

# Open education, open education resources, and massive open online courses

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## Abstract

Open education is a concept of opening access to education to all. It is based on the belief that education and knowledge are public goods and that everyone has the right to access quality education. The practice of open education has been influenced and accelerated by the advancement of information and communication technology (ICT), which has also triggered the global movements on open source software, open content, open license, and open educational resources (OER). Together, these movements have given birth and nurtured a new culture of sharing. The growing number of OER providers proves that people are willing to share their creations, and many even totally give up their copyrights. And now, the movement has gone beyond OER and many providers are now offering the full range of open educational services, including what we now call Massive Open Online Courses (MOOCs). Nevertheless, although MOOC initiatives continue to grow, people are still not sure whether MOOC will sustain as an education method due to several issues. This paper discusses the development of MOOC and its practices in extending the reach and access of education to the masses.

*Keywords: Open Education; Open Educational Resources; MOOCs*

## Background

The concept of open education is based on the belief that education and knowledge are public goods and that everyone has the right to access quality education. Open education, therefore, emphasizes the importance of system flexibility to minimize hindrances of access due to aspects related to place, time, economy, geography and age. One of the education systems believed to accommodate such flexibility is distance education. This is one of the reasons that, to some extent, people refer to open education as distance education, and within higher education the nomenclature of “open” is literally adopted in the names of universities such as the Open University, Indonesia’s Universitas Terbuka (means Open University), the Open University of Hong Kong, University of the Philippines Open University, Allama Iqbal Open University, etc. The premise of open education is undeniably well received and adopted by society, and the open educators’ commitment toward

open education was declared formally in 2007 through *The Cape Town Open Education Declaration*. The declaration states the principles, strategies, and commitment of educators to conduct open dialogues, to inspire, and to facilitate further development and realization of open education.

The development of the practice of open education has been influenced and accelerated by the advancement of information and communication technology (ICT). At the same time, this has also triggered various other global movements that are interdependent and support each other's further development. The global movements believed to have significant impacts on the realization of open education practices, among others, are those of open source software, open content, open license, and open educational resources.

### **Open Source Software, Open Content, and Open License**

The open movement initially grew within the community of ICT activists, and particularly among the software developers/programmers. It was marked by the launch of the free software initiative led by Richard Matthew Stallman in September 1983 through the GNU Project, a project to develop a free Linux operating system (<http://www.gnu.org/>). It was this project that later gave birth to the Open Source Software (OSS) movement.

Open Source Software (OSS) refers to computer software that is distributed with its programming source codes to allow the users to modify it in accordance with their needs. OSS movement, which is derived from the Free Software movement, emphasizes freedom of use but not necessarily that this means 'free of charge'. Nevertheless, although the notion of freedom does not mean free of charge or non-commercial, free software and OSS movement have inspired many programmers to actually distribute their software for 'free', as in free of charge. A study conducted by the Standish Group in 2008 reported that the use of OSS had decreased the income of commercial (proprietary) software development companies by up to USD60 billion per year. This indicates that software users/consumers globally have saved USD60 billion per year, the amount that makes up 1/6 of the total value of software sales globally. (Rothwell, 2008, downloaded from [www.freesoftwaremagazine.com](http://www.freesoftwaremagazine.com) on 24 July 2012). A more recent study conducted by the European Working Group on Libre Software in 2011 also claimed that, if the efficiency of developing commercial software using OSS is included in the analysis, the savings that OSS brought to the European economy were at least 116B€. (Daffara, 2012, URL: <http://carlodaffara.conecta.it/the-economic-value-of-open-source-software/>)

In line with the advancements in ICT, especially the technology behind the World Wide Web (www) that has converted the first generation of one-way

websites into interactive ones, everyone can now upload their creations into the Internet. Members of the general population, who are usually only users, can now become producers of online content. This has motivated many people to share their creations, in the form of texts, pictures, or videos, through the Internet. All content in the Internet, following the open movement paradigm, becomes open and accessible to everyone to use. This was originally known as Open Content. The latest definition of open content according to Opencontent.org is “...content that is licensed in a manner that provides users with the right to make more kinds of uses than those normally permitted under the law. These permissions are granted to users free of charge”. ([www.opencontent.org](http://www.opencontent.org), retrieved on 22 April 2014). Obviously, the open content movement also spread and developed very rapidly. The open paradigm has allowed many content creators to share their creations without having to deal with the many requests for use permits. Open content has also been, to some extent, facilitated by the availability of OSS that has helped the process of creating, distributing, modifying, and re-distributing the content easily and rapidly.

