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MOOCs: the New Educational Frontier of the 21st Century

ABSTRACT

Objective: Over and above being widespread in various sectors of the economy and finance, the uncontrollable expansion of digital technology is also conquering areas reserved for education and training, going beyond the traditional models of demand / supply, frontal and long distance lectures. The article aims to analyse the phenomenon of MOOCs (Massive Open Online Courses) and how, together with new trends in the context of digital teaching, they can represent an incentive for universities to reflect on the changes that are taking place in educational policies and in academic culture, possibly re-evaluating their mission with the aim of improving the quality of content and learning experiences.

Methodology: Through the study of various experiences and publications.

Findings: Since their appearance, MOOCs have generated a huge interest in the field of higher education, establishing themselves more and more worldwide as an important online training system, aimed at a large number of users.

Value Added: The MOOCs can represent valid support for training in companies and lastly they can represent a valid means of allowing access to education in developing countries.

Recommendations: The article suggests how the development of MOOCs, through distance learning, flexible and open, is a great opportunity both for mature knowledge-based societies and for developing countries.

Key words: MOOC (massive open on-line courses), Higher education, E-Learning, OER, Blended learning, Flipped class, Gamification, Professional training, Lifelong learning.

JEL codes: I21, I23, D83, J31, L25, L86

Introduction

The fact that flexible and open long-distance learning is expedient in economically developed societies as well as developing countries is by now a consolidated concept. In this context, Open Education (OE) is focusing more and more on improving higher education and education for adults in general.

21st century society has changed greatly with respect to the one for which scholastic and university education systems were conceived. Nowadays, rather than being represented by material, physical, financial and technological capital, the main resources are identified as being knowledge, relationships, human and intellectual capital, imagination and experience sharing.

At the same time, territorial boundaries have been eliminated and university institutions, even the most famous, face national and international competition. In order to cope with this new scenario, they are obliged to make use of organisational, cultural and didactic innovation.

A transformation has taken place through the use of the Network, which constitutes a state-of-the-art physiological language and with which it is necessary to make a comparison, representing a means of sharing for an audience which is by now unlimited.

Online education represents one of the most widespread means of development of education and the supply of e-learning, through MOOCs, is currently the latest frontier.

Process of change in higher education

The view of higher education is undergoing a great change due to globalisation, technological development and the exponential increase in students; expected to rise from 99 million to 414 million in the next twenty years. An ever-increasing number of students want to choose their subjects, method and time for studying as freely as possible, through online courses or through combined mixed forms of learning as well.

China is the country with the most significant increase thereof in the last few years, followed by Brazil and India. Thanks to the thirst for knowledge and the desire of social mobility of emerging economies, higher education will be available to hundreds of millions of citizens all over the world (European Commission, 2013).

The transformation of universities today is no longer a choice but an imperative. Internet has by now evolved into a richer and richer global platform of content and has in fact become the predominant infrastructure for the exchange of knowledge between people. Universities have to reflect if they do not want to lose their role and function, developing the old pedagogical model based mainly on frontal academic classes, by means of integration with new paradigms based on collaborative learning, modifying the creation of content and contributing to creating content suitable for the use thereof in open educational platforms which students all over the world can utilise without temporal limitations. Realising a global network in higher education, shared by teachers and students for the collaborative development (Rifkin, 2014) of knowledge may be vital in determining a new impulse in universities, making them protagonists in the global network economy, even if this reality seems distant as Universities continue to work in a mostly independent manner. The University of the future may offer better learning material and personalised studies with web-based support by lecturers, who may also make use of long-distance posts. In order to ensure such development, universities will have to face important structural changes (Garito, 2013). Open

Learning has progressively developed in relation to the needs for continuous updating and professional education induced by technological evolution, recalling the attention of the scientific community on the best practices of Open Access and of Open Educational Resources (OER)¹ in an educational framework. In this field, the scientific community is questioning the innovative capacity of MOOCs as the new gateway for Open Learning, a novelty which is destined to revolutionise the traditional academic world, overwhelming the institutions which do not demonstrate the capacity to accept new models of flexible learning often linked to long-distance education (Nirchi, 2014).

