

Running aMOOC?

Massive Open Online Courses

Adam Murray

Recently, there has been a lot of attention given to Massive Open Online Courses (MOOCs). An example of this coverage is a *New York Times* article that proclaimed 2012 to be the “The Year of the MOOC” (Pappano, 2012). This article has received a lot of attention not only in traditional media such as newspapers, magazines, and television, but also has been widely cited in social media outlets such as Twitter, forums, and blogs. In recent months, it seems that rarely a week passes that there is not a news article or two printed in the general media about MOOCs. Many of these articles focus on the benefits of providing free high quality courses to anyone in the world. One of the early pioneers of MOOCs, George Siemens,

stated that MOOCs “can impact lives around the world, for the next billion students from China and India” (Lewin, 2012). The president of edX, Anant Argarwal proclaimed, “It’s going to reinvent education. It’s going to transform universities. It’s going to democratise education on a global scale. It’s the biggest innovation to happen in education for 200 years” (Cadwalladr, 2012). With such optimistic statements about the potential of MOOCs, it is hard not to get caught up in the excitement.

Naturally, all of this recent coverage of MOOCs in the general media has caught the attention of leaders and decision makers in higher education. As can be expected, not everyone is optimistic about MOOCs. Eye-catching headlines such as “Will MOOCs destroy academia?” (Vardi, 2012) and “Do online courses spell the end for the traditional university?” (Cadwalladr, 2012) accompany articles that have less than optimistic predictions of the impact of MOOCs on traditional higher education. Unfortunately, the current coverage in the general media does not paint a completely accurate picture of MOOCs. Most of the articles focus on one form of MOOCs and overlook the other forms. In order to provide a more comprehensive perspective of MOOCs, this brief article introduces a short history, their defining features, their forms, and their future.



Adam Murray,
Tokai University, School of Marine Science and
Technology, 3-20-1 Orido, Shimizu-ku,
Shizuoka-shi, Shizuoka, Japan.
Telephone: 81-54-334-0411, ext. 3201.
E-mail: murray@scc.u-tokai.ac.jp

HISTORY OF MOOCs

Although MOOCs have only recently gained attention in the mainstream media, the term was coined in 2008 to describe a well-received online course named

Connectivism and Connective Knowledge, or better commonly known as The CCK08 MOOC (Alexander, 2008; Cormier, 2008). This groundbreaking MOOC was taught by Stephen Downes and George Siemens as an online credit-bearing course at the Extended Education and Learning Technologies Centre at the University of Manitoba from September 8, 2008 to November 30, 2008. What differentiated this course from existing online courses was that fact that it was made available for free to anyone who wanted to participate (Fini, 2009). In total, more than 2,200 people from around the world participated in the course (Downes, 2011).

Another groundbreaking MOOC was Digital Storytelling 106 (DS106) taught by Jim Groom at the University of Mary Washington. Like CCK08, DS106 was originally offered as a credit-bearing course. In fact, DS106 started out as a traditional face-to-face course. In 2011, the general public was invited by Groom to complete the assignments and to interact with the students who were taking the course for credit. It has been estimated that approximately 1,300 people have taken advantage of this offer and have completed assignments (Kolowich, 2012). How DS106 differed from CCK08 was the nature of the course itself. Instead of watching lectures and reading assigned course readings, the focus of the class was on skills development. Throughout the course, the students designed and completed assignments.

Despite several large MOOCs such as CCK08 and DS106 being successfully run, MOOCs were relatively unnoticed by the general public. This changed in the fall of 2011 when Sebastian Thrun and Peter Norvig of Stanford University offered Artificial Intelligence (CCS221) to the world. Although they were expecting several thousand people to participate, more than 160,000 participants from 190 countries enrolled in the course (Leckart, 2012). Even more interesting was that more than 75%

of the participants were located outside of the United States (Leckart, 2012).

As a result of the attention given to CCS221, venture capitalists wanted to become involved in the MOOC movement. One of these ventures was established when Thrun left Stanford University and founded Udacity (www.udacity.com) as a for-profit educational company. In the fall of 2011, two other Stanford University professors, Daphne Koller and Andrew Ng founded Coursera (www.coursera.org), another for-profit educational company. Last but not least, Massachusetts Institute of Technology and Harvard University collaborated to establish a non-for-profit named edX (edx.org).

DEFINING FEATURES

As the acronym suggests, there are four essential features of MOOCs. For a course to be considered a MOOC, it must have all of the following attributes: it must be massive, open, online, and a course. In this section, each of these characteristics is described.