David Wiley, one of the Open Content advocates, stated that the meaning of “open” in open content is just like the meaning of “open” in daily understanding. Like a door, it can be “widely open”, “half open”, or “a little open”. The extent of the rights the creator wants to grant to the users defines how open the content is. In a simple way, the openness of content can be measured from the rights granted to a user of the content. The primary usage rights to open content are expressed in the “5Rs Framework” ([www.opencontent.org](http://www.opencontent.org), retrieved on 22 April 2014):

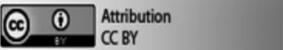
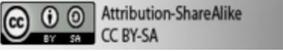
1. Retain — the right to make, own, and control copies of the content (e.g., download, duplicate, store, and manage)
2. Reuse — the right to use the content in a wide range of ways (e.g., in a class, in a study group, on a website, in a video)
3. Revise — the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
4. Remix — the right to combine the original or revised content with other open content to create something new (e.g., incorporate the content into a mash up)
5. Redistribute — the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend)

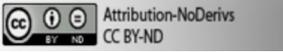
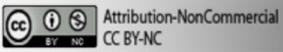
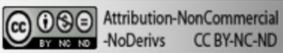
Those global movements of OSS and Open Content have further inspired many people and communities to start various initiatives taking advantage of the free software and content in the Internet. Within the education communities, these movements have motivated many educators, since the mid 1990s, to create

educational materials to enrich their classroom teaching; later these came to be known as learning objects (LO) and learning object material (LOM), and open courseware (OCW). MIT, as we know, was the first university to announce that all of its lecture materials were going to be uploaded and made public in 2001, later known widely as MIT Open Courseware (MIT-OCW).

The global change paradigm toward openness, that has moved very rapidly, has made people think about the issue of copyright. Open source software and open content emphasize and enforce the sharing paradigm, which aims to give freedom to users without having to worry about violating the copyright. Consequently, the concept of copyleft has emerged. Copyleft is a licensing scheme that gives a part or all of the creator's rights to the user. These include, for example, the right to duplicate, adapt, or distribute the creation. Copyleft also requires that the derivation of the creation is distributed using the copyleft scheme.

The situation inspired a group of professors (Lawrence Lessig, Hal Abelson, and Eric Eldred) at Harvard University to establish Creative Commons in 2001 (<http://creativecommons.org/about/history>) as a non-profit organization intending to support the creative process of creators to continue developing/creating and sharing their products using licensing schemes that are congruent with the willingness of the initial creators. For this, they developed a series of copyright-licenses known as Creative Commons (CC), using symbols that are easy to understand. The latest licenses are as follows (<https://creativecommons.org/licenses/>):

-  This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation. This is the most accommodating of licenses offered. Recommended for maximum dissemination and use of licensed materials.
-  This license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit you and license their new creations under the identical terms. This license is often compared to “copyleft” free and open source software licenses. All new works based on yours will carry the same license, so any derivatives will also allow commercial use. This is the license used by Wikipedia, and is recommended for materials that would benefit from incorporating content from Wikipedia and similarly licensed projects.

3.  This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.
4.  This license lets others remix, tweak, and build upon your work non-commercially, and although their new works must also acknowledge you and be non-commercial, they don't have to license their derivative works on the same terms.
5.  This license lets others remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms.
6.  This license is the most restrictive of our six main licenses, only allowing others to download your works and share them with others as long as they credit you, but they can't change them in any way or use them commercially.

As creators, the licenses we choose will define the rights we grant to our users, including the terms the users have to comply with when using our content. For example, if we choose the license “Attribution-Non-Commercial” (CC BY-NC), it means that we would let anyone use, copy, adapt, or modify our content. Although we also require that the users acknowledge us as the initial creators and will not commercialize (sell) the content, they do not have to distribute their derivative works using the same license.