The phenomenon of MOOCs

The origin of MOOCs can be identified in the discrepancy that exists between a society living amidst rapid changes day to day and the need to overcome traditional types of education which clash with the structure and architecture of knowledge and with the rhythm of its development (Siemens, 2015). They encourage creativity, favouring an alternative to scholastic rigidity, to the limitation of freedom, to the fencing of common ground, to an increase in control and surveillance by traditional educational institutions (Kop, 2011), providing the opportunity to satisfy the increasing demand for access to education and post-high school formation and their advantages (Ferguson, Sharples & Beale, 2015).

MOOCs are not only the result of the complexification (and digitalisation) of higher education but provide the opportunity to respond to the increasing demand for access to education and post-secondary school formation and the advantages associated thereto (Ferguson, Sharples & Beale, 2015). The acronym MOOC was used for the first time in 2008 during the “Connectivism and Connective Knowledge” course by professor George Siemens at Athabasca University. MOOCs spread worldwide from autumn 2011, the period

1. The term “Open Educational Resources” (OER) – refers to didactic material in a digital format made available with a licence that permits their reuse, modification and distribution.

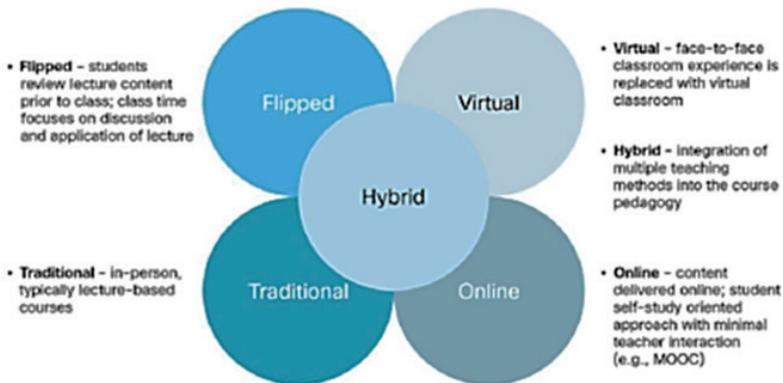
in which Stanford University started a postgraduate degree in artificial intelligence free of charge, in which 160 000 students from 190 countries enrolled.

What are MOOCs

The term MOOC, an evolution of the e-learning model (Corbeil, Corbeil & Khan, 2015), refers to an open online course (Open Access), which many users may use on the web (hence the term Massive) and which is based on the use of open educational resources (OER), realised by the same institutions that provide the courses or taken freely from other universities or chosen from a specially provided repository available on the web.

The novelties introduced by MOOCs are numerous with respect to the previous e-learning experiences in Universities, where the use thereof was disseminated as a support for traditional didactics in the class. All this was limited to the online dissemination of mainly textual didactic material for a limited number of pupils enrolled at the University providing it. MOOCs introduced the systematic use of tools in the form of course videos, implementing substitute or improved didactics, through the use of multiple online resources. Over and above this, free access to MOOCs for non-students permitted the dissemination of higher education to wider audiences (Third Mission).

The use of MOOCs does not exclude the simultaneous use of didactics in the classroom as a support (the so-called blended/hybrid approach) as shown in Figure 1, with the use of various didactic and communicative methods. A particular adaptation thereof is represented by the so-called Flipped Classroom, where the students follow video lessons individually and all material is available on the MOOC, while at a subsequent interactive classroom lesson possible problems and/or allocated exercises are dealt with.

Figure 1. Alternative Teaching Methods

Source: Cisco Systems Inc. Customer Case Study (2013).

They open up a double direction in this way; by widening the audience (Third Mission) whilst optimising the use of resources (saving physical space and refunctionalising the total hours of teaching).

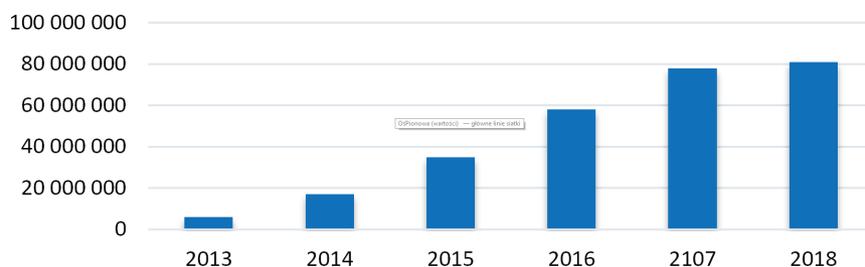
In international debates, reference is often made to the difference between xMOOCs (centred on the figure of the teacher) and cMOOCs (centred on connectivity) (Siemens, 2013).