The first feature of MOOCs is that they are massive in scale. Although this term is quite subjective nature, it refers to the number of students that can participate in the course. Depending on the subject matter, this may range from hundreds to tens of thousands of students. CCK08, the first MOOC, had 2,200 registrants, whereas CS221, a highly publicized MOOC, was truly massive with more than 160,000. These examples illustrate the scalability of MOOCs and underline the fact that they can serve many more students than traditional course offerings. Another aspect of massiveness is the diversity of the participants themselves. Because there are no restrictions as a result of physical location, participants from around the world can enroll. This can result in a very heterogeneous group with a variety of nationalities,

educational backgrounds, and life experiences.

Another feature of MOOCs is that they are open. First of all, they are freely accessible to anyone who is interested in taking them. This is a striking contrast with traditional online courses that are hidden from the public on secure websites. Also, participation is open to all because there is no requirement to be registered at the institution offering the course. In addition, there are no financial constraints because registration fees and tuition fees are not charged. Finally, although not an essential aspect of openness, the actual contents (i.e., course readings) of some MOOCs are freely available under Creative Commons.

The third attribute of MOOCs is that they are totally online. Both the course contents can be delivered and the communication between the instructor(s) and the participants can occur both synchronously and asynchronously. An example of synchronous delivery is when class lectures and discussions take place in real time by the use of learning platform software such as CourseSites (www.coursesites.com) by Blackboard. In the case of asynchronous delivery, instructional videos and lectures can be prerecorded and the participants view or download them as needed. Also, the asynchronous nature of discussion boards allows more people to participate by removing time-based restrictions.

The final attribute of MOOCs is that they are courses. Like traditional course offerings, MOOCs run for a specific period of time. That is to say, MOOCs have starting dates and finishing dates with most MOOCs being between 3 and 15 weeks in duration. However, it should be noted that the contents of many MOOCs are archived and are still accessible even after they have officially ended. Also, like their traditional counterparts, MOOCs have defined learning outcomes and objectives.

FORMS OF MOOCs

Despite the majority of media attention being focused on one kind of MOOC, they can be divided into three broad categories: network based, task based, and content based (Lane, 2012). The network-based and task-based MOOCs are also known as cMOOCs while the content-based MOOCs are referred to as xMOOCs or AI MOOCs. In this section, these three categories of MOOCs are described.

NETWORK-BASED MOOCs

The first category of MOOCs is network based. They are rooted in the principles of connectivism, a 21st century theory of learning (Siemens, 2005). An underlying concept of connectivism is that learning occurs in a complex and dynamic environment. Siemens (2005) explains how learning occurs in this rapidly changing environment: "new information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical" (p. 7). As a result, learning is "focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing" (Siemens, 2005, p. 7). One reason that the capacity to learn more is more important than what is actually known is because knowledge is growing exponentially but at the same time knowledge life is drastically shrinking. Downes (2011) explains the relationship between knowledge and learning, "knowledge is distributed across a network of connections, and therefore learning consists of the ability to construct and traverse these networks" (para. 6). Similarly, Kop and Hill (2008) summarize the learning process, "learning occurs when knowledge is actuated through the process of a learner connecting to and feeding information into a

learning community” (Overview of Connectivism section, para. 1).

In the case of a network-based MOOC, the focus is on the process, not on the actual course content. The content “serves merely as a catalyst, a mechanism for getting our projects, discussions, and interactions off the ground” (Downes, 2011, p. 5). As a result, a textbook or course facilitator is not the primary or sole provider of knowledge; there is no “sage on the stage.” This type of course is intended for a high-end knowledge exchange between the participants. For this reason, there is no formal assessment at all and only self-assessment is present. Cormier, a facilitator of a popular MOOC summarizes self-assessment, “only you can tell, in the end, if you’ve been successful” (Kolowich, 2012). By design, network-based MOOCs are intended for dedicated individuals who are interested in personal and professional development.