## Open Educational Resources

The MIT's Open Courseware inspired many other universities around the world to share their teaching and learning materials too. The mushrooming initiatives and projects done by many individuals, institutions, and communities eventually stimulated UNESCO to adopt the term Open Educational Resources (OER) in the Forum on “the Impact of Open Courseware for Higher Education in Developing Countries” in 2002.

There are many versions of OER. The definition used by Atkin, Brown and Hammond in their study report funded by The William and Flora Hewlett Foundation is;

*“... teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property*

*license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.”*  
(Atkin, Brown & Hammond, 2007, p. 4)

In the 2012 Paris OER declaration, the definition was refined and strengthened as:

*“teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the existing framework of intellectual property rights as defined by relevant international conventions and respects the authorship of the work”*

OER can include all kinds of materials, from small chunks such as LO/LOM up to a full text-book or a full course, and any software or tools to support teaching and learning activities. Included in these tools are the non-restrictive copyright schemes such as the Creative Commons.

Along with OER enthusiasts around the world, UNESCO has been promoting OER continuously through the UNESCO Chair on OER. The UNESCO Chair on OER is granted to interested institutions that want and are committed to OER research and development. The first two chairs are located at the Open University of the Netherlands ([www.ou.nl](http://www.ou.nl)) and Athabasca University ([www.athabascau.ca](http://www.athabascau.ca)) in Alberta, Canada. And 10 years after the adoption of the term OER, the world's commitment to it was re-emphasized in the World Open Educational Resources Congress in 2012 through the 2012 Paris OER Declaration. In addition, the International Council for Open and Distance Education (ICDE) has also strengthened its support toward the movement by appointing five OER Chairs, namely Wayne MacKintosh of the OER Foundation/OERu, New Zealand (who is also a UNESCO and CoL Chair), Rory McGreal of Athabasca University, Canada (who is also a UNESCO and CoL Chair), Fred Mulder of the Open University of the Netherlands (who is also a UNESCO Chair), Marisol Ramirez Montoya of the Tecnológico de Monterrey, Mexico, and Martin Weller of the Open University, UK.

We have come a long way since the time when MIT launched its first Open Courseware in 2001. At present, the OER sites are countless. A survey conducted by UNESCO and the Commonwealth of Learning (COL) in 82 countries found that OERs are being developed at all educational levels, from early childhood level to doctoral level (Hoosen, 2012). The survey also found that all countries claimed

to have national policies on OER, although the data indicated that their creation and use were dominated by sporadic individual and institutional initiatives, with the exception of countries in the Arab region which seemed to be dominated by government initiatives. Major portals providing OER can also be found easily nowadays, including those of the Open Courseware Consortium (now the Open Education Consortium), the OpenLearn of the UK Open University, MERLOT, OER Commons, iTunesU, and the Khan Academy.

Specifically in Asia, almost all countries are becoming aware of OER and there are many enthusiasts who are promoting it rigorously. Nevertheless, aside from India, China, and Korea, which have developed and deployed national initiatives on the development and campaign of OER, other countries are only moderate at best (Dhanarajan & Porter, 2013). India for example, through its National Programme on Technology Enhanced Learning (NPTEL), has created course content for more than 260 courses and is in the process of expanding the collection with video lecture content for about 1,000 courses (Krishnan in Dhanarajan & Porter, 2013). In China, the OER initiative started in 2003, when 12 leading universities established the China Open Resources for Education (CORE). One of CORE's big projects was to translate all of MIT's open courseware into Chinese and make it available for all universities in China for free. However, the further development of CORE appears to have been limited and shadowed by the steady development of the individual universities (Yawan & Ying in Dhanarajan & Porter, 2013). China Open University, for example, has committed to develop 5,000 OERs in the format of 'mini courses' (Yang Zhijian, 2013), and in Hong Kong, the Open University of Hong Kong has developed an extensive range of open courseware and, in fact, is among the first open universities to make its open courseware available in iTunesU, which has happened since 2010. Korea is another major producer of OERs in Asia. Through its Korea Open Courseware (KOCW) initiative alone, which was started in 2007, Korea has produced more than 140,000 lectures (Kim in Dhanarajan & Porter, 2013). In Indonesia, the Indonesia Open University (Universitas Terbuka or UT) is one of the biggest OER producers in the country. UT has developed over 500 OERs in the form of video, video interactive and pdf, as well as html (web based). Indonesia also has an intranet that connects all state universities and a portal that functions as a hub to all OERs produced by all universities. At the primary and secondary education levels, the Ministry of Education, through its Centre for Information and Communication Technology, develops a lot of open content and purchases the licenses of commercial text books and makes them available for free through their websites.

