents the challenges, problems and obstacles of involving less self-motivated students in MOOCs. It subsequently explains how students relate to their learning connectivism. Finally, it presents the findings and provides recommendations for future studies concerning this type of course.

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Challenges of involving less self-motivated students in MOOCs: (1) students that do not have a high proficiency in the language used on the platform or are unfamiliar with MOOCs or their educational environment need additional time to cover course objectives, look up meanings, and explore and learn about the tools they have to use; (2) self-regulation and self-motivation skills are requirements to perform successfully in the MOOCs; (3) a lack of thorough feedback and monitoring activities, due to the size of MOOCs, lead to student dropout or inactivity; (4) failure to release inductive activities sooner and prepare students, reducing scan time once the MOOC begins; (5) pre-course information stating clearly defined objectives and language requirements to increase student satisfaction regarding learning expectations and student retention; (6) designing or selecting a MOOC educational platform that balances its use with that of social networks for knowledge construction, and; (7) including more social networking and interactive activities.

Problems of involving less self-motivated students in MOOCs: (1) cybernetic and e-portfolio sharing difficulties due to some students scant ICT appropriation; (2) difficult quest for specific feedback in forums because of the MOOC's large size; (3) uncertain peer feedback quality if not endorsed by teachers or theoretically supported; (4) some evidence portfolios with no theoretical background were useless to the rest of the group, and; (5) it did not include objectives to identify and timely support students whose motivation and self-regulation skills were low.

Obstacles of involving less self-motivated students in MOOCs (predominantly contextual aspects): (1) students low workplace support discouraged their participation and undermined the application of recently acquired knowledge, but if students had suitable ICT appropriation, they would continue constructing and applying their knowledge personally and professionally through connectivism; (2) inconsistent ICT access for some students discouraged them by not being able to comply with their evidence portfolio, and; (3) a failure to meet some students basic personal wellbeing needs, or their inability to contextualize new knowledge due to the absence of such demands, discouraged them and led students to drop out.

It is noteworthy that in this course ***connectivism:*** (a) motivated members by stimulating interest in its content through forums when students updated and obtained new knowledge through interactions with others, (b) along with the MOOC's autonomy, promoted study group development for sharing OER and exchanging data in social networks and other systems, resulting in a knowledge network that could continue growing on the completion of the MOOC.

This *study's* ***goal*** was fulfilled by designing a MOOC requirements template. The template focused on self-motivation and student self-regulation through connectivism (Table 5). Its use can generate flexible MOOC designs based on connectivism, which perceive learning styles, include OER, methodologies to meet students' expectations, help them overcome learning inconsistencies, and support self-regulation and self-motivation.

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Table 5. Template design of MOOC requirements focused on self-motivation and student self-regulation through connectivism

Type of activity	*Activity detail*	*OER support activities*
Induction	*Provide at least five activities expressing and justifying its early release date.*	YouTube, etc.
Interactive	Trial and error tests. *Provide at least one activity per week other than the synchronous sessions.*	Survey Monkey, etc.
Recognize low self-regulated or self-motivated students	Describe and justify the procedure to identify such students.	Surveys, etc.
Self-regulation promotion	Generalized or voluntary call to identify low self-regulated students to perform activities such as reducing distractions, improving organization, distinguishing important information, looking for assistance, etc. *Offer at least seven activities.*	Corrective activity, monitoring, etc.
Self-motivation stimulation	Determine goals and reinforcement activities to conclude tasks, verify compliance of basic human needs and psychological demands, take advantage of students' excitement when being taught a new subject to make an impact on them with new knowledge. Develop plans that include elements of expectation linked to student ability, self-efficacy activities with self-affectivity outcomes, socialized scaffolding, etc. For autonomy: offer significant and varied learning bases, recognize student perceptions, minimize impositions, etc. Finally, for ability, assign challenging tasks and procure important feedback. *Offer a minimum of seven justified activities.*	Vary teaching format, transmit affection and respect, include formative assessments, etc.
Modeling	Examples of mandatory activities. *Provide at least one per week.*	Send examples
Social network inclusion	*Provide at least one per week.*	Twitter, etc.
Distinguish students learning styles	Explain the procedure to perform the identification. *Apply an initial survey that provides information for grouping suggestions, examples, etc.*	Surveys, etc.
Customized according to learning styles	*Provide at least one per week.*	Interactive, etc.
OER contextualization	Deliver the MOOC in at least one more language than the original.	Resource translation
Procedure to select competent teacher assistants	Explain and justify the selection procedure as well as the remedy plan in the event of teacher assistant dropout.	Survey Monkey, etc.
Plan to ensure quality feedback	Ensure that all students receive meaningful feedback.	Databases

The study's ***findings*** provide the following scientific contributions: (1) it is critical to promote self-determination and connectivism in MOOCs so that their members establish cybernetic connections by writing and analyzing metacognitive and horizontal contributions in forums to produce new knowledge agreements that invigorate the educational community; (2) effective learning, which results from self-regulation in MOOCs, will be produced by a smooth design that includes relevant resources, attractive subjects and aspects referred to in Table 5; (3) self-motivation, autonomy and self-regulation in MOOCs will be fostered if self-assessments, timely and significant reviews, proper scheduling and activity differentiation are provided; (4) MOOCs are tools that especially benefit students with low purchasing power, as they bring them closer to new knowledge and enable them to construct their own; (5) for technologically lagging or academically weak students, MOOCs are tools that give autonomy, and their evaluation style can support information comprehension by updating and motivating them to work

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at their own pace; (6) in the interest of effectively integrating less self-motivated and less self-regulated students into MOOCs, a differentiation between general activities and tasks to improve these behaviors is needed, and; (7) to increase retention, students must perceive affinity and course belonging, which comes from a course meeting their expectations.

Suggestions for future MOOCs stemming from this study: (1) to focus students' questionnaires in order to identify aspects such as their self-motivation and self-regulation characteristics, learning styles and academic weaknesses; (2) to monitor students that do not participate actively and distinguish them from those who might drop out from the course in order to timely help and study the latter; (3) to look for statistics on student retention that are more useful, since some students who enroll do not start, sign up several times, etc.; (4) to meet personally with some of the MOOC attendees and course designers to address issues that, according to their perception, were not covered; (5) include weekly learning self and summative assessments, with statistical data to promptly guide teacher assistants, coordinators and teachers regarding the conceptual quality of the formative evidence portfolios.

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About the authors

Brenda Jeanett García Espinosa
brenda.jgarciae@gmail.com
M.Ed. in Educational Technology from the Graduate School of Education (EGE) and B.Sc. in Industrial and Systems Engineering from Tecnológico de Monterrey

Brenda Jeanett García Espinosa holds a M.Ed. in Educational Technology from the Graduate School of Education and a B.Sc. in Industrial and Systems Engineering, both from Tecnológico de Monterrey. She has worked in Mexican private schools teaching Science and Technology. She has taught robotics, online etiquette, digital skills and general productivity software, requiring interdisciplinary projects from students. She was a technology coach for teachers, who trained weekly in subjects such as OER selection, teaching innovation, school platform, software and hardware effective usage, etc. She was also a member of the school's committee for Science curriculum validation for 4th to 7th grades. Finally, as a Head Science teacher in 6th grade, she received the Startech award for teaching classes that were immersed in technology in order to promote students' critical thinking and collaborative, innovative and differentiated learning using self-created materials, OER and licensed resources, as well as requiring student creation of electronic portfolios, mobile technology projects, etc.

Einstein 2408
Contry la Silla, 7º sector
Guadalupe, Nuevo León
Mexico 67173

Gloria Concepción Tenorio Sepúlveda
gloria_cts@yahoo.com.mx
Professor of B.Sc. in computer systems engineering; Tecnológico de Estudios Superiores de Chalco (TESCHA)

Gloria Concepción Tenorio Sepúlveda has a M.Ed. in Educational Technology from the Graduate School of Education (EGE) from Tecnológico de Monterrey, a bachelor's degree in Administrative Computer Science from the American Technological University (UTECA) and a Technologist in Information and Computers qualification from the Technological University of Nezahualcóyotl (UTN). Her professional experience has been focused on software development and technology support in education. She has been a facilitator of face-to-face, blended and distance learning environments for both bachelor's and master's degree programs. She obtained the Microsoft Office Specialist, Traditional Teaching Tutoring (CONOCER) and the Tutoring in Academic Transformation and Management Mentor (Harvard) certifications. She was the writing coordinator for the book *Educational Teaching and Practical Competences in Distance Education*, in which she authored the chapter "Competencies for OER production in b-learning environments". She participated as a speaker at the joint Iberoamerican Conference on Technologies and Learning 2014 and is collaborating on the development of standardized questions and answers for the CENEVAL (National Evaluation Center).

Tecnológico de Estudios Superiores de Chalco (TESCHA)
Carretera Federal México – Cuautla s/n
56641 La Candelaria Tlapala, Chalco
Mexico

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María Soledad Ramírez Montoya
solramirez@itesm.mx
Permanent research professor for Education, Humanities and Social Sciences and coordinator of innovation of educational models; Tecnológico de Monterrey. Chair of the open educational movement UNESCO offices for Latin America and of ICDE OER Latin America

María Soledad Ramírez Montoya holds a PhD in Education from Salamanca University (Spain). Her research focuses are teaching strategies, digital resources for the education and training of educational researchers. She is chair of the open educational movement UNESCO offices for Latin America and of ICDE OER Latin America. She is the main investigator for the Network Strengthening Information Society Research Capacity Alliance (SIRCA), coordinator of educational models of Tecnológico de Monterrey and is the main organizer of the Latin American Open Regional Network of Social Research and Education (CLARISE).

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MOOCs: Game Changer or Passing Fad?

Indicators of pedagogical quality for the design of a Massive Open Online Course for teacher training

Lorena Yadira Alemán de la Garza[1], Teresa Sancho-Vinuesa[2] and Marcela Georgina Gómez Zermeño[3]

1. Monterrey Institute of Technology and Higher Education (ITESM), Mexico | lorena.aleman@itesm.mx
2. Open University of Catalonia (UOC), Spain | tsancho@uoc.edu
3. Monterrey Institute of Technology and Higher Education (ITESM), Mexico | marcela.gomez@itesm.mx

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Abstract

Massive Open Online Courses (MOOCs) have generated high expectations and revolutionized some educational practices by providing open educational resources for reference, usage and adaptation; therefore, their pedagogical quality is often questioned. The objective of this study is to identify indicators related to pedagogical, functional, technological and time factors in order to assess the quality of the MOOC entitled "*Liderazgo en gestión educativa estratégica a través del uso de la tecnología*" (Leadership in strategic educational management through the use of technology), offered as a teacher training program through Coursera to 10.161 participants. Via the Delphi method, a group of 55 experts agreed that time is a key factor to be considered in the design of learning activities. It was concluded that without measuring results, the success of a MOOC could not be evaluated; thus, institutions and consortia must establish evaluation indicators to focus their efforts on the enhancement of pedagogical quality. By providing relevant information, the learning potential of educational resources based on connectivism principles can be evaluated, and so can the quality of MOOCs. The goal is to contribute to a vision of a future in which everyone has access to a world-class education.