xMOOCs, a more interactive-educational style, are based on the principle of behaviour, are more widespread and are realised in big Universities. It focuses on the transmission of knowledge in a didactic way nearing it to the classical pedagogical model applied in university classrooms. The MOOC designer defines the learning aims and the way of verifying the knowledge attained. The learning material is offered in small units, usually by means of a video, lasting 12–20 minutes on average while other means include tests, exercises and games online. Forums permit participants to experience social learning and increases scalability since the workload of lecturers increases slightly with the increase in the number of participants. cMOOCs, a constructivity-connectivity style, are based on the strong motivation of participants and the availability of facilitator lecturers. Connectivity type MOOCs stimulate interaction between peers, collaboration, sharing of knowledge

and resources and facilitate the growth of networks which go beyond local, regional and national boundaries, expanding on a large scale. The possibility of accessing learning environments is generally allowed also after the conclusion of courses, permitting students and invited experts to co-operate in the development of knowledge as a common asset. Numerous authors show how all this is implemented with the perspective of lifelong learning, of digital citizenship and of an improvement in the very knowledge, competence and attitude which is essential to prosper in a digital economy (Savelli, 2016). A further type of MOOC is the sMOOC (Brouns et al., 2017) (social-seamless), in which a differentiated and more holistic approach is offered by means of a design which permits a wide range of approaches and contexts related to a variety of languages, cultures, settings, pedagogy and technology. The sMOOC environment uses a collaborative-decentralised scenario which adapts to the needs of the students, combining the traditional pillars of the open education theory with elements of socio-contructionalism, gamification, omnipresent learning and digital inclusion.

Current Trends in MOOC

The success of MOOCs lies in the globalisation of academic educational content. The number of users and of MOOCs are the most evident phenomenon, since over 80 million students have enrolled in the last six years and more than 9.000 open access MOOCs are now available on the Net (Fig. 2) (Calise, 2018).

Figure 2. The exponential growth in the number of MOOCs learners

Source: Class Central, 2018.

According to a survey of Visiongain (MASSIVE OPEN ONLINE COURSE..., 2017) (a company information portal), the MOOC market is dominated by developed countries and the main regions include North America, Europe and Pacific Asia, areas which will continue to dominate the market from 2017 to 2027. Latin America, the Middle East and Africa currently make up a small share of the market, which is expected to increase in the next five years and however to a lesser extent than the other regions by 2027.

The region with the highest earnings in 2016 was North America with 1,047.2 million dollars and is expected to rise to 13,821.5 million dollars by 2027 with a CAGR² of 25,7%.

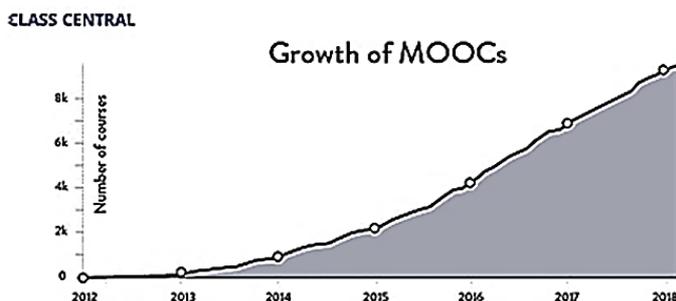
Pacific Asia invoiced 461.7 million dollars in 2016 with an expected growth of up to 12,708.7 million dollars by 2027. According to the report, earnings from the MOOC market in Europe will reach 9,507.1 million dollars by 2027 starting from 702.1 million dollars in 2016 with a CAGR of 26% in the period 2017-2027. Strongly driven by the EU5 countries³, the European market will be very active in the first half of the predicted period. The same report highlights that in 2017 alone, the whole market will have a value of 3.2 billion dollars. According to Class Central, one of the most well-known MOOC associations, over 800 Universities from all over the world have launched

2. CAGR (Compound Annual Growth Rate).

3. France, Germany, Italy, Spain, United Kingdom.

at least one MOOC to date. The total number of MOOC has increased to reach 9,400 courses with respect to 6,850 in 2016. Approximately 20 million new students subscribed to their first MOOC in 2017, taking the number to a total of 78 million students; in 2016 the total number of new students was 23 million. The total number of MOOC students on the date of publication was 81 million (Dhawal, 2018). The first 5 providers based on the number of registered users are: Coursera (30 million), edX (14 million), XuetangX (9.3 million), FutureLearn (7.1 million) and Udacity (5 million). In the graph below, the impressive growth of the number of courses activated from 2012 to date are shown (Figure 3).

