**MOOCs: Benefits, Costs, Ethics, Outcomes and Popular Opinion**

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November 30, 2014

**Abstract**

The purpose of this paper is to introduce the reader to the concept of Massive Open Online Courses (MOOCs), their formats, content, logistics, student performance and outcomes of completion. Also discussed is the cost of “free” courses with respect to professional/faculty salary and time and/or resources. Ethical concerns are raised for the purpose of protecting the participants from harm, exploitation and privacy infringement. Finally, the topic of popular opinion of MOOCs is generated by some original research categorizing the types of comment left in online media from *The Chronicle of Higher Education*.

**Introduction**

 Massive Open Online Courses (MOOCs) are very controversial and difficult to define. Even when it comes to the origin of the name, some give credit to Dave Cormier, from the University of Prince Edward Island. Others claim George Siemens and Stephen Downes coined the term themselves in 2008 during their connectivism and connective knowledge online course, which serves as the beginning point for what we now know as MOOCs (Schneider, 2013). The general principle and modern version of taking a course from distance without direct contact with an instructor can be traced back to the 1980’s. Back then VHS cassettes would be mailed to distance learners and graded essays exams, reports and artwork would be sent back to an instructor for grading. Many educational institutions including the University of Delaware offered distance courses on DVD-ROM as the technology advanced through the 1990’s. By the early portions of the 2000’s the Internet was the technology of choice for offering distance courses. The new platform for these courses was course management systems (CMS). CMS websites offered instructors a framework for posting readings, instructions and schedules for assignments, message boards and even gradebooks- everything necessary for an instructor to host a course entirely online. Up to this point, all these classes were for credit at accredited universities and colleges, which meant the students were matriculated and paying tuition and fees. Currently there is a general malaise towards higher education in the millennial generation and the media proliferation of the idea that many college graduates were unemployed, leading a few philanthropic individuals to the idea that courses should be offered to the masses for free as long as the students had access to the internet. It was basically thought that it would be for the greater good to educate all of mankind. This paper takes a general look at the MOOCs benefits, costs, ethics and end result as well as offering a bit of empirical evidence of the current opinion of MOOCs from commenters in online articles on the subject.

**Definition of MOOCs and the Two Styles**

 Again, defining a MOOC is difficult as even the acronym is open to interpretation. Massive may again be subjective, a small liberal arts college may think 1,000 participants would be an insurmountable challenge, while a large Midwestern university with a popular course in a field of the universities core research expertise may draw hundreds of thousands of participants. The term Open may lead many to believe that it is entirely free to the general public, however there are a few caveats. Even the courses that are offered with no tuition towards the university may require a fee for licensing material through the platform provider. This takes us to the Online term, which technically means it requires internet access. But more importantly, it requires access to another company or provider such as Coursera, Udacity, EdX, etc. The content offered by the providers is often in the video or large file format that requires great bandwith or high speed internet access, so again that will cost someone (Khe, 2014). The final letter is often referred to as Course, however there is an argument in the literature that it should mean content.

MOOCs can be categorized into 2 types: xMOOCs, which are content and curriculum driven or cMOOCs, which focus more on a collective conscience or sharing of knowledge. In either case the content of the course is often offered by recorded lecture videos or recommended readings. xMOOCs with their rote memorization style can often be compared to a large lecture class in the face to face (FtF) format, a critique that occurs often is that xMOOC is redundant with FtF format. Some critics of the system go so far as to say the FtF system is under duress in those large lecture hall style courses anyway and the xMOOC is the natural progression whether it is for better or worse. One concern is that xMOOCS may water the content down to spread the information thin enough to make it reach the masses (Freedman, 2013).

One can imagine how grading would be difficult for an instructor with a 1:10,00 student ratio. Because of that, many xMOOCs rely on multiple choice/fill-in-the-blank/matching assessments, similar to large lecture hall FtF format. Just as a FtF instructor would not want to grade 200 essays or short answer exams in their basic Anatomy and Physiology class, one can imagine it would be impossible for an instructor to hand grade the 1,000 to 100,000 exams or quizzes turned in for a single MOOC. The downside of the xMOOC format is the lack of feedback on these types of tests. The participants lose the opportunity for finding out why they got the wrong answer and may be doomed to repeat the error or just find the right answer by trial and error. There is no discussion between the participant and the instructor to clear flawed previous knowledge or offer new analogies or experimental models that describe concepts in different views. All is not lost though for making sure participants are advancing through to the mid level Blooms hierarchies of learning as multiple choice questions can be written at the comprehension and application level by any instructor well trained in pedagogy and assessment.