Keywords

Massive Open Online Courses, MOOC, evaluation, pedagogical quality, teacher training

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Indicadores de calidad pedagógica para el diseño de un curso en línea masivo y abierto de actualización docente

Resumen

Los cursos en línea, masivos y abiertos (MOOC) han generado importantes expectativas y han revolucionado algunas prácticas educativas, al ofrecer recursos educativos abiertos para su consulta, uso y adaptación; sin embargo, con frecuencia se cuestiona su calidad pedagógica. El objetivo de este estudio es identificar indicadores relacionados con factores pedagógicos, funcionales, tecnológicos y de tiempo, para evaluar la calidad del MOOC Liderazgo en gestión educativa estratégica a través del uso de la tecnología, ofrecido como recurso de actualización docente en Coursera a 10.161 participantes. Mediante el método Delphi, un grupo de 55 expertos acordó que el tiempo es un factor clave a considerarse en el diseño de las actividades de aprendizaje. Se concluye que sin medición de los resultados no se puede valorar el éxito de un MOOC, por ello instituciones y consorcios deben establecer indicadores de evaluación para enfocar sus esfuerzos para la mejora de su calidad pedagógica. Si se proporciona información relevante se podrá evaluar el potencial de aprendizaje que poseen los recursos educativos basados en principios conectivistas y reconocer la calidad pedagógica de los MOOC, con el objetivo de coadyuvar a la visión de un futuro en el que todos tengan acceso a una educación de clase mundial.

Palabras clave

cursos en línea masivos y abiertos, MOOC, evaluación, calidad pedagógica, actualización docente

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1. Introduction

Currently, Massive Open Online Courses, or MOOCs, have generated high expectations and revolutionized pedagogical practices by providing open educational resources for reference, usage and adaptation (UNESCO, 2012). c-MOOCs, which gave rise to this phenomenon, adopted a pedagogical strategy with an epistemological basis grounded in connectivism; they also promoted educational change, not only through technological advances, but also through the theoretical developments that emerged from this field of study (Zapata-Ros, 2013). They provided access opportunities to the general public and were facilitated by renowned professionals who took a vital role. Thus, c-MOOCs made knowledge from a wide range of prestigious universities available to the whole world at a speed, scope, scale and price that no traditional course would be in a position to offer (Bell, 2012). Just a decade ago, this type of training would have been impossible without the current advances of technology (Friedman, 2013; Skiba, 2013).

Siemens (2004) posits that connectivism is an educational theory characterized by considering learning as an extension of a personal network through which participants learn, share knowledge and comprehend. He claimed that the most important contribution of MOOCs resided in their potential to change the relationship between students and teachers, academia and the community at large, by offering a broad and diverse virtual space, a meeting place for the exchange of ideas. He emphasized that anyone enrolling on a MOOC would probably find learning in its most exposed form, through platforms that not only invited participants to see and hear, but also to participate and collaborate.

Despite its rapid integration into the educational offering, the Institute for Prospective Technological Studies claims that the criteria for evaluating the educational quality of a MOOC lack transparency and warns that, for the moment, the implemented educational models are evidently not sustainable (Aceto, Borotis, Devine, & Fischer, 2014).

For Sangrà and Wheeler (2013), the massive aspect of the courses, which is promoted as something positive, has never been a feature of successful training. They believe that, in MOOCs, informal learning has found a perfect ally in ICT in general, and in online learning in particular. This emphasizes the need to investigate MOOCs in depth in order to establish whether they represent real opportunities for learning in informal settings, or if they are simply attempts to formalize the informal.

This article presents the results of a study aimed at identifying indicators for the educational quality of a MOOC, which will greatly improve the design of the course entitled "*Liderazgo en gestión educativa estratégica a través del uso de la tecnología*" (Leadership in strategic educational management through the use of technology), offered as a teacher training update strategy by a higher education institution. In the analysis, the assessment of the indicators by a group of 55 experts is presented, and the profile and expectations of 10,161 participants in the first edition of the course are described.

1.1. Background

Although the history of MOOCs may seem short in absolute terms, Boven (2013) locates its origins in open and distance education. He notes that many emerging movements have adopted the principles advocated by educational reformers, such as those proposed by the "Education for All" ideal. This perhaps explains why MOOCs

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have so often been described as "recurrent resources in the discourse of educational openness" (McAuley, Stewart, Siemens, & Cormier, 2010, p. 46).

As its name suggests, a MOOC is an online course accessible to virtually anyone who wishes to participate with unlimited attendance (EDUCAUSE, 2011). For Tschofen and Mackness (2012), MOOCs are online courses that appeal to a wide variety of participants around the world; they are massive because literally thousands of people can participate in them, and they are open because participants can openly share resources, ideas and experiences without any requirements. They constitute a collective creation of knowledge, resulting in a composition greater than the sum of its parts. In many ways, they are a microcosm of a nation (Liyanagunawardena, Adams, & Williams, 2013).

While reviewing the educational research undertaken, ever-increasing interest in the study of MOOCs in recent years was noted. This contemporary interest is manifested in the evolution of their conceptual references and the definition of their main features. According to Rodriguez (2012), the term 'MOOC' was coined by Dave Cormier when the number of students on the course entitled "Connectivism and Connective Knowledge (CCK08)" offered by George Siemens and Stephen Downes reached a total of 2,300. After analyzing the results of their experience, they could see MOOCs as a new modality of online education and stated that its implementation required conceptual changes in the processes of teaching and learning, from the perspective of teachers and students alike.

1.2. Theoretical perspectives on learning

In pedagogy, learning theories are the basis of educational processes, and they often refer to principles of behaviorism, cognitivism and constructivism to create instructional environments. Adding technology to existing learning theories raises many questions and prompts theorists to review them continuously, in order to adapt them as learning conditions change. These three theories were developed at a time when learning had not been impacted by the use of technology in education. At some point, the underlying conditions have been so significantly altered that additional modifications are no longer feasible. An interconnected world allows us to explore how information is acquired; connectivist environments have facilitated the creation of networks to share resources, ideas and experiences, and they must be evaluated. Faced with this new reality, a completely different approach is necessary (Siemens, 2004).

The SCOPEO (2013) report confirms that the "first generation" of MOOCs was based on connectivism, a pedagogical theory that posits that personal knowledge is created from a network that provides its members with information. In turn, these members provide feedback with additional information generated within the same network. The process ends when this information, which may come from different nodes, transforms and alters the knowledge base, and generates new learning for individuals. For Chiecher and Donolo (2013), MOOCs have broken curricular rigidity, questioning the ability of traditional teaching to meet training needs in changing conditions. Training offerings in which teaching differs from the what is commonly referred to as "traditional classroom education" are being overwhelmingly adopted. This has given rise to critical reflection on the perception of learners – and is something that demands a paradigm shift.

Addressing the future of MOOCs, some experts predict that they will mutate into different forms of learning with a greater emphasis on participants' support and a decrease on their number to allow adequate attention. Experts emphasize the need to implement evaluation systems to establish pedagogical quality criteria that go beyond limited assessments, based on the "reputation" of the educational institution offering them (Menéndez, 2013).

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1.3. Indicators of the educational quality of a MOOC

For the educational community, it is a reality that the use of technology in teaching practices has led to the emergence of modern social structures and organizational forms, in which the traditional space and time referents are no longer valid (Garrido, 2003). Given the lack of space and the growing demand for admission to educational institutions, online education is renowned for offering opportunities to expand the educational range and coverage. For Moore (2013), distance education is a psychological construct that depends on macro factors such as dialogue, structure and autonomy.

In relation to their pedagogical design and to the learning expectations of students, MOOCs imply a change of instructional schemes. At first, their structure was thought of in a minimalist way to allow participants to design their own learning, but research findings have since revealed that, in order to improve their pedagogical quality, multiple factors related to how, where and when participants learn must be considered (The New Media Consortium & Universitat Oberta de Catalunya, 2012).

Although MOOCs imply the design of new schemes that recognize studies outside the classroom, the lack of standards for evaluating their pedagogic quality is often questioned (Bernal, Molina, & Perez, 2013). For Gómez-Zermeño and Alemán (2012), the integration of technology into educational processes requires the establishment of both theoretical foundations and evaluation mechanisms to identify their numerous sources of influence. They point out that the design of technology-based strategies that seek to strengthen access to quality education poses significant challenges to educational researchers yet offers attractive advantages that could encourage their adoption.

In the MOOC Quality Project by the European Foundation for Quality eLearning, it became apparent that the evaluation of MOOCs was more complicated than in other online offerings due to the lack of an agreed definition on what they are, to the involvement of perceived external factors and to the lack of consensus on their purpose (EFQUEL, 2013). Bernal et al. (2013) recommend that MOOCs should apply the same quality standards used in formal open and distance courses. The fact that they are massive, open and online calls for greater rigor in their quality in order to overcome dissimilar profiles and a lack of monitoring of results and objective attainment.

In assessing the educational quality of distance education and open learning resources, Arias (2007), Cabero and Romero (2007), Gómez-Zermeño (2012), Gómez-Zermeño, Rodríguez, and Márquez (2013), Domingo and Marquès (2011), and Roig et al. (2013) used indicators related to pedagogical, functional and technological factors. For Barbera, Gros, and Kirschner (2012), time is a critical factor that has also been used as a quality measure, since it is related to the amount and the sequence in which people learn through the accumulation of experiences. In collaborative learning environments, the implementation of strategies that promote participants' self-regulation is recommended (Franco-Casamitjana, Barbera, & Romero, 2013).

2. Method

The objectives of this research can be addressed via different methodologies. Given the object of study, a quasi-experimental design was adopted. Cross (2013) claims that educational research into MOOCs generates large methodological and interpretive challenges, as it poses new dynamics in the teaching-learning process. Strengthening its design involves considering the relationship between research and educational innovation. For Schmelkes (2001),

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research into an educational innovation may have a quasi-experimental design that does not require evaluation of a random sample. Moreover, the results are measurable with one post-test group (Shadish, Cook, & Campbell, 2002).

Regarding quality indicators to strengthen the design of a course of this nature, a set of indicators was selected from studies by Arias (2007), Barbera et al. (2012), Cabero and Romero (2007), Franco-Casamitjana et al. (2013), Gómez-Zermeño (2012), Gómez-Zermeño et al. (2013), Domingo and Marquès (2011), and Roig et al. (2013). A group of experts reviewed and validated these indicators using the Delphi method. This method involves selecting a group of experts, who are asked their opinion on issues relating to the future, implementing consecutive anonymous rounds to ensure the autonomy of participants. The predictive power of this method is based on the systematic use of intuitive judgment by all experts (Astigarraga, 2003).

Once the set of selected indicators had been identified, a questionnaire entitled "MOOC-I-Quality Indicators" was designed, consisting of closed questions that assess 50 indicators on a 4-point Likert scale. For the analysis, the indicators were classified into 15 subcategories related to Pedagogical, Functional, Technological and Time factors (Table 1). This instrument was applied to a group of 55 experts involved in the design, development and delivery of MOOCs, as well as in distance education courses and open learning resources offered by the institution. This group was formed by 14 lecturers responsible for design and content generation, and a total of 41 tutors, instructional designers, graphic designers, programmers and audiovisual producers.

Based on studies by Breslow, Pritchard, DeBoer, Stump, Ho, and Seaton (2013), the "MOOC-I-Participants' Information" questionnaire, made up of 30 questions gathering demographic, employment, educational update, expectation and opinion data from those on the course, was designed. Taking into consideration the assessment made by the experts for indicators of pedagogical quality, the MOOC entitled "*Liderazgo en gestión educativa estratégica a través del uso de la tecnología*" (Leadership in strategic educational management through the use of technology) was designed and offered as a teacher training update strategy; this questionnaire was administered to 10,161 participants on the first edition of the MOOC.

3. Results Analysis

Aligned with the objectives of this research, the analysis of two different issues is presented. First, the assessment of quality indicators for the design of MOOCs and, second, after the MOOC in question had been designed and implemented, the students' profiles and expectations.

3.1. Indicators for assessing the pedagogical quality of a MOOC

The results of the Delphi method show that while experts rated the indicators related to the Time factor higher, they also recognized that the quality of a MOOC must take the other factors into account (Figure 1). It is worth noting that the indicator for the time to *Take exams* was rated the highest. Studies by Barbera et al. (2012) corroborate that time remains a crucial strategic issue in online teaching, requiring explicit attention from teachers and designers, since it affects students' learning. For Franco-Casamitjana et al. (2013), time management skills determine self-regulation of students and members of a group alike (Guitert, 2011). In distance education, autonomy refers to the extent to which students decide "what to learn, how to learn, and how much they learn" (Moore 2013, p. 68).