It is undeniable that people have been bought by the new culture of sharing. The growing number of OER providers shows clearly that people are willing to share their creations and many even totally give up their copyrights. As a result,

it is now almost impossible even to estimate an accurate number of ongoing OER initiatives and projects. The emerging issue nowadays is no longer so much the development of OERs but rather their use: whether they are being used, by whom and for what purpose. However, there is not very much empirical data on the use of OER. Earlier data in 2005 on the use of MIT open courseware showed that some 8.5 billion visits were recorded, 57% of which came from outside the United States, including Western Europe, East Asia, and South Asia (UNESCO, 2009). A later study by the Babson Research Group reported that, based on 2009–2011 surveys, the level of reported use of OER by academic leaders in the United States (2,590 responses in 2009 and 2,583 in 2010) was not very high (Allen & Seaman, 2012). Only about 50% of all respondents claimed to have made use of OER materials. In Europe, the ParisTech OCW, which offered OER mostly in French, reported 30,000 to 35,000 unique visitors per month (UNESCO, 2009). And although OERs are high on the policy agenda and supported by many educational institutions in Europe, their use in schools, universities and adult education institutions has not reached a critical threshold (Sabadie, 2014). A survey conducted in 11 Asian countries in 2011 showed that 65% of the 420 respondents (university lecturers) said that they were using OER, and 80% of those who had not yet used it said that they would do so in the future (Dhanarajan & Porters, 2013). They expressed the belief that some of the benefits of OER include gaining access to the best possible resources, promoting scientific research and education as publicly open activities, bringing down costs for students, and bringing down costs of course development for institutions.

### **Beyond OER: Open Courses and Massive Open Online Courses**

The practice of online education has now gone beyond OER. Many providers are now offering the full range of open educational services, with some even granting credentials. Among those providers are the University of the People and OER University. The University of the People, or UoPeople (<http://www.uopeople.org/>), was founded in 2009 by an educational entrepreneur, Shai Reshef, and was designed as a non-profit organization offering tuition-free online courses. The courses are offered in accordance with the principles of e-learning and peer-to-peer learning, using open source software, OER, and facilitated by experts who donate their knowledge and time voluntarily. They offer courses towards two different degrees, which are Associate and Bachelor in Business Administration and in Computer Science. UoPeople claims that, to date, it has admitted more than 1700 students from 142 countries (UofPeople, <http://www.uopeople.org/>, 22 April 2014). With the support of different partners, students are freed from any tuition-related charges and only have to pay a one-time admission fee of USD10-50 an examination fee of USD100 per course.

The OER university ([http://wikieducator.org/OER\\_university/](http://wikieducator.org/OER_university/)) was founded by the OER Foundation, which is also a UNESCO OER Chair, as well as a Commonwealth of Learning (COL) and the International Council for Open and Distance Education (ICDE) OER chair. It is an independent, not-for-profit network coordinated by the OER Foundation that offers free online courses for students around the world. OERu (with small u because it is claimed to be not a university) also offers various affordable schemes for learners to gain credit toward qualifications from its recognized partner institutions.