The xMOOC format does work better for the natural sciences and mathematics, as some of the first and most successful xMOOCS are in the field of electrical engineering (Fisher, 2012). In this instance the instructor reluctantly flipped his class from a traditional lecture style to include xMOOC material. He instructed the students to view the video lectures from another “superprofessor” and come to class ready to discuss the material and engage in active learning and Problem Based learning (Fisher, 2012). In fact xMOOCs may work so well for natural sciences courses that an Introductory Physics showed learning on a scale higher than lecture based traditional courses (Colvin, 2014). However it does have its’ limits, the course was not as good as classes that offered active learning and problem based learning opportunities as in the above example (Colvin, 2014). The authors though go on to say that it may depend on the course material and the students. A physics course with animations on force and motion will obviously be more beneficial than static images and hand drawn arrows. With that in mind, it would be best to choose the right format for the material or the right material for the format.

This xMOOC format could easily be stretched to include professional development. The University of Delaware offers many tiny versions of MOOCs, however they may not be open to the public but are free and sometimes a reuirement for university employees. University workers have access to chemical hygiene, radiation safety, blood borne pathogen safety, and even IRB and HIPA training through xMOOC style training sessions that end in the user getting a certificate of completion. If the university offered these classes to the general public they would need to slightly scale up format, which is the Massive focus of xMOOCs, training a large number of individuals in a curriculum of knowledge and skills. Many recommend that MOOCs, especially xMOOCS are beneficial for badge earning. Several united efforts are driving to make MOOCs an openly recognized occupational achievement worthy of as much credit as certification (Badge Alliance, 2013; Design Principles Documentation Project, 2013). It is hoped that the badges will be held electronically through public sites such as Google and Mozilla.

 cMOOCs are large classes that are based mostly on discussion and written assignments. This form of class may not benefit the introverted student. According to Schneider, the cMOOC environment requires participatory culture (Schneider, 2013) which would benefit an extrovert participant. It would be easy to lose the shy or hesitant to speak in a class of thousands, that does not have an instructor to goad them to participate in class. Schneider also states that the cMOOC requires a collective intelligence to carry on an informed discussion session or raise new ideas and concepts. The collective intelligence is created and enhanced by the cMOOC environment with its many geographically and culturally heterogeneous participants. As demonstrated by Page, a group of diverse individuals taking turns offering input and opinions yields the most creative and greatest group intelligence (Page, 2008). While any cMOOC detractors would argue that FtF is associated with better learning experiences, no difference in learning could be seen when comparing cMOOC to FtF through pre- and post-test performance (Kizilcec, 2013).

cMOOCs do have regions where they may just go completely wrong though. The discussion forums may become an entangled mess of disconnected thoughts that is not a discussion but merely an effort to score participation points. Or the exact opposite may happen, where the discussion section is used to simply answer the instructors question again to score points, but in this case it may just be 10,000 versions of the same answer and again, not a discussion. Those participants that are not point scoring may just be lurking in the forums without contributing. In other instances the discussion forum may degenerate into a brutish, nasty and fierce argument (Kirshner, 2012). This arises in many instances in the non-punitive environment of online social media. Often, a discussion thread on Facebook, Youtube, Twitter and other media turns into name calling and denigrating those with opposing opinions. The “trolls” feel as though they can hide in the anonymous masses of one hundred thousand other users.

Not only is the course size important in discussion, but also it is important when it comes to grading. In cMOOCs, the class size requires an alternative to hand grading essays by the instructor. Most cMOOCs get around this 1:100,000 instructor-student ratio issue by having the students peer review the work and grade the assignments (Rees, 2013). There are several concerns with this method when the discussion of accrediting MOOCs comes up. In the FtF format the instructor is culpable for assessment of student learning for good reason. The students pay for the opportunity to learn from an expert in the field of study, not one another. Peers may not hold the same responsibility or incentive to give the reviews or critiques the time and effort that it deserves. The greatest learning tool is formative feedback. Peer grading in many instances may not be constructive, logical, in depth or even present on many assignments (Rees, 2013). As noted by Rees, participants in many cMOOCs that are often required to perform 3-5 peer evaluations of work before being given their own score. The system has a fatal flaw though in that the numerical score is necessary, yet the feedback may be left out.