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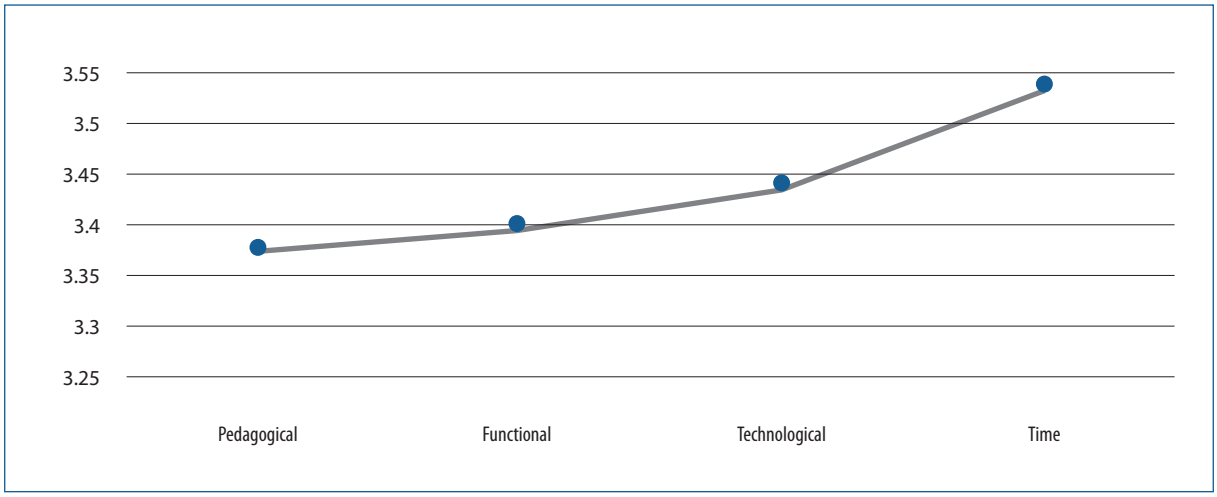
Figure 1. Indicator categories



When analyzing the results by subcategory (Table 1), the experts considered the pedagogical quality of the content of a MOOC to be a relevant factor. They also recommended a review of the pedagogical approach, the provision of tutorials and the specification of the evaluation process of educational activities. For Moore (1983), the content or topic of study determines the dialogue between teachers and learners; it also constitutes one of the main characteristics of open educational resources. Thus, excellent quality should be ensured (UNESCO, 2012).

Table 1. Results of indicator assessment by subcategory

Category	*Subcategory*	*Result*
Pedagogical 3.37	**Contents**	**3.60**
	Pedagogical approach	3.47
	Tutorial and evaluation	3.44
	Adequacy and adaptation to users	3.29
	Motivational capacity	3.27
	Resources	3.15
Functional 3.4	**Ease of use**	**3.72**
	Autonomy and user control	3.44
	Functionality of the documentation	3.03
Technological 3.43	**Interaction and dialogues**	**3.61**
	Navigation	3.52
	Visual environment	3.52
	Design and technology	3.44
	Versatility	2.97
Time 3.53	**Take exams**	**3.64**
	Perform activities	3.62
	Perform exercises	3.60
	Study the topics	3.60
	Calendar / Schedule	3.53
	Participate in discussion boards	3.22

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Regarding the subcategories of functional factors, experts believe that *Ease of use* is an important factor, followed by *Autonomy and user control*, and *Functionality of the documentation*. Under the subcategory *Ease of use*, the indicator "Exercise instructions are clear and easy to understand" was positively valued, while "The activities suggest the use of additional documents (blogs, wikis, etc.)" was considered less important. Among the Technological factors, the subcategories *Interaction and dialogues*, *Navigation* and *Visual environment* were rated highly, while *Versatility* was not considered relevant. The experts mentioned, in relation to the indicators of *Interaction and dialogues*, that communication is one of the most important elements, emphasizing the importance of making means of communication available to foster exchanges among and between participants (discussion boards, news, etc.) and tutors.

In the experts' opinion, MOOCs enable the comprehensive development of competitive citizens who are able to position themselves as agents of change. Experts recognize that to meet the growing demand for education, the adoption of innovative models that develop commitment and linkage between participants is required (Brown, 2013). Such models should also emphasize the need to implement an evaluation system in order to improve the educational quality of resources like MOOCs.

3.2. Participants' profiles and expectations

Based on the quality indicators assessed by experts, the MOOC entitled "*Liderazgo en gestión educativa estratégica a través del uso de la tecnología*" (Leadership in strategic educational management through the use of technology) was designed and implemented using the Coursera'® platform. For three weeks, the call for mass participation in the course was disseminated via institutional electronic media and social networks. A total of 10,161 participants enrolled on the MOOC in question. The participants were from 79 countries located in all continents: The Americas 90.0%, Europe 9.0%, Asia 0.6%, Oceania 0.1% and Africa 0.1%. According to Coursera, 85% of the study's population came from emerging economies. One of the main features of a MOOC is its openness to enrolment; so all the participants who confirmed their interest in voluntarily registering for free by answering the questionnaire "MOOC-I-Participants' Information" formed the population of this study. Table 2 describes their main features.

Table 2: Participants' profiles on the MOOC entitled "*Liderazgo en gestión educativa estratégica a través del uso de la tecnología*" (Leadership in strategic educational management through the use of technology)

Data	Characteristics	Responses
SOCIODEMOGRAPHIC	Country of residence	Mexico 57%, Colombia 7%, Peru 6%, Argentina 3%, Chile 3%, Ecuador 2%, United States 2 %, Venezuela 2%, Dominican Republic 2%, Guatemala 1%, Brazil 1%, Honduras 0.7 %, El Salvador 0.7%, Costa Rica 0.6%, Bolivia 0.5%, Uruguay 0.5%, Puerto Rico 0.3%, Nicaragua 0.3%, Paraguay 0.3%, Panama 0.2%, Canada 0.2%, and with 0.1% Trinidad and Tobago, Haiti, French Guyana
		Spain 7%, United Kingdom 0.3%, Italy 0.2%, Russian Federation 0.2%, Portugal 0.2%, Germany 0.2%, France 0.2%, and with 0.1% Greece, Poland, Switzerland, Belgium, Ireland, Denmark, Ukraine, Turkey, Norway, The Netherlands, Czech Republic, Hungary, Austria, Sweden, Serbia, Romania, Moldavia, Malta, Macedonia, Lithuania, Latvia, Cyprus, Croatia, Aruba, Andorra
		China 0.3%, and with 0.1% Hong Kong, Korea, India, Vietnam, Taiwan, Australia, Philippines, Thailand, Singapore, New Zealand, New Caledonia, Mauritius, Malaysia, Japan, Morocco, South Africa, Angola, Algeria, Pakistan, Kazakhstan, Israel, Iran, Islamic Republic
	Gender	Female 59.4% and Male 40.6%
	Age	Average of 37 years 9 months old, highest frequency 34 years old, range from 14 to 76; 75.0% is 45 or younger, 25% is older than 45.

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Data	Characteristics	Responses
OCCUPATIONAL	Occupation	Teacher 60.9%, Principal 11.0%, Pedagogical advisor10.9%, Higher 2.5%, Inspector 0.4%, Student 14.2%
	Educational level	Preschool 8.5%, Elementary School 17.6%, Secondary School 18.7%, High School 21.4%, Superior 33.8%
	Geographical zone	Urban 76.0%, Rural 11.3% and Urban/Rural 12.7%
	Type of school	Public 56.2%, Private 32.8% and Public/private 11.0%
	School equipment	Media room 20.1%, Internet in media room 18.8%, Classroom 10.4%, Internet in classroom 12.7%, Principal's office 17.5%, Internet in Principal's office 17.8% and none 2.7%
TEACHER TRAINING UPDATE	Educational level	Undergraduate 52%, Graduate 37%, High School 7%, PhD 4%
	Years of Service	5 years or less 28.6%, 6 to 10 years 20.6%, 11 to 15 years 14.6%, 16 to 20 years 11.7%, 21 to 25 years 7.4%, 26 to 30 years 5.9%, more than 31 years 3.5%, No years of service 7.7%
	Frequency of teacher training update courses	1 to 2 courses 53.7%, 3 to 4 courses 22.0%, 5 to 6 courses 4.5%, more than 7 courses 2.0%, does not participate in teacher training update courses 17.7%
	Types of teacher training update courses	National Catalogue of Continuing Education 11.3%, Centre for Training and Teacher training Update 9.7%, National Program of Teaching Career 7.4%, Requested courses 21.6%, courses from public institutions 16.5% and courses from private institutions 18.7% and other courses 14.8%
	Modality	Classroom 35.8%, Online 19.4%, Blended 40.7% and other 4.1%
	Use of ICT level	None 0.6%, Basic 20.5%, Intermediate 38.5%, Advanced 32.7%, Expert 7.7%
	Development of ICT level	None 3.0%, Basic 30.2%, Intermediate 39.3%, Advanced 22.7%, Expert 4.9%
EXPECTATIVES	Reason for participating	Take a MOOC 15.4%, Model of Strategic Educational Management 31.1%, Technological tools 25.4%, Técnologico de Monterrey course 17.7%, Learn what a MOOC is 10.1% and Other 0.3%
	Main expectation	Teacher professional development 46.5%, Points for Teaching Career 4.8%, Know a MOOC 14.7%, Evidence of MOOC participation 13.6%, Evidence of Tecnológico de Monterrey 18.2%, Economic stimulus 2.3%
	Workspace	School 26.9%, Home 67.7% and Cybercafé 5.4%
	Hours participation	No specific hour 27.1%, 8:00am-10:59am 9.1%, 11:00am-02:59pm 7.3%, 03:00pm-05:59pm 8.3%, 06:00pm-08:59pm 22.0%, 09:00pm-12:00am 26.2%
	Intention to complete the course	I intend to finish the course 96.03%, I just want to know the agenda 2.01%, I just want to participate in some activities 1.52% and I do not intend to finish the course 0.45%

In relation to their expectations, 43.3% of the participants believed that through MOOCs they could acquire enriched learning and 23.6% mentioned that they would experience higher learning proficiency compared to a classroom course, while 29.8% thought that they would be getting the same learning experience. It is relevant that 96% of the participants expressed commitment to the successful completion of the course, and 68.99% reaffirmed their assurance to strengthen their professional development through participation in other MOOCs offered as part of a teacher training update strategy.

On completion, the MOOC achieved a terminal efficiency rate exceeding 22% (see MOOC 12 in Figure 2), which is considered "atypical", as well as a higher commitment rate from participants, which reached 52.15%. It is noted that the average terminal efficiency rate of all MOOCs this institution has offered is 4%, which coincides with the percentage reported in studies by the University of Pennsylvania Graduate School of Education (Penn GSE, 2013).