Figure 3. MOOC growth



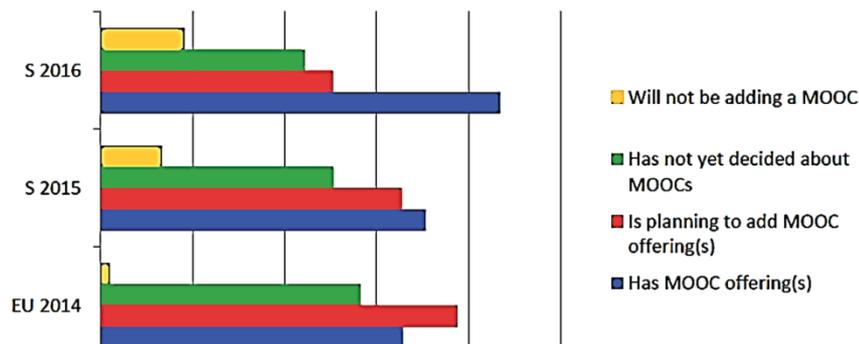
Source: Class Central, 2018.

The future of the MOOC market seems promising in relation to the increase in the use of digital tools and connectivity in movement as well. Learning has become a part of this technological culture and academic institutions are consequently more and more interested in introducing MOOCs to their education programmes to permit independent studying, expanding their student base to a worldwide public.

MOOCs in Universities: prospects and opportunities

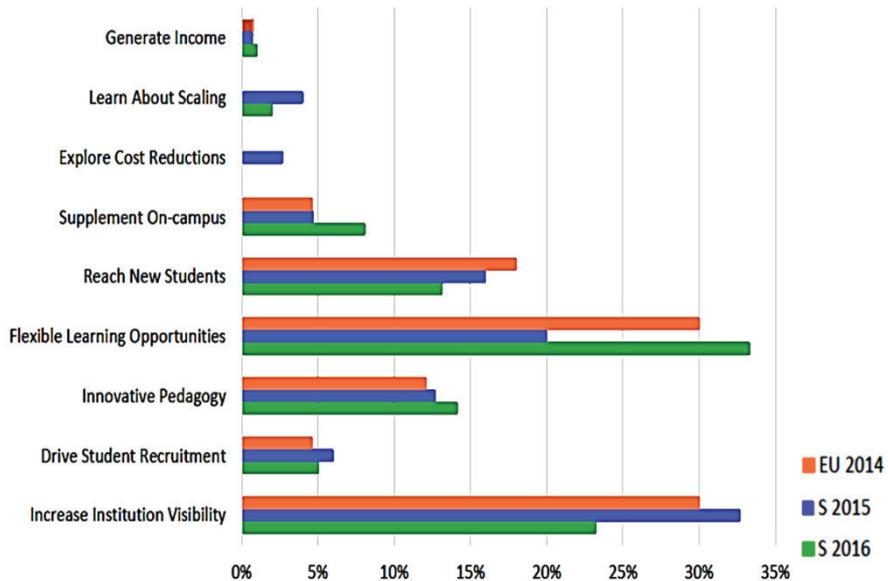
Various universities are approaching MOOCs in a variety of ways, since some are actively involved in the production of MOOCs (producers) while others are introducing MOOCs produced by others to their own programmes (consumers) and others are doing both while some are waiting to make a decision and others are not interested in introducing MOOCs yet at all. The production of MOOCs is not limited to only “elite” universities but also other institutions, like some community colleges which have created MOOCs based on the needs of their students (Hollands & Tirthali, 2014). The activation of MOOCs in Europe is developing at a higher rate than in the United States, as can be seen from the report in 2016 of Jansen and Goes-Daniels (2016), which shows that at least 40% of the European higher education institutions developed a MOOC or were about to do so as opposed to only 12-13% in the United States. According to some data extrapolated from the report drawn up by EADTU (the European Association of Distance Teaching Universities), published in February 2017 (Jansen & Konings, 2017), which involved 101 institutions of higher education in 24 different countries, 97% of which belong to the European Higher Education Area (EHEA), it is possible to observe constant growth in the number of institutions that offer MOOCs. The total number of institutes that have or are expected to add a MOOC has on the whole been stable in the last few years, with 68% in this survey of 2016 and 2015 and 72% in 2014 (Fig. 4).