 When thought about in the most basic level, the openness of the cMOOC may generate its own issues. If one were to randomly select 10,000 individuals, the background and education would vary greatly. The lack of prerequisites compounds the issue so that the basal level of understanding needed to form solid constructive criticism of one another’s work is simply not present. There is no quality control; those participants sampling the work are unaware of the scale of possible outcomes. Because someone writes better than you does not mean they have mastered the material, it may mean they are just above average.

 One glimmer of hope for cMOOCs is that some platform providers are working on an artificial intelligence that would be better at grading essays and written assignments than peers (Markoff, 2014). However there are concerns that nonsense essays that use key terms and connectors to get good grades can fool the program. Hopefully the technology will be perfected in the future, but for now it at least offers the opportunity for resubmission, so participants can tell if they have improved their writing. The overall goal for cMOOCs is to create a massive community of connections through networked learning to develop shared practices, knowledge and learning.

**Benefit and Completion Rate**

 In either case whether participants take an xMOOC or cMOOC, there may be the question as to what the benefit is to the student, why do students take MOOCs in the first place and on average how do they fair? According to Hew, students join for several reasons. Some are autodidacts that join MOOCs just to learn a new topic. Others are joining to refresh on old topics that they find themselves thrust into again (Hew, 2014). Some are taking courses as “Just-in-time” efforts that may pad resumes or help with upcoming projects as recognized in the anecdote of the authors colleague taking a class in HTML5 to make himself appear better on job searches (Kirshner, 2012). However, independent of the reason for joining, there is on average a 95% drop out rate. In any usual brick and mortar FtF class, a failure to complete rate like that would almost instantly lead to the instructor being relieved of his or her duties. In some reports, participants claim that a lack of incentive leads to skipping material or falling behind (Khe, 2014). One journalist while taking a MOOC reported that the non-punitive and non-incentivized environment lead to him skipping course work to watch TV or go to the movies (Sweeney, 2013). But as the future of MOOCs is unknown now, there is little information out there on how to incentivize the participants.

**The Price of Free**

 It is a shame though that the drop out rate is so high and the participants do not see the benefit to continuing to completion when one looks at the cost of MOOCs. Hollands et al. created a rather comprehensive study on the cost of “free” courses offered through several of the usual platform providers. When they took into account just the cost of personnel salary and staff wages they found that MOOCs cost almost the same as FtF courses in 3 different brick and mortar institutions. The small liberal arts college faculty contributed 3-10 hours of preparation per video, at 12 videos per course that came to 36-120 hrs costing a total of $38,980 (Hollands, 2014). This is roughly the same amount of time or more for prepping for an FtF lecture. In the same report, Siemens and Downes the creators of MOOCs reported 770 and 108 hours of preparation respectively on all aspects of the course (Hollands, 2014). This included 3 weeks of 70 hours a week for material preparation on top of 150 hours set aside for course design. Downes stated his time was in programming, creating the course website and maintenance throughout the time of the course, costing a total between $65,800-$71,790. A museum offering a MOOC spent somewhere between $78,470-$104,620. Most surprisingly a large Midwestern university that wanted to remain anonymous spent between $203,770 - $325,330 on a MOOC that lasted 5-8 weeks (Hollands, 2014). The one interesting analysis by Hollands et al., was that when considering the cost per completed participant for the entire study, the price ranged between $74 to $272 - a surprisingly small sum of money. However, it is important to remember that is just for personnel time. It must be put into context that the personnel are occupying office space which includes electricity, internet, wifi, phone service, air conditioning, heating, water, sewage and in many cases a faculty development fund that pays for computers, software, printing services, travel expenses and ancillaries. In fact the study does not state that “salary” includes fringe benefits, which could easily swell these numbers. The fact that the course is on the internet means that material must be stored electronically on a server, which has it’s on costs and maintenance personnel. Some material may require licensing agreements with the research libraries that have to offer the material to the public domain (Butler, 2012). This is all paid for by the college or department, which in most cases has to pass the cost onto the matriculated students that are showing up to class. Of course the benefit to them is that they leave with a degree after completion, not just knowledge.