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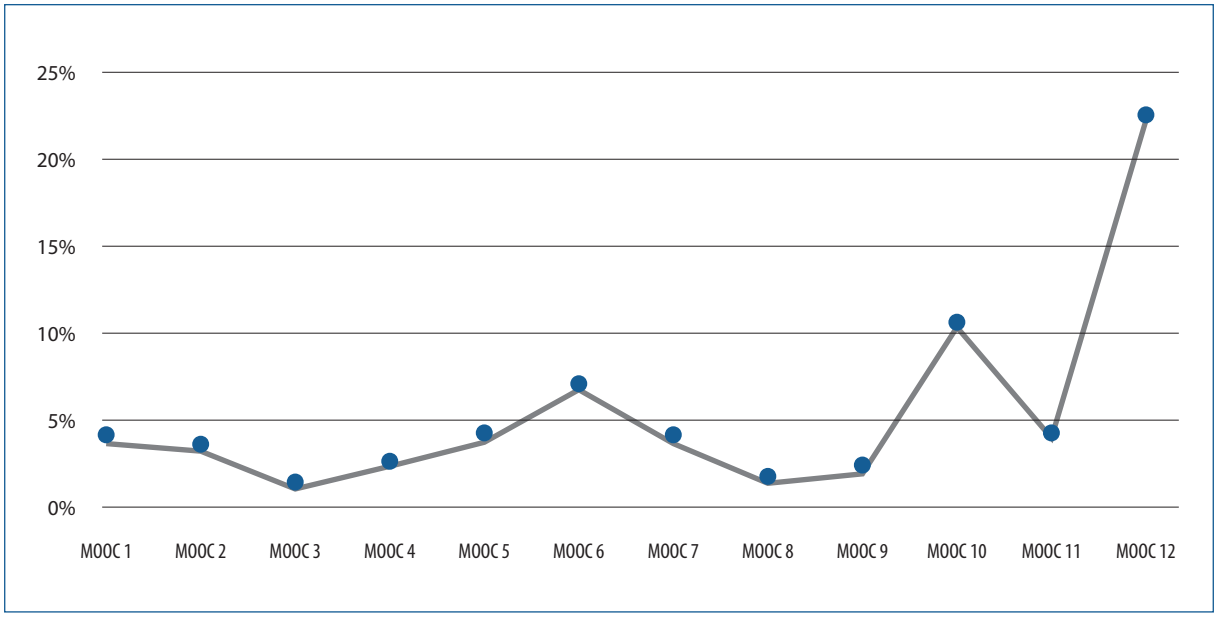
Figure 2. Terminal efficiency rate with highest number of enrolments



4. Conclusions

In this paper, quality indicators endorsing the design of a MOOC on Leadership in strategic educational management have been identified, as have the profiles of participants in its first edition and the rate of terminal efficiency.

The main conclusion from this research is that the success of a MOOC cannot be evaluated without measuring results. Thus, institutions and consortia should establish indicators to focus efforts on improving their pedagogical quality. Design changes and development cannot be planned either, as these actions require the implementation of appropriate mechanisms to measure the participants' performance, which should be integrated into the standards of their educational model. When applying quality criteria, it should be considered that the indicators cannot operate in isolation, so it is necessary to define them in order to build a complete picture of the educational system that will receive feedback.

According to 55 experts, time is a key factor that impacts the pedagogical quality of a MOOC; however, they emphasize that the results are a logical consequence of the interrelationship between the Pedagogical, Functional, Technological and Time factors. When designing a MOOC, the time it will take participants to review the content, videos, resources, exercises and tests, and to take an active part in activities and collaborative learning discussion boards should be considered (Gros, Barbera, & Kirschner, 2010). The designed system involves promoting self-regulation skills, and must include the elements and approaches that support the theory of connectivism in order to be able to offer open educational resources that provide a real strategic opportunity to improve the quality of education (UNESCO, 2012).

As the use of technology in education advances, the understanding of the elements and principles of connectivism will be challenged, and educational research will provide evidence on the network capacities and possibilities intertwined with the various learning styles of individuals. By providing pertinent information, the learning potential of MOOCs to improve teacher training may be evaluated. Only then can the pedagogical quality

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of MOOCs offered by educational institutions be recognized and contribute to the vision of a future in which everyone has access to a world-class education.

4.1. Future research

There are significant areas of opportunity related to the evaluation of MOOCs, as standards regarding their pedagogical quality have yet to be agreed upon. Little is known about their uses and scope, or about the ways in which they are integrated into the educational models of different institutions and consortia. Separate lines of research are therefore proposed to address this issue. On the one hand, it is crucial to carry on studying in detail the results of each of the indicators that make up the different subcategories in order to understand the interplay of all factors and their level of impact on pedagogical quality. On the other hand, the definition of success of a similar course should go further than the rate of terminal efficiency and delve deeper into the analysis of traffic patterns to understand the interests and behavior of its participants.

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About the authors

Lorena Yadira Alemán de la Garza
lorena.aleman@itesm.mx
Coordinator of Special Projects and Continuing Education, Monterrey Institute of Technology and Higher Education (ITESM), Mexico

Doctoral candidate on the Education and ICT (e-learning) doctoral program at the Open University of Catalonia (UOC), Spain. She holds a master's degree, with honors, in Educational Institution Administration from ITESM, and a bachelor's degree, with honors, in Business Administration from TecMilenio University, Mexico. She has worked as a postgraduate lecturer in the Graduate School of Education at ITESM on master's degree programs in Educational Institution Administration, in Education and in Educational Technology. She is a member of the Research Chair in The School as a Knowledge Organization. She is the technical manager on educational research projects of the Mexican National Council of Science and Technology (CONACYT). She is the coordinator of university extension programs and special projects. Of note among these is the Higher Middle Education Teacher Training program (PROFORDEMS) and the New Teaching Profile diploma.

Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)
Avda. Eugenio Garza Sada, 2501 Sur
Edificio CEDES, piso SS1
64849 Monterrey (Nuevo León)
Mexico

Teresa Sancho-Vinuesa
tsancho@uoc.edu
Lecturer and IN3 Researcher, Open University of Catalonia (UOC), Spain

Vice-rector for Research and Innovation at the UOC. She holds a doctorate in Electronic Engineering and a bachelor's degree in Mathematics. She is the principal researcher of the CIMANET (Online Science and Mathematics) RD&I group at the UOC. She has lectured in the field of numerical analysis, probability theory and stochastic processes at La Salle School of Engineering and Architecture, Spain. She has been a member of the TEXTO pedagogical and editorial team, and has coordinated Mathematics on Information Technology Studies at the UOC. She has been the academic coordinator and director of the doctoral program in Information and Knowledge Society at the UOC. She is currently responsible for the Mathematics subjects on the bachelor's degree program in Technical Engineering and Telecommunications. She has been a researcher on the interdisciplinary research program on the Information Society in Catalonia (Project Internet Catalonia), jointly led by Manuel Castells and Imma Tubella; within this framework, she headed a study on changes occurring in Catalan universities by analyzing Internet use. She has now resumed her activities in the field of Mathematics teaching for Network-based Engineering.

Universitat Oberta de Catalunya (UOC)
Rambla del Poblenou, 156
08018 Barcelona
Spain

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Marcela Georgina Gómez Zermeño
marcela.gomez@itesm.mx
Researcher-Lecturer, Director of the Education Research Center, Monterrey Institute of Technology and Higher Education (ITESM), Mexico

She holds a doctorate in Educational Innovation from the Graduate School of Education at ITESM, and a master's degree in Information and Communication Technology Engineering Sciences. INT-CITCOM, France Télécoms Higher Education. She also holds a bachelor's degree in Computer and Administration Systems from ITESM. She is a tenured lecturer at the Graduate School of Education at ITESM on master's degree programs in Education and in Educational Technology, and on the doctoral program in Educational Innovation. She is a member of the Research Chairs in The School as a Knowledge Organization and in Innovation in Technology and Education, and of the Mexican Education Research Council (COMIE). She is the technical manager on educational research projects of the Mexican National Council of Science and Technology (CONACYT) and on the ALFA program of the European Commission. She forms part of the National System of Researchers (SNI) Level 1.

Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)
Avda. Eugenio Garza Sada, 2501 Sur
Edificio CEDES, piso SS1
64849 Monterrey (Nuevo León)
Mexico

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MOOCs: Game Changer or Passing Fad?

Beyond objective testing and peer assessment: alternative ways of assessment in MOOCs

María del Mar Sánchez-Vera[1] and María Paz Prendes-Espinosa [2]

1. University of Murcia, Spain | mmarsanchez@um.es
2. University of Murcia, Spain | pazprend@um.es

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Abstract

MOOCs (massive open online courses) are an online teaching proposal that, in their short lives, have already thrown up two very different possibilities: cMOOCs and xMOOCs. Both are analysed in this paper from the perspective of assessing students' learning. While assessment in xMOOCs is usually limited to multiple choice tests and sometimes delivering tasks, in cMOOCs the aim is to foster interaction from an educational standpoint, usually on the basis of peer assessment. Pedagogically, both models have their limitations. Multiple choice tests are mainly content bound while peer assessment has its own difficulties and drawbacks, which we explain here. We will put forward some useful ideas to give more flexibility to assessment in MOOCs (groups of experts, semantic web, portfolio, learning analytics), in an attempt to address educational assessment not as an end in itself but as another part of the educational process.

Keywords

MOOCs, assessment, feedback, e-learning

Más allá de las pruebas objetivas y la evaluación por pares: alternativas de evaluación en los MOOC

Resumen

Los MOOC (cursos masivos abiertos en línea) son una propuesta de enseñanza en línea que en su corta vida han mostrado ya dos posibilidades bien diferenciadas, los cMOOC y los xMOOC. Ambas son analizadas en este artículo desde la perspectiva de la evaluación de los aprendizajes de los alumnos, pues mientras que en los xMOOC la evaluación suele aparecer reducida a pruebas tipo test o en algunos casos a la entrega de tareas, en los cMOOC la evaluación pretende promover la interacción desde una perspectiva de evaluación formativa y suele sustentarse en la evaluación por pares. Ambos modelos pueden resultar limitados desde una perspectiva pedagógica. Por una parte, los exámenes tipo test se circunscriben principalmente al contenido y, por otro lado, la evaluación por pares tiene también dificultades e inconvenientes que explicamos en el artículo. Así, en este artículo presentamos diversas alternativas útiles para flexibilizar las posibilidades de evaluación en los MOOC (grupos de expertos, web semántica, portafolio, analíticas de aprendizaje), intentando abordar la evaluación educativa no como una finalidad en sí misma, sino como una parte más del proceso educativo.

Palabras clave

MOOC, evaluación, feedback, e-learning

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1. Introduction

Although the world of MOOCs has only just "found its feet" (the first course called a MOOC took place in 2011), the courses already have their own identity. They have their defenders and their detractors, practice and theory, research that analyses the courses so far and experts who seek to devise what the future holds. The MOOC phenomenon is so new and has such importance and impact that it is, in itself, worthy of study (Adell, 2013).

In an earlier paper (Sánchez & Prendes, 2013), we reported an interesting study from the UK Department for Business Innovation and Skills which, following an exhaustive study of MOOCs, concluded that there are two trends: one involving those who embrace MOOCs enthusiastically and value their potential in learning, even going so far as to talk about a transformation of online education; the other has its detractors, who are critical and sceptical of this phenomenon. The critical stances do seem to take in an idea that we believe is important: the pedagogical literature around the turn of the century valued the potential of personalising online education, in other words, one of the most outstanding advantages of online education is the possibility of communicating with the students over distances, of having interaction and feedback on their individual learning processes. Thus, summative assessment is given more importance than formative assessment. Nevertheless, the massification inherent to MOOCs in some way brings with it a divergence from this educational trend and, as the report cited states, represents a victory for *packaging content*.

Before the advent of MOOCs, online assessment had been widely studied in the literature. Besides being of scientific interest, the point was made that it was one of the didactic aspects of online teaching that had, in the main, been least susceptible to pedagogical changes and innovations (Dorrego, 2006; Prendes, 2007). MOOCs, while bringing the "massifying" nature to online courses, also mean that we have to consider alternative models for assessing online students' learning.

It is true that there is a broad typology surrounding MOOCs, and it can be categorised into two trends: xMOOCs and cMOOCs. The categories are different in both their origins and in the pedagogical model underpinning each: xMOOCs focus on content and transmission of information, while cMOOCs are more constructivist and prioritise interaction among participants (Brown, 2013). The distinguishing characteristics are well expressed in the table below, drawn up by Yuan, Powell, and Olivier (2014).