Figure 4. Status of MOOC offering compared



Source: MOOC Strategies of European Institutions, Status report based on a mapping survey conducted in November 2016.

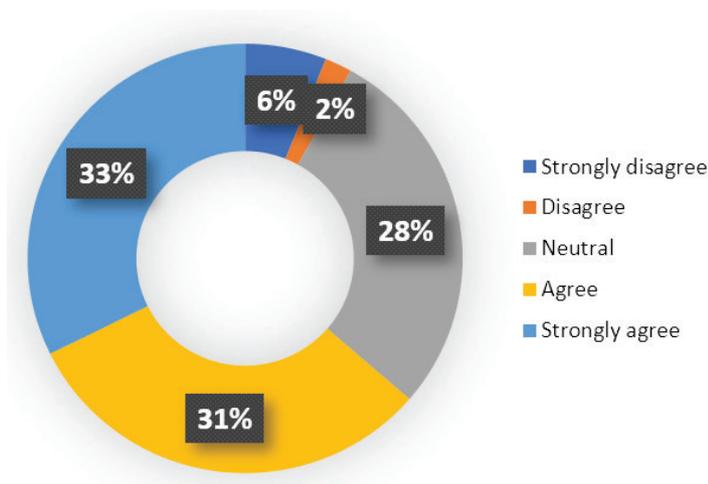
The survey shows that 66% of the higher education institutes are not connected to one of the main MOOC platform suppliers (eg. EdX, Coursera) but offer their MOOCs on the institutions' platforms or on regional/national platforms that are available. The results emphasize the fact that institutions of higher education in Europe are generally well disposed in using MOOCs, which are considered sustainable models for offering courses. In the period of the report (2014-2016), the main aims in MOOC offers constituted an increase in institutional visibility and flexible learning. In 2016 flexible learning was considered the most important aim of offering a MOOC (33% as opposed to institutional visibility at 23%). The rest of the persons interviewed considered innovative pedagogy and reaching new students as the main reasons for offering a MOOC (Fig. 5), in contrast with the American surveys conducted in 2014 and 2015 (Allen & Seaman, 2014), in which the recruitment of students was considered to be the most important aim.

Figure 5. Primary objectives

Source: MOOC Strategies of European Institutions, Status report based on a mapping survey conducted in November 2016.

MOOCs spread with the intention of guaranteeing high quality education to as many users as possible and from this point of view the survey shows that 51% of the interviewees believed that they should be open to everyone and not reserved for specific target groups; only 1% stated that they should be limited to users in difficulty (unemployed, disabled, immigrants and refugees, etc.). Open Education has many aspects (Patru & Balaji, 2016) and one of these is related to the reuse of material and open licences. According to the report, 36% of the institutions are developing MOOCs that may be reused by other institutions whilst another 36% are reusing existing MOOCs for students of lifelong learning and/or university education. Other important data refers to the potential barriers and opportunities in recognising learning based on MOOCs. 63% of the interviewees believed that it is essential to offer formal credits (ECTS) together with the more informal certificates, such as attendance certificates for example.

Figure 6. It is essential to offer a formal (ECTS) credit together with more informal certificates like for example a certificate of participation



Source: MOOC Strategies of European Institutions, Status report based on a mapping survey conducted in November 2016.

Other relevant data is that 70% of the persons interviewed held that the ECTS should be recognised in formal bachelor/master programmes of institutions that offer a MOOC and these credits (ECTS) should be recognised by other higher education institutes (for example, as part of joint programmes or virtual exchange programmes). All of this indicates a strong intention to include MOOCs in educational offers and consequently recognise the credits thereof. The MOOC phenomenon described in this and other reports highlights the fact that responsible politicians and decision-makers should consider the opportunity of capitalising on the potential offered by these courses on a large scale to a greater extent and use them as a valid development strategy, supporting and extending multi-stakeholder partnerships for reasons of efficiency as well as for the benefit of society as a whole.

MOOCs and education opportunities in companies

Over and above universities, companies nowadays have also understood that MOOCs represent a valid instrument in education and have begun to grasp their numerous advantages.

In fact, Open Education in general and MOOCs in particular permit the formation of a large number of workers, whilst optimising time and costs with respect to traditional training in attendance (Schroeder et al., 2015).

The change is already taking place in an international company context and the number of companies turning to educational contents from public and open repositories is increasing. Big enterprises in North America are using more and more numerous Technology Entertainment Design (TED)⁴ videos instead of external experts.