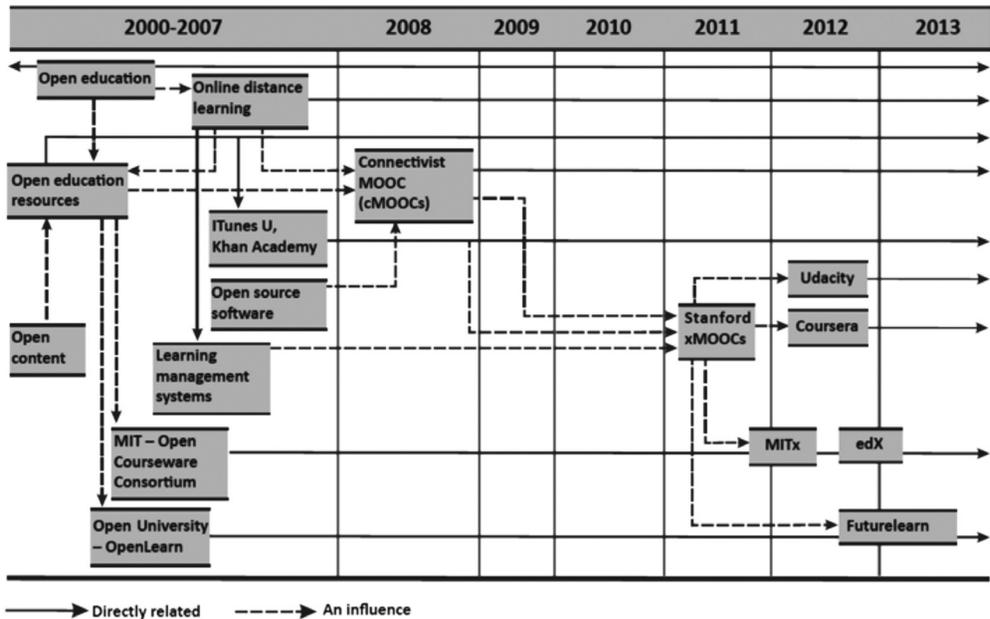
Another development beyond OER is the online course offering known as Massive Open Online Courses (MOOCs). The term MOOC was actually introduced to refer to a course on “Connectivism and Connective Knowledge” conducted by George Siemens and Stephen Downes at Manitoba University, Canada, in 2008. The course that was intended to be attended by only 25 tuition-paying students was made openly available online, and it attracted some 2,200 free online students. This first generation of MOOC later became known as the cMOOCs. This was followed by many other universities and, by 2012, MOOC had become a phenomenon. According to The New York Times, 2012 became “the year of the MOOC” as several well-financed providers associated with top universities emerged, including US-based platforms such as Coursera, Udacity, and edX. The most cited MOOC was the course on “Introduction to Artificial Intelligence” offered in 2011 by Sebastian Thrun and Peter Norvig of Stanford University, which has attracted about 160,000 student enrollments. The figure below depicts the evolution of MOOC since its origin in open education (Yuan and Powell, in Tittlestad, 2013). The latter are US-based MOOCs, such as those offered through the three most popular platforms known as the xMOOCs.

The difference between the cMOOC and the xMOOC is well summarized by Ross et. al. (2014) as follows:

1. The cMOOC [is] designed [based] on what are described as “connectivist” (Siemens, 2005) principles, and involving a networked and collaborative approach to learning that is not primarily curriculum-driven, and does not involve formal assessment. Emphasis is placed on distributed, self-led exploration of topics, rather than on the expertise of authorities.
2. The xMOOC [is] a highly structured, content-driven course, designed for large numbers of individuals working mostly alone, guided by pre-recorded lectures, assessed by automated or peer-marked assignments. xMOOCs aim to provide access, at scale, to established higher education subjects as presented by authorities in various fields...

Of course, both MOOC types have their own variations in practice. In fact, there are many derivatives of MOOCs introducing new different nomenclatures

Figure 1: Timeline of MOOC developments



Adapted from Yuan and Powell (2013)  
MOOCs and Open Education: Implications for Higher Education (CETIS)

such as MOOC-Ed, “Wrapped” MOOC, MOOC-Ed, SPOC, “Wrapped” MOOC, “White label” MOOC, Mini-MOOC, DOCC, SMOC, POOC (Hollands and Thirthali, 2014). MOOC-Ed refers to courses for the professional development of teachers, SPOC refers to Small Private Online Courses, “Wrapped” MOOC is similar to SPOCs, where some instructors re-design their courses around a MOOC offered by another institution, “White label” MOOC refers to MOOCs that are only available to employees of a particular company or to members of an organization, Mini-MOOC refers to MOOCs openly offered using technology and pedagogical features that can accommodate a large number of students, but in practice enroll only a few, DOCC refers to Distributed Open Collaborative Course, SMOC refers to Synchronous Massive Online Courses, and POOC refers to Personalized Open Online Course offering adaptive learning that, at present, are still more of an idea than a reality.