Table 1. MOOC typology (Yuan, Powell, & Olivier, 2014)

xMOOCs		*cMOOCs*
Scalability	Massive	Network and connections
Open access and restricted licenses	Open	Open access and free licenses
Individual learning on a single platform	Online	Network learning through various platforms and services
Acquiring knowledge and skills	Course	Common practices, learning and understanding

Scalability is a term used in computer science to refer to the ability of a system or network to skilfully manage a growing amount of work. It also refers to the ability of the system to react and adapt without loss of quality (Bondi, 2000). Relating this idea to that of xMOOCs comes from the fact that massification here focuses on participation

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in a training system that grows in terms of resources and people, while the massive nature of cMOOCs lies in their potential to establish learning communities and create new connections.

Moreover, cMOOCs are usually run on various platforms and do not usually have a single virtual environment, as occurs with xMOOCs. Many cMOOCs use blogs, wikis and open social networks to establish connection networks.

Basically, xMOOCs focus on content and its acquisition individually, while cMOOCs focus on community learning and the potential to learn by creating and joint collaboration, designing resources and generating the actual content.

Given this panorama, we will focus on an aspect that has always been of great relevance in any formative action: educational assessment and how MOOCs are addressing this very important aspect of the educational process.

2. A review of MOOCs and their methods of assessment

Assessment is not dealt with in the same way in the two large MOOC typologies described above. In xMOOCs, the potential lies in the content, where the formative action is focused, and so the main thing is to assess learning in relation to content, and this has been done mainly through multiple choice tests. These can be done on the same platform at the end of each week or unit, and there may also be a final test.

In contrast, in cMOOCs, peer assessment prevails, which means that one student assesses another. In order to facilitate and, to some extent, standardise the process, it is common to provide students with assessment rubrics so that they know what aspects to assess.

Table 2. Assessment trends in xMOOCs and cMOOCs

xMOOCs	*cMOOCs*
Multiple choice tests at the end of each week	Assessment of tasks or resources created
Multiple choice final examination	Use of rubrics
Student recognition protocols (identity check): webcam, digital ID…	One fellow student provides feedback on another
A specific platform is developed to accommodate all the information	Developed on the web using various resources and telematic tools

Table 2 can be said to represent the original trend in understanding assessment. In short, in xMOOCs there is basically a summative assessment, while in cMOOCs the idea is to assess the process. Nevertheless, peer assessment is also being incorporated into the former as there are now platforms such as Coursera that allow multiple choice tests to be used alongside peer assessment.

We would also highlight that it is possible to run a MOOC without using any single specific platform, a strategy that is used mainly in cMOOCs, which start from a website but then develop through blogs, wikis, social networks and any other tools used by the learner community. Peer assessment is not so widely used in this case.

The assessment trends found in MOOCs do not differ much from other trends considered to be assessment. To some extent, an assessment based on objective multiple choice tests is a classic model which is widely used in teaching if we consider the two models put forward by Escudero in 1998, a long time before MOOCs took off.

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Table 3. Synthesis of assessment movements (Escudero, 1998)

From assessment of "before"...	*...to another version of assessment*
Assessment of results, in particular those related to the students' learning	Assessment of processes and of each of the components and subjects involved in the teaching
Quantitative	Qualitative
Hierarchical, bureaucratic top-down control	Social, democratic, participative control
Emphasis on decisions relating to design, methodology, tools	Emphasis on the underlying theory, on systems of criteria and values, on the importance of the contexts in which what is assessed happens
Decision taking and reasoning	Stimulating social debate and reflection
Grading, report preparation and administrative decisions	Emphasis on use and on social and educational implications

It is interesting to compare Tables 2 and 3 as a means of reflecting on the teaching model we are introducing when adopting a specific decision about the assessment of students.

2.1 Advantages and limitations of assessment through tests

Online assessment through multiple choice cloze tests is nothing new (Prendes, 2007), since before MOOCs, these were used either on-site or online in the majority of cases in the realm of virtual campuses. The use of multiple choice tests does not have to be negative, provided that they are incorporated into a broader and coherent methodology. Among the advantages for the teacher of objective testing is that they offer reliable measurements of an area of knowledge, while for the student, in a wider framework, they can, when accompanied by appropriate feedback, reinforce the learning of content.

The problem arises when MOOCs focus exclusively on this aspect, i.e., when a test of this nature has to be passed to obtain a certificate.

On the web, taking the concept of the tests to the extreme may lead to the mistaken idea that assessment by test of educational content is also an indication of a whole range of educational parameters (quality of the course, teachers, content, etc.) and that other components such as skills can easily be assessed, when these really require another type of formative assessment. xMOOCs usually employ tests based on answers to previously seen content, and therefore foster rote learning and conceptual learning. Without additional strategies and assessment tools, we will be foregoing more recent assessment models of processes that take into account not so much content as students' skills.

This perspective of assessment based on a succession of tests responds to the model described in Table 2 as a "before" assessment model, and it is worth stressing that the "before" was stated by Escudero in 1998.

2.2 Advantages and limitations of peer assessment

Although peer assessment has characterised the type of assessment cMOOCs make, it is true that there are more and more platforms associated with xMOOCs that also include peer assessment.

On the plus side, we can point to recent research (Luo & Robinson, 2014) reporting that students like peer assessment on MOOCs. In this study, the students indicated they had received fair grades and useful feedback, which they considered to be a motivating element.

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As regards the validity of scores given to students, Piech, Huang, Chen, Do, Ng, and Koller (2013) cite the study by Kulkarni, Pang-Wei, Chia, Papadopoulos, Koller, and Klemeer (pending publication), which states that, on average, the grades awarded by a group of facilitators are not significantly different from those given by students in peer assessment.

From a general perspective, students' becoming assessors may bring various spin-offs. Assessing in itself is an important learning experience, although it does need to be clearly designed and explained to the students.

It is also true that peer assessment seeks to make a formative assessment and to take into account the huge number of students enrolled on MOOCs. This may at first seem to be an enriching system but, as O'Toole (2013) states, rather than calling it peer assessment, we should be calling it *peer grading*, since in many case what ultimately happens is that the students are given closed assessment rubrics along with a series of instructions on how to apply them, which rather defeats the object.

Downes (2013) analyses another two difficulties associated with this method, against which it is difficult to argue:

- "The blind leading the blind". An interesting name for a phenomenon that may arise when leaving assessment in the hands of the learners, as they may create their own rules on the basis of criteria that are not well founded.
- "The charlatan". Some students are not experts but they believe they are, which may lead them to issue mistaken opinions, or even to erroneously consider another student to be an expert.

3. Back to the past or looking forward? Assessment alternatives in MOOCs

In 2013, *The Chronicle* carried out a study with over 100 MOOC teachers. Among other questions of interest, they were asked which assessment method they had used. We would highlight here a comment made by a teacher who had worked with the Coursera platform (Kolowich, 2013): "I would, of course, prefer to be able to read each piece of work carefully and follow its logic, but that is a technological issue that I believe Coursera will soon solve." We do not agree that this is a technological problem, since the careful reading of students' work when there is a huge number of students is a problem of teacher-student ratio, so a huge number of teachers would be needed to balance things out. Where technology can help to some extent is in facilitating grading, as we will see.

In the same vein, Sandeen (2013) explains that 74% of teachers stated they had used automatic marking and 34% had made use of peer assessment. Of the former, 67.1% had found automatic marking to be highly reliable and 30% said it was fairly reliable. Among the 34% who used peer assessment, the level of reliability was reported as being lower, with 34% claiming it was highly reliable and 71% describing it as fairly reliable.

The huge numbers of students mean that assessment is complicated, so any software that eases the task is welcome; however, MOOCs should not represent a step backwards in teaching. If we understand assessment as a qualitative aspect that forms part of the learning process, we need to seek alternatives that enable us to marry this to the high number of students on the courses.

Below, we look at some proposals that could be used on MOOCs as part of an appropriately designed strategy. Combining a variety of these can broaden our outlook and offer new opportunities.

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3.1 Peer assessment 2.0

We have already spoken about peer assessment and its drawbacks. Even so, that does not mean that it should be automatically discarded. As Downes (2013) states, peer assessment may work very well for blog entries or discussion forums.

In order to avoid problematic issues with the model (like a student not taking assessment seriously, a failure to understand the rubric or not knowing how to do it), professor Duneier, in an article in *The New York Times*, explains that, in the method he used, the student had to assess five fellow participants in order to receive his or her own grade, which was the mean of the grade awarded by the five fellow participants (cited by Lewin, 2012).

We give the name *peer assessment 2.0* to a new peer assessment model that includes other approaches that may make the model more effective. One option is to understand peer assessment as yet another task within MOOCs, which may even be assessed by a fellow participant, in order to ensure higher reliability. This would imply designing procedures based on triangulation, which is highly characteristic of qualitative assessment.

Designing a mixed peer assessment approach based on peer assessment combined with assessment by experts who supervise the process may prove to be more effective. Similarly, tasks can be assigned in peer assessment according to the state of the learning and the participant's context, instead of randomly (O'Toole, 2013).

3.2 Network-based grading

Network-based grading is explained by Downes (2013) by the fact that in this model people are not assessed on individual pieces of work (as occurs in the main in peer assessment), but according to the network metric, a classic approach in assessment of collaborative tasks (see Prendes, 2003). Downes gives Klout as an example, an application that measures our influence in social networks by assigning a value between 0 and 100, based on various factors like retweets, mentions, friends on Facebook, etc. (related to the idea of learning analytics that will be dealt with later), and which, since the beginning of 2014, allows score or influence to be increased by creating content.

Developing a similar idea for MOOCs so that the importance of our rating lies in how we create and share content would seem to be interesting indeed.

3.3 Portfolio

The possibilities of the portfolio in online assessment have already been outlined (Prendes & Sánchez, 2010). Among other things, portfolios enable an understanding of the students' learning process as well as providing them with useful feedback. Downes (2013) explains how a portfolio in a MOOC can serve as a resource that a student has to present as proof of his or her learning. The combination of portfolio strategies with peer assessment and the semantic web is of considerable interest given its flexibility and the possibility of using a wide range of complementary techniques.

3.4 The mantle of the expert

O'Toole (2013) proposes the mantle of the expert as an alternative assessment in MOOCs. Designed by Dorothy Heathcote in 1985, this methodology starts by grouping students who are designated as expert assessors according

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to their area of knowledge. Together, they have to perform the assessment and, to do so, they negotiate their expectations with other groups of assessors. The teacher may act as a facilitator, aiding consensus and assuring compliance with minimum requirements and institutional rules of the course. Each group is responsible for its own section being developed by the other groups, and they can create a product to explain the whole process followed.

3.5 Semantic web

Codina (2003) explains that semantic web is the name of an aspiration, of an aim that, if totally fulfilled, will radically change the web as it is today. To speak of the semantic web implies that "the significance of the data published can be known by humans and applications alike" (Fernández-Breis, Prendes-Espinosa, Castellanos-Nieves, Martínez-Sánchez, Valencia-García, & Ruíz-Martínez, 2007). This means that information should be published to enable two interactions: content and human users and content and applications.

In today's web we move through information by links, obtaining various resources and then we use the links to jump around, but the computer cannot record the information. In the semantic web, we first give the computer a basis with a sense of content, so that when we start to move around the information, we do so in a more logical and organised structure of knowledge (Sánchez-Vera, 2010), and this throws up a wealth of educational applications (Prendes, 2013).

Codina's aim is ever closer. There are now programs that allow a student to perform assessment tests and, through the semantic web and ontologies, to receive assessment and feedback. One example is the OeLE program, which allows for online examinations that use open questions and for students to get feedback on their learning process (Fernández-Breis et al., 2007; Sánchez-Vera, 2010).