Throughout the duration of a network-based MOOC, participants primarily engage in four activities: aggregation, remixing, repurposing, and feeding forward (Downes, 2011). As the name suggests, aggregation is the collection of content related to the course. This content can take a variety of forms such as articles, videos, podcasts, and blog postings. Naturally, this content comes from the facilitator and the participants. Because of the sheer number of participants in a network-based MOOC, there can be an overwhelming amount of content generated during the course. As a result, an important point for the participants and facilitator to remember is that they are not expected to read or view all of the content. The second activity, remixing, is forming connections with course contents and with external contents. In this activity, participants document their activities and share these records with others. Common ways to remix are blog entries, discussion postings, and tweets. The third activity and an important aspect of learning is repurpos-

ing. Repurposing is working with the aggregated and remixed course contents. This activity is the main purpose of a network-based MOOC. About the purpose of repurposing, Downes (2011) summarizes that it is “how to read or watch, understand, and work with the content other people create, and how to create new understandings and knowledge out of them” (Repurposing section, para. 3). The fourth and final activity is feeding forward. Quite simply, feeding forward is sharing with other participants and with the general public.

To date, there have been a number of network-based MOOCs on a variety of topics. Topics such as connectivism, learning analytics, personal learning networks, and mobile learning technology have been covered (The MOOC Guide, n.d.). Table 1 shows four notable network-based MOOCs that have been held. As previously mentioned, the first MOOC, CCK08, attracted 2,200 participants. The number of participants in the other notable network-based MOOCs ranged between 556 and 1,700 (Rodriguez, 2012).

TASK-BASED MOOCs

Although often classified along with network-based MOOCs, the second category is task-based MOOCs. A task-based MOOC differs from a network-based MOOC because the focus is not on knowledge but on skills. In task-based MOOCs, the participants are asked to complete tasks or assignments (Lane, 2012). Although there is also a community in a task-based MOOC, it is not the primary focus (Lane, 2012), because the focus is on the tasks. However, the participants interact with each other to provide assistance and advice for the tasks.

Like network-based MOOCs, there are task-based MOOCs on a variety of topics. One of the largest task-based MOOCs, DS106, focuses on the development of digital storytelling skills with audio, video,

Table 1. Notable Network-Based MOOCs (cMOOCs)

Year	Name	Facilitator(s)	Number of Participants
2008	CCK08	Downes & Siemens	2,200
2009	CCK09	Downes & Siemens	700
2010	PLENK 2010	Cormier, Kop, Siemens, & Downes	1,700
2011	MobiMOOC	deWaard	556

Table 2. Largest Content-Based MOOC (xMOOC) Providers

	Type	Founded	Partners	Course Offerings	Course Duration
Coursera	For-profit	2011	33 universities	207	3 to 15 weeks
edX	Nonprofit	2012	4 universities	7	5 to 15 weeks
Udacity	For-profit	2012	No affiliated universities	18	Self-paced

Note: As of December 1, 2012.

visual, and design assignments (About 106, n.d.). Examples of other task-based MOOCs are the Games MOOC (games-mooc.shivtr.com) and the Program for Online Teaching (pedagogyfirst.org/wppf12) offered by MiraCosta College.

CONTENT-BASED MOOCs

The third category of MOOCs is content-based MOOCs. Content-based MOOCs are commonly referred to as xMOOCs. Of the three forms of MOOCs, this form is the focus of the general media. There are three popular content-based MOOCs that receive most, if not all of the media's attention: Coursera, edX, and Udacity (The Big Three, 2012). As shown in Table 2, Coursera and Udacity are for-profit, while edX is nonprofit. Another major distinguishing feature is that Coursera and edX have university affiliations, whereas Udacity does not.

Coursera is the largest and most popular of these MOOCs. It currently offers 207 courses (Course Explorer, n.d.). These

courses, organized into 20 categories such as computer science, education, and medicine, are provided by a consortium of 33 well-known universities from around the world such as Columbia University (United States), University of Edinburgh (Scotland), University of Toronto (Canada), and University of Melbourne (Australia). Most of the courses are between 3 and 15 weeks in duration, with the majority of them 5 or 6 weeks in length. However, some of courses such as Computer Science 101 are also offered for self-study.

Unlike network-based and task-based MOOCs, the focus of these MOOCs is on the course content. In an attempt to ensure that the enrolled students have successfully acquired the content, traditional assessment is used. In a Coursera course, Think Again: How to Reason and Argue, all of the course content is delivered in the form of lecture videos that are between 3 and 20 minutes in length. After each lecture, there is an ungraded follow-up homework exercise. After each unit of the course, the students take a graded unit

quiz. However, due to the huge number of students in these courses, it is impossible for the teacher(s) to assess each student on an individual basis. As a result, automated testing is relied on. For this reason, content-based MOOCs are also known as AI MOOCs. Upon successful completion of a content-based MOOC, a certificate is awarded by the professor(s). In the case of Coursera, students who achieve an average score of 70% or more receive Statements of Accomplishment and those who have an average score of more than 85% receive Statements of Accomplishment With Distinction (Course Logistics, 2012). Similarly, Udacity students can receive one of four certificates: Completion, Accomplishment, Accomplishment with High Distinction, and Accomplishment with Highest Distinction (Frequently Asked Questions, 2012). In the case of edX, students receive Certificates of Completion (FAQ, n.d.).