With regard to financial issues, MOOCs providers certainly have to cover costs. In fact, many discussions about MOOCs now focus on finding sustainable business models. If the tuition is free, certification has been used as one income source. Some MOOCs providers have started to offer certificates upon the completion

of courses for a moderate fee. Coursera, for example, charges around USD50 for students who want to be certified. However, they also offer fee waivers for those who cannot afford it. Some other providers, such as the Universidad Nacional de Educación a Distancia in Spain, under “UNED Abierta” (Open UNED), offer a range of validation options starting with ‘a participation’ certificate for €15 to award ECTS at a higher cost (Gaebel, 2013).

Despite the uncertainty about business models, MOOCs continue to gain popularity around the world. New players are emerging every day, both independently and collaboratively. Nevertheless, the major and most popular providers seem to remain in the US-based platforms such as Coursera, edX and Udacity. For universities that offer MOOCs in these platforms, it is not only technically solid and financially efficient, but also provides international visibility (Gaebel, 2013).

*Coursera offers more than 641 courses, and claims to have served more than 7.4 million Courserians through its 108 university partners (per 25 April 2014). Coursera has been very aggressive in inviting partners from the non-English speaking countries and it has now also offered MOOCs in French, Spanish, Italian, and Chinese. It is interesting to note that some of the courses are offered with an option for a “signature track”, which is fee-based, and awards a certificate. Coursera claimed to have raised USD43 million in venture capital, on top of the USD22 million it raised in 2012 (Economist, 20/07/2013 in Gaebel, 2013).*

*The edX consortium currently offers 176 courses from its 45 partner universities including the founders and owners of edX, Harvard University and Massachusetts Institute of Technology (MIT). Seventeen edX partners are from outside of the US (Switzerland, the Netherlands, Sweden, Belgium, Germany, India, China, Hong Kong, South Korea, Japan and Canada). In addition, starting from 2014, edX is also offering policy-oriented economics courses for government officials of IMF member countries. Students who complete the courses successfully can earn certificates at no cost, but edX does not offer course credits. To recover the operation cost, it is charging institutions that use the platform and services. It was claimed that more than 100 thousand certificates have been awarded to edX students.*

*Udacity was founded based on the famous Stanford University’s first MOOC “Introduction to Artificial Intelligence” that has attracted 16,000 enrollments from more than 190 countries. Udacity has*

*further sharpened its “applied” approach (“learn–think–do”), and in autumn 2013 also announced a shift towards fee-based courses for companies. There are currently 28 courses on offer by its individual lecturer partners. Unlike Coursera or edX, its advisory board brings together expertise from business, politics and education.*

In Europe, there must have been at least 100 institutions offering 200–250 courses plus 61 courses provided by the European open universities at the OpenupEd Portal in September 2013. This number has grown rapidly, and by the end of October 2013 it has increased to 345 MOOCs available (in Gaebel, 2013). In addition, another platform called the FutureLearn, a British platform led by the Open University, was launched in the UK in September 2013; this has been designed to provide courses free of charge as well as to be adapted to mobile devices such as smart phones. FutureLearn has partners from within as well as outside the UK and has now offered many courses in various fields.

In other parts of the world, many other universities have joined the movement, either through the international platforms or their own national and regional initiatives. In Japan, Schoo (the Japanese version of Coursera) was reported to have provided young Japanese professionals with around 130 courses and has attracted a total of 40,000 users, and is expected to have more than a million students by the end of 2013 (Chronicle of Higher Education 05/07/2013 in Gaebel, 2013). In China, Chinese MOOCs and open courses can be found at several portals, including glr.cn (www.topu.com), Sohu, Netease (<http://open.163.com>), and the Chinese website of the Khan Academy. In Taiwan, the Ministry of Education of Taiwan launched a “MOOCs” project aiming at February 2013, including 15 universities with 100 courses.