MOOCs have provided a new opportunity for these types of technologies. Sandeen (2013) explains how we are witnessing a push towards incorporating these technologies into the MOOC context, and some teachers who have participated in MOOCs indicate that consideration should be given to the idea of using automatic assessment technologies in them (Kolowich, 2013).

3.6 Learning analytics

Learning analytics has been defined as "measuring, collecting, analysing and communicating data about learners and their contexts with the purpose of understanding and optimising learning in the context in which it takes place" (University of Bristol, 2013). It is a growing field of study that, like MOOCs, is being tackled from various angles. Its potential lies in combining information from various sources in order to enhance learning conditions during the process and to consider various viewpoints as to what the student is doing (Booth, 2012). Data can be used from platforms and from actions that students have taken when using other tools and connecting with contacts. As with other phenomena, these analytics may have a quantitative or qualitative perspective, with emphasis on the type of information sought, how it is to be analysed and the use to be made of it.

We should not lose sight of this phenomenon, as it may provide interesting information that helps to ascertain what participants on MOOCs are doing. It may also help when it comes to performing assessment, by providing information of an individual nature about each student and also an overview of general trends within a specific group.

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4. Conclusions: pedagogy-based technology

It is crucial to be aware of the fact that, depending on the stance we take towards assessment, some tools and methods will serve while others will not. If we consider assessment to be ascertaining the degree to which a student has assimilated a certain amount of information, then multiple choice may meet our aims. The problems arise when we consider that assessment makes little sense unless it forms part of the overall teaching process. If we understand assessment as part of learning, and that we need to use procedural and formative strategies, the mass use of these courses does indeed become a problem. This is the perspective to adopt, or at least we need to know how to place MOOCs correctly.

MOOCs may be very useful and proffer important information that will enrich our personal learning environment (PLE). However, if we take assessment and feedback as key parts of the educational process, we can understand why MOOCs cannot easily replace a good online non-massive course, because the facilitator is essential for guiding and contextualising the students' learning process. We therefore think that MOOCs are one of the many possibilities that give flexibility to the educational offering; while they can never be a substitute, they can indeed be a complement.

Sandeen (2013) considers that assessment focuses the development of MOOCs from the outset, yet we firmly believe that many MOOCs focus on developing quality content or network learning, and relegate assessment and certification to a secondary level. MOOCs here are like a field for experimenting and innovating with online massive teaching strategies.

From the information collected here, there is clearly a need to foster research into the assessment made in MOOCs. Some interesting experiments exist on assessment and MOOCs, such as "wrapped MOOCs", according to (Downes, 2013), which are MOOCs whose content and development are shared by several institutions but whose students are assessed at the institution to which they belong, which makes the assessment more contextualised.

Finally, it should be pointed out that MOOCs do not cease to be online training courses and therefore share many of the challenges in network education put forward by Ridway, McCusker, and Pead (2004):

- To re-establish the credibility of online assessment, since there are areas in which they consider it not to be reliable.
- To build a capable system. Programs and systems are needed that provide wider assessment than just designing tests.
- Appropriately designed tasks. There are few real experts in creating suitable online assessment tests.
- To establish technical standards. Agreed guidelines need to be drawn up to cover students' needs and the procedures to be followed.
- To improve ICT infrastructure.
- To pay closer attention to assessment processes.
- To make the sector more professional. High-quality professional experts in online assessment.
- Participation by schools since most experiments are done in higher education.
- Tools to deal with the problems of plagiary.
- The issue of equity. Online assessment technologies need to be usable and accessible.

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About the authors

María del Mar Sánchez-Vera
mmarsanchez@um.es
Senior lecturer in the Department of Didactics and School Organisation of the Faculty of Education
at the University of Murcia and member of the Research into Educational Technologies Group (GITE)

PhD in Pedagogy. She has worked at the National Centre for Education, Information and Communication and she has been a visiting researcher at the University of Cambridge, John Moore University (Liverpool) and the University of Southampton. She has participated in national and international projects related to the implementation of ICT in society and school, which has allowed her to publish in high-impact journals and books in the educational technology field. Currently, she is interested in different topics, such as students' and teachers' digital competence, social networks in educational contexts, flipped classroom and MOOCs.

Universidad de Murcia
Facultad de Educación
Campus Universitario de Espinardo
30100 Murcia
Spain

María Paz Prendes-Espinosa
pazprend@um.es
Professor in the Department of Didactics and School Organisation of the Faculty of Education
at the University of Murcia and director of the Research into Educational Technologies Group (GITE)

PhD in Educational Sciences. She is also secretary of the Association for the Development of Educational Technology and New Technologies in Education (EDUTEC). She has led and participated in numerous research projects, both national and international, focusing on the study of didactic image, textbooks, design and evaluation of teaching resources, e-learning, collaborative networking, online tools for training, new technologies for special education, semantic web applications, social software and Personal Learning Environments (PLEs). She is guest expert at different scientific national and international events.

Universidad de Murcia
Facultad de Educación
Campus Universitario de Espinardo
30100 Murcia
Spain

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MOOCs: Game Changer or Passing Fad?

Comparative between quality assessment tools for MOOCs: ADECUR vs Standard UNE 66181: 2012

Miguel Baldomero Ramírez Fernández[1], José Luis Salmerón Silvera[2] and Eloy López Meneses[3]

1. Pablo de Olavide University, Seville, Spain | mbramfer@upo.es
2. Pablo de Olavide University, Seville, Spain | salmeron@acm.org
3. Pablo de Olavide University, Seville, Spain | elopmen@upo.es

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Abstract

Massive open online courses (MOOCs) have emerged in informative and scientific literature as a revolution with great potential within the educational and training world. However, at the same time, there are discrepancies and questions about the pedagogical value and scope that this movement has on higher education. Therefore, the MOOC universe is the object of educational consideration among various authors and institutions in the globalised world, but some dimensions and implications of their evaluation still need to be assessed and analysed from different perspectives.

In this paper, we introduce a comparative overview of the quality indicators of two instruments for assessing MOOCs: Standard UNE 66181:2012 on quality management for virtual teaching, and the training analysis instrument for teaching models and strategies of online university courses (ADECUR). Lastly, we will introduce the development of a tool for assessing the quality of MOOCs based on the strengths of the two instruments examined.

Keywords

MOOC, quality, UNE 66181, ADECUR

Comparativa entre instrumentos de evaluación de calidad de cursos MOOC: ADECUR vs Normas UNE 66181:2012

Resumen

Los cursos abiertos en línea y masivos (en adelante MOOC) se han considerado en la literatura divulgativa y científica como una revolución con un gran potencial en el mundo educativo y formativo. Sin embargo, al mismo tiempo, existen discrepancias y cuestionamientos sobre el valor pedagógico y el alcance que tendrá el movimiento en la educación superior. Así pues, el universo de los MOOC es objeto de reflexión didáctica y formativa entre diferentes autores e instituciones

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en el mundo globalizado, pero todavía son necesarias unas dimensiones y unas implicaciones de la visión evaluadora de los mismos que deben ser valoradas y analizadas desde diferentes puntos de vista.

En este artículo se presenta un panorama comparativo de los indicadores de calidad de dos instrumentos de evaluación de los cursos MOOC: la Norma UNE 66181:2012 sobre la gestión de la calidad de la formación virtual y el instrumento de análisis didáctico de modelo y estrategias de enseñanza de cursos universitarios en red (ADECUR). Por último, se planteará un diseño de herramienta de evaluación de calidad de cursos MOOC en base a las fortalezas de los dos instrumentos analizados.

Palabras clave
MOOC, calidad, Norma UNE 66181, ADECUR

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1. Introduction

The growth of user-generated content initiatives, the increase in open educational practices (OEPs), massive open online courses (MOOCs) and the creation of new self-learning solution providers such as the Open Educational Resources university (OERu), the Peer 2 Peer University (P2PU) or the University of the People (UoPeople) are transforming familiar scenarios into other domains of an uncertain nature. This trend poses a challenge to conventional institutions, especially universities (Sangrà, 2013).

Nowadays, the rapid increase in MOOCs is considered in the informative and scientific literature as a revolution with great potential in the educational and training world (Bouchard, 2011; Aguaded, Vázquez-Cano, & Sevillano, 2013). The Horizon Report, led by the New Media Consortium and Educause, brings a prospective study of the use of educational technologies and future trends in different countries. In its ninth edition (Johnson, Adams Becker, Cummins, Estrada, Freeman, & Ludgate, 2013), it especially highlights the impact of MOOCs on the current educational landscape. In addition, the Iberoamerican Edition Oriented To Higher Education, a joint initiative between the eLearn Center of the Open University of Catalonia (UOC) and the New Media Consortium, indicates that MOOCs will be introduced in our institutions of higher education in four to five years (Durall, Gros, Maina, Johnson, & Adams, 2012).

According to McAuley, Stewart, Siemens, and Cormier (2010a), the development of a MOOC raises a number of pedagogical questions:

- To what extent can they promote in-depth research and the creation of sophisticated knowledge?
- How to articulate the breadth versus the depth of student involvement and participation, which may extend beyond those with broadband Internet access and advanced skills in the use of social networks?
- How to identify processes and practices that might motivate relatively passive users to become more active or adopt more participatory roles?

Moreover, specific strategies should be used to optimise the contribution of teachers and advanced participants.

However, MOOCs are used by many educational organisations without ensuring compliance with minimum quality standards required by participants. In that respect, users of distance learning must be able to select educational courses that best suit their needs and expectations, and educational organisations must improve their offerings to better satisfy their students.

A descriptive comparative analysis of the assessment tools for online courses will produce new scenarios that will help to design higher quality and more efficient tools. These new elements will enable any gap between the participants' expectations and their level of satisfaction to be narrowed. Therefore, the wide range of e-learning will gain in reliability and credibility, which will mitigate the risk of user dropout and will provide online courses with guaranteed higher quality parameters.

In this article, the bases of these new instruments will be designed from the comparative analysis between Standard UNE 66181:2012 (quality management of e-learning) and the analytical tool of teaching models and strategies for undergraduate online courses (ADECUR).

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2. Theories used

2.1. Pedagogical design of MOOCs

In the informative and scientific literature, MOOCs have been considered a revolution with great potential in the educational and training world (Vázquez-Cano, López-Meneses, & Sarasola, 2013b). Many formative courses with the seal of prestigious universities worldwide are increasingly grouped under this concept. Therefore, an understanding of the pedagogical development of these courses is crucial for students and future developers. A good educational philosophy and an adequate architecture for participation will promote a better development for the acquisition of skills by students (Vázquez et al., 2013a).

According to McAuley, Stewart, Siemens, and Cormier (2010b), the fundamental characteristics of MOOCs are: free access without any limit on the number of participants, lack of certification for free access participants, instructional design based on audiovisuals supported by written text, and the collaborative and participatory methodology of the student with minimal intervention from the teacher.

The open nature of the carriers of knowledge or learning resources are in a context where what matters is the matrix of the knowledge (Zapata-Ros, 2012): the procedures for developing knowledge in groups and in individuals. Thus, in MOOCs, which are not purely connectivist, students often encounter a fairly routine pattern in almost all universities and institutions. Therefore, the model of almost every MOOC follows a similar structure (Vázquez et al., 2013a.), that is to say, main page, development page and elements of participation and collaboration. These authors suggest that the design must be attractive and capable of generating competences, and that it must fulfil a number of objectives in a knowledge area or professional field. Moreover, the platforms should offer different possibilities related to 2.0 social participation tools such as blogs, wikis, forums, microblogs, etc.

2.2. ADECUR assessment tool

ADECUR is an assessment tool capable of analysing and identifying the defining features of teaching quality in online courses from the scales provided by the socio-constructivist and research paradigm. It is a way to promote the proper development of educational innovation processes (Cabero & López, 2009).