The videos are characterised by short and easy to use contents, centred on determinate themes and selected on the basis of their quality and the interest they induce. Access options and copyrights are well-defined. An increase in the use of YouTube videos is emphasized even though there are some critical issues related to the limits, which are mainly technical in nature (eg. management of authorisation and rights, the possibility of selecting short segments and the difficulty of inserting them in certain contexts).

Furthermore, companies may also refer to contents developed by Associations in their sector, may collaborate with other companies, may improve open source MOOCs or upon paying a participating fee, may use contents made available by course participants or developed by means of crowd source designs (Prpic et al., 2015).

Generally, when companies use external MOOCs they turn to specific themes which can group individuals that share the same interests or work experiences together and can provide answers, make suggestions and build relationships with other people in the same sector. Some enterprises are

4. TED Conferences LLC (Technology, Entertainment, Design) is a media organization that posts talks online for free distribution under the slogan "ideas worth spreading".

beginning to consider reimbursing workers who obtain certificates showing that they have completed or passed courses. In this way, education that satisfies varying needs can be implemented with the possibility of undertaking modular and flexible learning according to varying study times, facilitating the use thereof by its workers and thereby increasing work satisfaction. The possibility of accessing educational resources at any time, even after courses have closed, permits employees to maintain the competence and knowledge that is useful in facing variable working contexts (Schroeder et al., 2015).

Companies can provide higher education institutions with specific topics in order to be able to develop courses which permits them to facilitate the evaluation of participating candidates for the purposes of future recruitment (Masie, 2015). Therefore an increase in the number of MOOCs for certified formation connected to working activities and more and more companies creating and using them, can be observed. Some authors state that all this could strongly modify professional formation, breaking up institutions, programmes and the traditional experiences of tertiary education (Schroeder et al., 2015).

MOOCs as a tool for the democratisation of education

MOOCs also especially represent a valid instrument in developing countries, facilitating access to higher education for the masses and not only for the elite (Wati Abas, 2015). The development of these countries may be facilitated by open online education following the spreading and impact of extended high quality instruction.

Feasible lifelong multilingual learning provided by MOOCs promote the independence of workers, making them aware of their professional growth as well as of students who through their frequency/attendance can follow their interests, deciding which type of studies to undertake (Wati Abas, 2015).

The same MOOCs, through their collaborative potential between wide and diversified groups of people, are able to create virtual relationships with possible positive repercussions in terms of a reduction in poverty and inequality, with the creation of new work opportunities and placing citizens in a position to demand a non-corrupt government (Jagannathan, 2015).

Using online courses and MOOCs, developing countries still face multiple difficulties, connected with a lack of ICT infrastructure, limited experience of traditional universities in long distance education and e-learning and governments' restrictive policies of regulation, which limit the methods and strategies of distribution and services supporting students, so consequently not all academic institutions are authorised to offer online courses and MOOCs.

As a result, an adaptation to local needs is necessary to overcome OER (Open Educational Resources) published by educational institutions of OECD countries directly usable by developing countries, so as to separate technology and processes (elaborated by developed countries) from content and substitute the latter with suitable content for the needs of developing countries realised within their boundaries (Savelli, 2017). This ensures an educational experience created for the local population, in the preferred language, with meaningful and relevant examples which students can refer to and which enhance the cultural, religious and social variables of the specific country (Wati Abas, 2015).

Conclusion

Since 2012, known as "the year of the MOOC", Massive Open Online Courses have expanded worldwide, shaking the landscape of higher education, potentially interrupting the model of universities made of bricks and cement (Patru & Balaji, 2016); the rapid advent of MOOCs is considered by some experts as an educational revolution. Open Education in the past few years has been a secondary aspect of university education, usually recognized by *ad hoc* institutions (Open Universities) or in non-formal education implemented by

parallel agencies. Currently, scientific literature and the perception of interested parties have attributed increasingly relevant interaction between OER/MOOC and higher education and MOOCs seem to have launched a concrete challenge to the traditional educational methods in university education, the consequences of which have only been partially identified.

In this paper, characteristic elements have been illustrated with the aim of stimulating the debate on the contents and tools of OE which, by means of technology, have overcome the physical learning environment, making it open and usable to everyone in relation to their needs and limits, reflecting the values of transparency, freedom, democracy and respect for the differences that have brought together various cultures and people all over the world.

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