### **Reasons for Offering MOOCs and Remaining Concerns**

So why are institutions going into MOOCs? A study of 39 colleges and universities in the US (Hollands & Tirthali, 2014) identified a variety of institutional goals for engaging with MOOCs, including extending reach and access (65%), building and maintaining brand (41%), improving economics (38%), improving educational outcomes (38%), innovation (38%), and research on teaching and learning (28%), although the goal to extend the reach of the institution to a wider audience and improve access to education seem to be dominated by those who are already being educated from the developed world. As an illustration, data about the participants in the first 17 MIT’s MOOCs on edX show that 66% of 841,687 participants, and 74% of the 43,196 participants who obtained a certificate have already had a bachelor’s degree or above; and only 20,745 (3%) of all participants were from

the UN-listed least developed countries (HO, 2014). Another survey by researchers at the University of Pennsylvania revealed that the participants in Coursera's MOOCs are employed, degree-holding men (83% of the 34,700 respondents held 2 or 4-year degrees and 44% held advanced degrees. Similarly, when considering respondents in Brazil, Russia, India, China, and South Africa, where only 6 percent of the population has earned a college degree, nearly 80% of Coursera students are college graduates and from the wealthiest echelons of society (McKenzie, 2014). In relation to this, because MOOCs are offered through online platforms and most are in English, there are also some growing concerns about the possibility of MOOCs widening the digital divide between the "haves" and the "have-nots", and about the potential unwanted cultural effects that MOOC might cause. This has raised a concern about whether or not the basic principle of openness has been compromised. As shown by some of the MOOC derivatives and practices by the for-profit MOOC platforms such as Coursera and Udacity (Jean-Louis, 2014), the meaning of 'open' does not necessarily mean free of charge or open to anyone.

Nevertheless, although MOOC initiatives continue to grow, people are still not sure whether MOOC will sustain as an education method due to issues of low completion rates and unclear course/credit acknowledgement or accreditation. The report of the statistics of the first 17 MOOCs offered by edX (by MITx and Harvardx) for example, shows that only 5% of the 841,687 course registrants completed the courses and earned certificates (HO, 2014). However, if we look at the absolute number, that 5% still counts for 42 thousand completers!

Another remaining concern is about accreditation or credit acknowledgement. Currently, MOOCs are being offered as loose courses with no credits and not directly associated with any curriculum of the offering institutions. In other words, MOOCs are mostly offered as informal learning opportunities. However, although still very early, more and more universities and educational authorities are now considering, and some even starting, to acknowledge and grant credits to MOOC completers. One example, Penn State University, just announced on May 27, 2014 that it will offer a for-credit MOOC on "Presumed Innocent? The Social Science of Wrongful Convictions." The course will be opened to thousands of students for free on the Coursera platform in late June, and will also be offered for Penn State credit at a reduced tuition rate beginning July 2, 2014 (Penn State News at <http://news.psu.edu/>). When MOOCs can be for-credit courses, it raises the issue of authentication of the participants. Educators want to make sure that the participants are actually who they say they are. For this purpose, many research studies are being conducted to develop a system or mechanism for ensuring students' authentication, which include, for example, using the speed of typing or the corneas of the eye. We have yet to wait until such systems are available and proved effective.

## Conclusion

Open education is a concept of opening access of education to all. Although it is not a new concept, its realization has never been emphasized and accelerated widely by the advancement and availability of the current information and communication technologies. The idealism of education and knowledge as public good, combined with the advancement in information and communication technologies, have developed and nurtured the sharing paradigm, which has given birth to the OER and MOOC phenomena.

Nevertheless, despite the high popularity of MOOCs both among the educational institutions as the providers and among the participants, some remaining issues are yet to be addressed. The issues of low completion rates and the fact the most MOOCs participants are not the “unreached” group of people have raised a question about its effectiveness in increasing the people’s access to quality education. Similarly, the issues of business models, credentialing and participants’ authentication have also fostered people’s doubts about its sustainability. We will have to continue watching the next development of this MOOC movement. As stated by Christensen and Wiese (2014), MOOCs’ disruption is only beginning.

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