This instrument, registered with the Spanish Patent and Trademark Office (dossier number in force: 2,855,153), is the result of the doctoral thesis entitled "Analysis of teaching models and teaching strategies in Tele-training: design and testing of an instrument for assessing teaching strategies of telematic undergraduate courses" (López, 2008). This tool has two main dimensions:

1. Psycho-educational dimension. It consists of six axes of progression: the virtual environment, the type of learning that it promotes, the objectives, content, activities, sequencing, assessment and tutoring.

2. Technical aspect dimension. It consists of an axis of progression: resources and technical aspects.

Additionally, the tool has some didactic elements listed as components of the axes of educational progression. Thus, a higher level of information is obtained in the analysis of models and teaching strategies.

The instrument consists of 115 items. Each item has one or more criteria to respond to one of two options only: "1" if the statement is met, or "0" if it is not. The teaching tool emerging from this research may be very interesting for education professionals and experts in the field of MOOCs.

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This study initiates innovation and research on the assessment of the quality of MOOCs. Online training requires the establishment of pedagogical models designed to promote a learning process, which combines flexibility with programming and well-structured planning. All of this is combined with the establishment of open lines of communication and exchange in the virtual classroom, which facilitate the creation of environments. It promotes the construction of knowledge adapted to the particular needs of each participant.

In that respect, an approach to what is shared and participatory among the teaching and learning group is required (Mercader & Bartolomé, 2006). In addition, this approach evaluates these virtual environments to learn and reflect upon their social and educational implications. Moreover, the research undertaken makes a significant contribution to the innovation and evaluation of the teaching curriculum to provide a tool for evaluating hypermedia materials of an educational and technological nature.

2.3. Standard UNE 66181: 2012 on quality management of e-learning

In recent years, there has been a remarkable development of the e-learning phenomenon, facilitated by globalisation and the development of Information and Communication Technology (ICT), which has helped to improve and expand the existing educational offering.

This type of training is used by many organisations to comply with paragraph 6.2 of Standard UNE-EN ISO 9001 on quality management systems, to "provide the necessary standards for their employees and guarantee their competence." In this respect, it is necessary "to ensure that the acquired e-learning meets specified purchase requirements" according to section 7.4 of this Standard.

Therefore, Standard UNE 66181: 2012 is intended to serve as a guide to identify the characteristics of e-learning programmes. Users may select online courses that best suit their needs and expectations, and educational organisations may improve their offering, thereby satisfying their students. In this respect, the dimensions comprising the satisfaction factors of e-learning are: employability, teaching methodology and accessibility.

Information about quality levels is expressed according to a system of representation of cumulative stars, where one star is the lowest level and five stars is the highest level. Thus, the level attained in each dimension is represented by an equal number (1 to 5) of black (or filled) stars, which build up from the left until all five are attained. Furthermore, the quality levels of this standard are cumulative, thus each level is also the sum of the content of the previous levels.

However, these headings were adapted to a tool that can easily measure courses with quality indicators. That is to say, a MOOC could include indicators of different levels of quality rubrics without being cumulative. In fact, each quality standard may be evaluated and does not have to contain the sum of the indicators from previous levels.

3. Study and analysis of the research scenario

The study presented belongs to the line of work initiated in teaching research Innovation 2.0 Information and Communication Technology in the European Higher Education Area, located in the framework of Action 2 projects funded by Educational Innovation and Development in the Department of Teaching and European Convergence at the Pablo de Olavide University, Seville, Spain, and developed at the Laboratory for Computational Intelligence, under the direction of Professor Salmerón.

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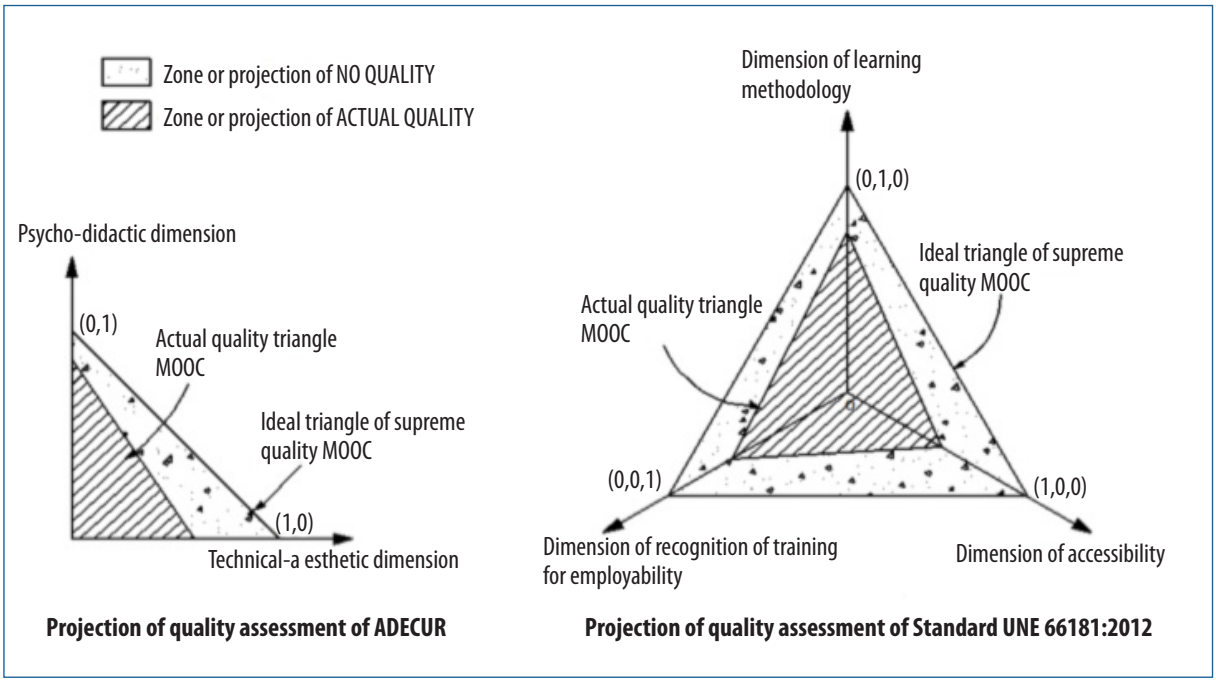
Figure 1 shows the representation of MOOCs in two quality triangles. On the one hand, the orthic ideal triangle of supreme quality MOOC, showing an equilateral triangle (for all three dimensions of the UNE Standard) or rectangle (for the two dimensions of the ADECUR instrument), with the highest scores in all the quality dimensions (axes cut in point 1 of them). This ideal triangle gets the orthic adjective because it is a high quality projection surface and serves as a benchmark for measuring the "lack of quality" of MOOCs. In this regard, the actual quality triangle of any MOOC (hatched area) has also been represented in the two instruments, intersecting with the above-mentioned axis at points below 1.

Figure 1. Representation of isometric triangles of quality of the instruments analysed. *Source: original content*



3.1. Comparative between the quality assessment instruments ADECUR and Standard UNE 66181: 2012

In this study, the common and different indicators of the two assessment tools will be discussed. Thus, it is intended to conduct an internal analysis between ADECUR and the UNE Standard to establish the real situation of the two instruments, as well as the risks and opportunities of their use in the evaluation of online courses.

3.1.1. Analysis of common indicators

We have used the analysis of the common indicators of the quality evaluation subfactors of ADECUR and Standard UNE 66181:2012 as a premise, according to the dimensions of the Standard. Therefore, Table 1 only shows the common quality indicators of the dimension "Learning Methodology", since there is no other dimension with common indicators.

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Table 1. Common quality indicators

Dimension: Learning Methodology	*Indicators*
Subfactor 2.1 Didactic instructional design	Entails general objectives
	Entails general learning objectives
	Entails specific learning objectives
	Entails a method of learning and identifiable activities
	Knowledge assessment is made at the end of the course
	Activities and problems develop in a realistic context
	Some degree of freedom is allowed in the training schedule
	There is an initial evaluation that provides information about learning needs and, after the final evaluation, the lessons learned during the course
	The learning methodology is based on performing troubleshooting or doing real projects with direct involvement in society
Subfactor 2.2 Training resources and learning activities	The training resources are only reference material for self-study
	The training resources allow student interaction
	Students may engage in self-assessment
	Instructions are provided for the use of training resources
	Students must conduct individual and group practical activities
	A teaching guide is provided with information about the course
	There is variety in the training resources and different interaction models
	Complex individual and group practical activities are proposed
	Synchronous sessions are scheduled by the trainer
	Knowledge management is facilitated
Subfactor 2.3 Tutorial	The course tutors respond to student questions without a pre-set time
	Answers to questions about the course content are given in a pre-set time
	Tutors keep track of learning
	The students' progress in relation to pre-defined learning indicators is considered
	Personalised learning and individual tracking is done
Subfactor 2.4 Technological and digital learning environment	Provides information on hardware and software requirements
	At least some asynchronous communication tools are available
	There is a digital technology learning environment that integrates content and communication
	Includes a section of frequently asked questions and / or help
	Enables or has mechanisms or components that facilitate student orientation within the environment and the learning process

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3.1.2. Analysis of non-common indicators

An internal analysis of non-common indicators will highlight certain weaknesses of the instrument that does not contain them. As a result, these aspects limit the reach of the evaluation tool of any MOOC. However, the instrument that does contain these non-common indicators will have certain strengths, which are advantageous in terms of the dimensional scope of the assessment, as shown in Table 2.

Table 2. Non-common quality indicators

STANDARD UNE 66181:2012	
Dimension 1: Recognition of training for employability	***Indicators***
Subfactor 1.1 Recognition of training for employability	All
Dimension 2: Learning Methodology	***Indicators***
Subfactor 2.1 Teaching-Instructional Design	The learning objectives are organised by skills
	Monitoring post-course
Subfactor 2.3 Tutorial	Existence of a personalised programme of contacts
	Individual feedback is provided
	Individualised synchronous sessions are scheduled
Subfactor 2.4 Technological and digital learning environment	Enables groups of students and tasks to be managed via access logins and reports
	Resumes the learning process where it left off in the previous session
	Allows repositories for sharing digital files among its members
	Allows discussion forums and student support
	Allows visual indicators of learning progress
	Allows management and reuse of best practices
	Allows use of different presentation formats
	Allows collaborative technology or of active participation
Dimension 3: Accessibility levels	***Indicators***
Subfactor 3.1 Accessibility hardware	All
Subfactor 3.2 Accessibility software	All
Subfactor 3.3 Accessibility web	All
ADECUR	
Dimension 1: Psycho-educational	***Indicators***
Subfactor 1.1 Virtual environment	Powers a generally motivating context
	Promotes a caring and democratic environment

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ADECUR	
Dimension 1: Psycho-educational	***Indicators***
Subfactor 1.2 Learning	Provides different levels of initial knowledge
	Introduces resources that help relate the lessons learned from initial personal experiences
	Uses different procedures to facilitate and enhance understanding
	Boosts negotiation and sharing of meanings
Subfactor 1.4 Content	Proposes the use of different content as raw materials for the construction of learning
	Content arises in the context of each of the activities
	The documentary content is updated
	Prior knowledge is considered as content
	Allows external inquiries to external specialists from the online course
	The content is relevant
	The information and language used are suitable
	The formulation of content is appropriate to the construction process
	Facilitates and promotes access to conceptual, procedural and attitudinal content
	Promotes gradual access to content
Subfactor 1.5 Activities and sequencing	Includes activities to relate prior knowledge to new content
	Includes activities to insert knowledge within wider schemes
	Includes activities that facilitate communication and discussion of personal knowledge
	Includes activities to reflect on what they have learned, the processes followed and the difficulties faced
	Includes activities that promote decision making
	Includes activities that foster independent learning
	Includes activities that promote a research approach
	The activities are organised into coherent sequences with constructivist perspectives and research
Subfactor 1.6 Evaluation and action	Assessment is formative
	Includes assessment processes led by students
Subfactor 1.7 Tutorial	Includes personal realisation of different screening tests on learning outcomes
	Presents a virtual space for evaluation
	The initiation and development of the activities are oriented and energised
	A virtual dynamic element that acts as a guide is incorporated
Dimension 2: Technical-aesthetic	***Indicators***
Subfactor 2.1 Resources and technical aspects	Retrieval of information is provided
	Is easy to use