Compared to the other kinds of MOOCs, there is relatively limited interaction between the students. In fact, it is quite possible to successfully complete a content-based MOOC without interacting with classmates. However, the content-based MOOCs do have discussion forums to facilitate communication. In the case of Coursera, the discussion forum has designated areas to discuss the lecture contents, organize study groups, and schedule Google+ Hangouts.

THE FUTURE?

Despite all the potential that MOOCs have, they will not have a major impact on higher education until a number of issues have been dealt with. Hill (2012) identifies four potential problems that must be addressed: revenue models, course completion rates, credentialing, and authentication. In this section, these four problems are briefly described.

A large problem that must be overcome is financial in nature. The current MOOCs,

particularly the large content-based MOOCs, are far from being self-sufficient. They are operating on a combination of grants and funding from venture capitalists. In order to successfully function long term, alternate sources of revenue will need to be found. Of course, one potential of revenue will be from institutions of higher learning. For example, institutions that do not have the resources to offer certain courses could outsource them to MOOC providers. Another feasible source of revenue is from the students. The basic course would be free but additional services such as tutoring and certification would be provided for additional fees.

The second problem is course completion rates or student attrition. Although over 100,000 students register for some of the popular content-based MOOCs, very few successfully complete them. It is estimated that between 5 and 20% of edX students finish their courses (Hill, 2012; Pope, 2012). Although the reasons for such high attrition rates are unclear, one obvious contributing factor is the ease to which students can register for courses. It takes only a few minutes to register for a course. And, because there is no financial commitment, there is nothing to dissuade students from dropping out. One more possible reason for the levels of enrollment is the general public's interest in content-based MOOCs because of the widespread coverage in the media. Many register as a result of their curiosity and have no intention of completing the course. Despite the currently low completion rates, for the reasons mentioned there is little need to be overly concerned about this.

For the majority of the people currently taking MOOCs, credits will not awarded. In order for MOOCs to be seen as an alternative to traditional institutions of higher learning and existing online programs, MOOCs will need to "deliver valuable signifiers of completion such as credentials, badges, or acceptance into accredited programs" (Hill, 2012, p. 94). At present, the

Statements of Accomplishment and Certificates of Completion have little extrinsic value. As seen in Appendix 1, the disclaimer in Statements of Accomplishment from Coursera makes this fact quite clear. However, some progress is being made in this direction. Recently, some institutions (Antioch University, Excelsior College, and the University of Texas system) intend to award credits (Pope, 2012).

The final problem is authentication. Until this obstacle is overcome, it is highly unlikely that many institutions will award credits for MOOCs. One way that Coursera is discouraging cheating is the use of an honor code that the students must acknowledge each time they submit coursework (Webley, 2012). Using a stronger measure to prevent cheating, edX and Udacity now offer proctored final exams at Pearson test centers around the world (Webley, 2012). Like their online learning counterparts, MOOCs are looking to authentication technologies. Some of these technologies are Secureexam, Out-of-Wallet, BioSig-ID, and ClickID (Adams, 2012). The Georgia Institute of Technology is looking at incorporating authentication technology such as retina scans and facial recognition in their upcoming MOOCs (Webley, 2012).

MOOCs are an exciting development in higher education. However, they will not have a truly disruptive effect until the previously described problems are successfully addressed. Although the general media is portraying MOOCs as being in competition with traditional higher education, it is more likely that they will complement existing courses rather than replace them. Regardless of what happens, the next few years will be interesting as institutions react and adapt to these recent developments.

APPENDIX: COURSERA DISCLAIMER

Please Note: This online offering does not reflect the entire curriculum offered to stu-

dents enrolled at the University of Pennsylvania. This statement does not affirm that this student was enrolled as a student at the University of Pennsylvania in any way. It does not confer a University of Pennsylvania grade; it does not confer University of Pennsylvania credit; it does not confer a University of Pennsylvania degree; and it does not verify the identity of the student.

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MOOC—PRONOUNCED LIKE MOOOOOK, AS IN COW TALK.