**Ethical Concerns for Participants**

 One may then ask if it is ethical to pass the cost of a free course to an already overburdened modern undergraduate. Funny though, MOOCs themselves come with an ethical debate that is almost never-ending as the participants may be considered students as well as human subjects in an experiment. According to Marshall, there are three main areas of ethical concern when it comes to the participants in the MOOC (Marshall, 2014). The first is to avoid doing harm, the concern is that you may be widening access to education but you need to make sure that the ensuing change is not harmful. Some things are simple; do not overstate the goals of the course. It would be unethical to tell the participants that they are as knowledgeable as electronal engineers after completing a MOOC. They may try to apply the information improperly and harm themselves or others. It is also important to realize that creating and maintaining a MOOC requires time from an instructor. This may be time lost to a matriculated student or for credit class. Or, to allow time to create a MOOC other courses may be cancelled or the enrollment may be trimmed down.

The second major concern is that the course instructors get participant consent as if it were a human subjects experiment, which is the case of many MOOCs. MOOCs are often used as a source of a huge number of subjects in a social/educational experiment. Data being retrieved from the participants from pre and post tests are often used for publication purposes that then go on to benefit the study investigators. This may either be directly through grant funding or indirectly through promotion and tenure. It is very important to not exploit the student. In one instance a very public scenario played out when a MOOC professor shut off a course without informing the participants. This was very disruptive to the learning environment and in some instances trust was lost between the participants and the instructor (Kolowich, 2014). The instructor stated it was a preconceived action to get an emotional uprising from the students, however when asked about the subject Siemens stated that “learning is a vulnerable process, there is a responsibility on the part of the person you are making yourself vulnerable to” (Kolowich, 2014). In an interesting turn, according to Kolowich the terms of service from the platform provider absolve the provider and the university from liability in the event of outages, interruptions and security issues.

This previews the third ethical concern; respecting the privacy of the participants (Marshall, 2014). On most MOOC platforms there is advertising, in many instances the advertising is targeted by monitoring and utilizing web browser data on the end users computer. Aside from the exploitation of the learning environment for making money off of advertisements, there is another aspect to this; the information along with the credentials given to the platform provider may be used by unscrupulous individuals in phishing scams and other means of targeting vulnerable individuals. A final scenario when privacy is important would be when an authority figure participates in a MOOC along side subordinates. If a professor were to take a course along with undergraduates and graduate students, the discussion forums can be a source of discord that could then spill-out into other courses and mentoring/advising manners. Reputations may be tarnished and status may no longer be upheld.

**Public Opinion**

 In trying to gauge the public opinion of MOOCs in general, 10 online articles from *The Chronicle of Higher Education* were chosen randomly. The comments under the article were rated as being positive towards, negative towards or neutral/off-topic towards MOOCs. In total 314 comments were categorized and here are the results. Eighty-five comments were categorized as positive towards MOOCs, 137 comment were categorized as negative towards MOOCs and 92 were categorized as neutral or off-topic. Without any statistical verification, all that can be stated is that there was a trend towards negative comments about MOOCs. Almost half of the comments (47%) were of a negative fashion. Less than one third of the comments (27%) were positive in nature. Below is a selection of the topics that were under discussion many times lead by the topic of the article: Arguing credentials-certificate versus Statement of Completion; Arguing that MOOCs should be considered Massive Open Online Content, not Courses; Accountability for poor ethical practices; Celebrating MOOC success or focusing on what is working in this instance; Discussing course sizes; Discussing MOOC content inconsistencies; Ineffectiveness and poor offerings of current courses vs. optimistic look into the future.

 Although the trend offered in this rather preliminary and anecdotal study shows that the current opinion on MOOCs is one of generally poorly used effort and time for no current incentive or benefit, there is hope for what may come in the future. Commenters were quick to celebrate exceptional courses identifying them by name of course and instructor. However no commenters similarly identified a poor course. Almost no commenters showed interest in allowing MOOCs to count towards a degree. But, there was some concession that a MOOC could offer knowledge and practice towards passing a placement exam so the participant could advance to higher than remedial courses. It should also be noted that faculty, graduate students, administration and those interested in higher education, frequents *The Chronicle of Higher Education*. This may skew the trend towards a reactionary and defensive posture against MOOCs in the commentaries of articles featured here. It may also severely limit the generalizability of the data, as it may not typify the opinion of the general public. It may though show how MOOC creators and endorsers have a tough road ahead. They will likely meet a great resistance from FtF faculty and brick and mortar administrators.

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