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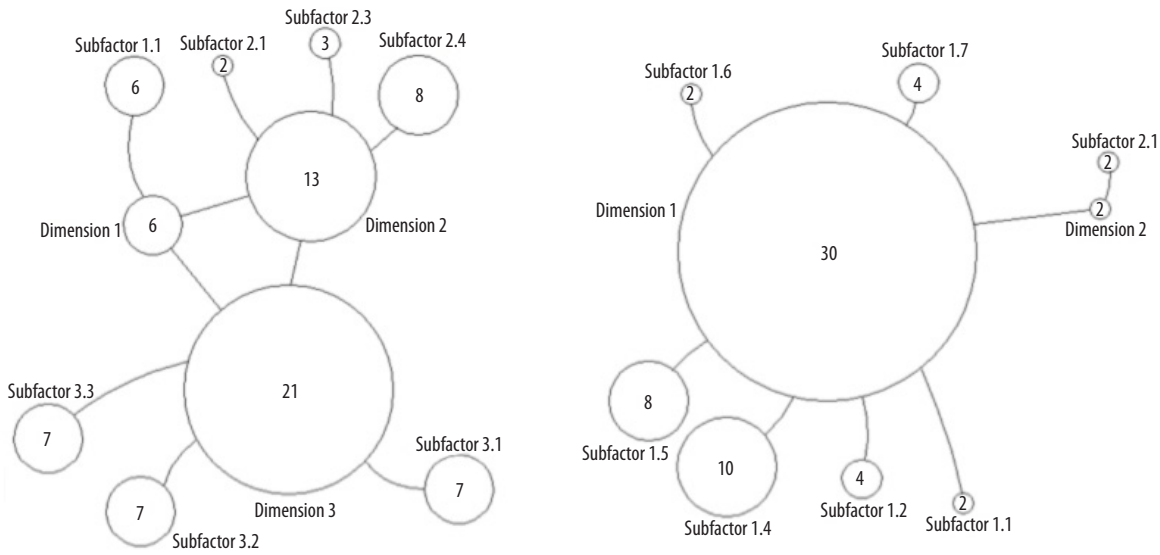
Figure 2 graphically represents the strengths of Standard UNE 66181:2012 and the ADECUR instrument. To do this, we symbolise the dimensions of the instruments as intertwined nodes of different sizes. In turn, each dimension is connected to its component sub-factor. This way, we can represent the strength of each tool as a dimension map and non-common subfactors. The number within the node of each subfactor represents the non-common indicators of the tool that make it up, and it is proportional to its own size. Moreover, the number within the node of each dimension represents the non-common indicators of all sub-factors that make it up, and it is also proportional to its size.

Figure 2. Graphical representation of the strengths of the instruments analysed. *Source: original content*



In this respect, it can be inferred that Standard UNE 66181: 2012 has 6 non-common indicators of dimension 1, 13 of dimension 2 and 21 of dimension 3. As for the ADECUR tool, it has 30 non-common indicators of dimensions 1 and 2.

3.2. Design of new tools for evaluating the quality of MOOCs

This study proposes some guidelines or bases for the configuration of a new instrument that obviates the deficiencies yet includes the strengths of the two instruments described above. The new tool should therefore consist of four dimensions: recognition of training for employability, learning methodology, levels of accessibility and virtual classroom environment/climate. To the three dimensions of Standard UNE 66181: 2012, we will add the non-common indicators of the ADECUR dimensions. Thus, a fourth didactic progression dimension is added, "Virtual classroom environment/climate" from the ADECUR instrument, which does not have any non-common measure with Standard UNE 66181:2012, and this entails a new and efficient key factor in shaping new tools. In Figure 3, this construct design is represented as tetrahedral dimensions of future tools for evaluating the quality of MOOCs.

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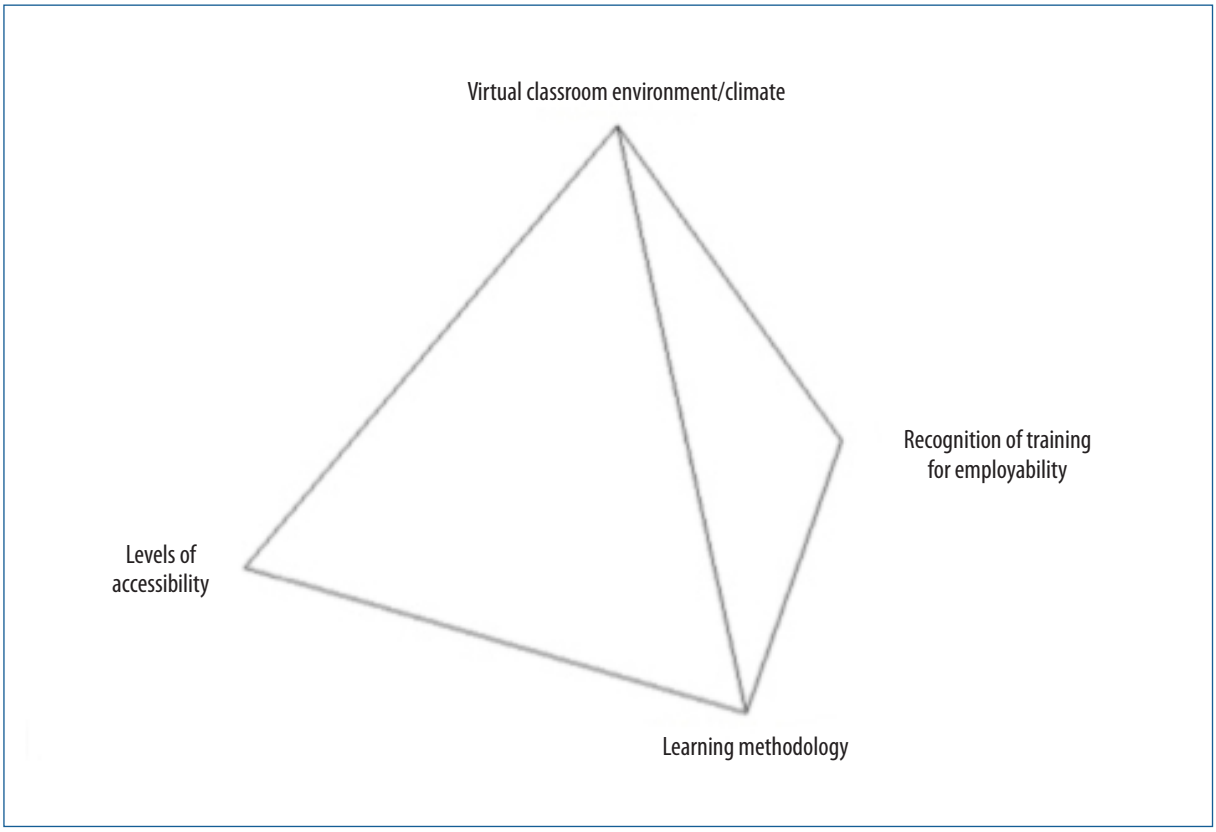
Figure 3. Representation of the tetrahedral dimensions of the new instruments for the quality assessment of MOOCs.
Source: original content



Based on the above, Table 3 shows the configuration of the new tools for assessing the quality of MOOCs. These instruments should contemplate a platform of common quality indicators (Table 1), the four tetrahedral dimensions (Figure 3) and sub-factors or axes of progression of non-common indicators (Table 2).

Table 3. Basis of the design of new tools for assessing the quality of MOOCs

COMMON INDICATORS OF QUALITY			
Dimension: Learning methods (ADECUR tools and UNE)			
Subfactor 2.1	Subfactor 2.2	Subfactor 2.3	Subfactor 2.4
TETRAHEDRAL DIMENSIONS			
Dimension 1: Recognition of training for employability	***Dimension 2: Learning methodology***	***Dimension 3: Levels of accessibility***	***Dimension 4: Virtual classroom environment/ climate***
Subfactor 1.1 (all indicators)	Subfactor 2.1	Subfactor 3.1	Subfactor 4.1 (all indicators)
	Subfactor 2.3	Subfactor 3.2	
	Subfactor 2.4	Subfactor 3.3	
UNE Standard	ADECUR and UNE Standard	UNE Standard	ADECUR

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4. Discussion and conclusions

This study reduces the differences within the evaluation of the educational action of MOOCs between Standard UNE 66181: 2012 and the indicators of the ADECUR tool, through a new analytical and visual tool that minimises the weaknesses of the two instruments analysed. Thus, a design of new instruments that takes into account all of the indicators of the dimensions needs more research efforts.

Moreover, the platforms that supply certified MOOCs could be accredited, thus avoiding the provision of educational actions with inappropriate methodologies (Valverde, 2014). Furthermore, it would prevent, as far as possible, the trend towards the standardisation of knowledge and its serious drawbacks, and address individual differences due to overcrowding. It should be noted that overcrowding leads to a unidirectional-communication, teacher-centred and content-based design. Thus, MOOCs could be shown as the democratisation of higher education, with pedagogical interests that take precedence over economic ones.

In any case, the assessment of the quality of MOOCs is an emerging research field. In this respect, we estimate the need for more studies on certain indicators of quality assessment of online courses, as well as longitudinal (Stödberg, 2012) or comparative studies (Balfour, 2013). And, more specifically, to continue researching into methods that improve student assessments (reliability, validity, authenticity and safety), effective automated assessment, immediate feedback systems, and a better guarantee of usability (Oncu & Cakir, 2011).

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About the authors

Miguel Baldomero Ramírez Fernández
mbramfer@upo.es
Lecturer of Financial Economics and Accounting, Pablo de Olavide University, Seville, Spain

Doctor of Science in Education. Engineer of the Enginnering School of Seville. Member of the Systems and Information Technologies Research Group (PET-240). Scientific Reviewer for the journal *IJERI*. Inspector of Education, Government of Andalusia (Spain).

Universidad Pablo de Olavide de Sevilla
Carretera de Utrera, km. 1
41013 Sevilla
Spain

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José Luis Salmerón Silvera
salmeron@acm.org
Professor of Information Systems and Director of the Laboratory for Computational Intelligence,
Pablo de Olavide University, Seville, Spain

He has participated as a director and member of several research groups and professional projects working on developing intelligent algorithms for decision support, fuzzy cognitive maps and new methodologies based on soft computing, artificial intelligence techniques for complex diagnostics, decision support and quantitative methods. He has published in journals such as *IEEE Transactions on Fuzzy Systems*, *IEEE Transactions on Software Engineering*, *Information Sciences*, *Applied Intelligence*, *Applied Soft Computing*, *Knowledge-Based Systems*, *European Journal of Operational Research*, *Communications of the ACM*, *Computer Standards & Interfaces*, *Journal of Software and Systems* and *Technovation*.

Universidad Pablo de Olavide de Sevilla
Carretera de Utrera, km. 1
41013 Sevilla
Spain

Eloy López Meneses
elopmen@upo.es
Lecturer, Department of Education and Social Psychology, Pablo de Olavide University, Seville, Spain

Specialised in MOOCs, ICT and Instructional Design. Doctor of Science in Education and Special PhD Award from the University of Seville. Second National Award in Science Education Studies. He is the editor of the scientific journal *IJERI*.

Universidad Pablo de Olavide de Sevilla
Carretera de Utrera, km. 1
41013 Sevilla
Spain

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