

MOOCs and the Future of Higher Education

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MOOCs (Massive Open Online Courses) have exploded onto the online education scene in the last few years. Pundits have expressed their opinions from one extreme – physical college campuses will disappear within 10 years – to the other - MOOCs are a bubble which will burst in a few years. Increasing use of technology mediated modes of instruction challenges traditional notions of instructor-learner interaction. This paper will provide an explanation of MOOCs and explore possible realistic scenarios for MOOCs and the online environment in higher education. The higher education cost and tuition bubble is an important part of online and MOOCs. MOOCs have provided an impetus for discussion of how to award credit, how to prevent cheating, and how to grade the large number of students efficiently while assessing the online interaction among students and instructors.

INTRODUCTION

Consider this comparison to the entertainment industry. Over 100 years ago the only visual entertainment was in live theater or other live venues. Performers acted in plays or other entertainment types such as variety shows, all live with a viewing audience limited to the size of the venue. Then came film! The play could be transformed into a film medium that scaled the presentation to a massive audience through many movie theaters, at a relatively small price per viewer. The current class lecture can be compared to the live theater performance. Then came YouTube! The best lectures by world-class professors can now be recorded and presented through massive scaling on the internet at a very low price per viewer. Are MOOCs the future of higher education?

MOOC is the acronym for Massive Open Online Course. In the last few years, MOOC course offerings, course platforms, and student enrollments have rapidly expanded. The combination of enabling internet technology, engaging faculty presentations and topics, and the funding of initial courses has allowed the MOOC to become the hot topic in higher education.

MOOCs have been considered the disruptive innovation of higher education by Clayton Christensen, the theorist behind disruption innovation (Hardesty, 2013). An article at Techcrunch.com online is entitled “Online Education is Replacing Physical Colleges At a Crazy Fast Pace” (Ferenstein, 2013). Others suggest the possibility that MOOCs will put universities out of business (Smutz, 2013). Other pundits are not too sure, suggesting that MOOCs are just another ed-tech bubble (Crispin, 2012) that will not transform education.

The MOOC acronym:

Massive – scalable to a large audience, e.g., at least one course reported >160,000 students, many > 50,000

Open – anyone can enroll

Online – online enrollment, video, blogs, assignments, submissions

Course – organized, structured

This is in stark contrast to typical online courses that charge tuition, have limited slots available, but offer credit for successful completion.

This paper will present a brief history of MOOCs, the current status of MOOCs, potential disruption in the higher education market, and some speculation about how MOOCs may change higher education.

THE PAST

There have been Online Courses for a number of years. The University of Phoenix and other private and public universities have introduced courses and degree programs completed partially or fully online. So why are MOOCs now expanding rapidly and generating so much hype in the press?

Much of the latest development in MOOCs has come about by the groundbreaking work of Salman Khan. Starting in 2006, Khan started to develop and post to YouTube, lectures on mostly mathematical topics for his friends and relatives. These posting became so popular that Khan continued to develop more and now has about 4100 videos (khanacademy.org, 2013). The key defining disruptive change with Khan Academy is the removal of the talking head, and the introduction of short videos that present mathematical concepts step-by-step with voice-over. (Clark, 2013)

MIT OpenCourseWare started in 2000 posting a large number of courses and content online. Much of the early postings were PowerPoint lecture notes. In recent years more video lectures were added. However, these were mostly recorded in-class lectures, but this platform has had an enormous worldwide impact with over 2000 courses and millions of enrollments.

The most famous MOOC course, and the one that seemed to start the whole MOOC movement, is the “Introduction to Artificial Intelligence” course offered online by Stanford Professor Sebastian Thrun in the fall of 2011. This course enrolled more than 150,000 students worldwide and led to the founding of Udacity in 2012 with \$15m in venture capital. (Pappano, 2012; Crispin 2012).

Two other Stanford University faculty members, Andrew Ng and Daphne Koller, set up Coursera with \$16m in venture capital funding. Harvard and MIT put \$30m into forming edX to develop their courses onto online offerings.

Stanford Professor Amin Saberi ran an entrepreneurship course in March 2012 than enrolled 80,000 students in 150 countries. This and other courses at Stanford were run under the name of Venture Labs, sounded by Saberi and Farnaz Ronaghi, but recently Professor Saberi announced the creation of NovoED as the successor to Venture Labs (New, 2013).

The desire by a worldwide audience for knowledge of many topics has allowed MOOCs to grow rapidly. This was enabled by the expansion of high speed internet to a large portion of the world. This also, of course, verified a very important microeconomic principle: when the price is zero, then many people buy. Although enrollment may be large, only a small percentage actually complete.

THE PRESENT

Here are brief descriptions and differences among the largest and most important MOOCs at this time (Round, 2013).

Coursera (courser.org): the most courses and widest range of topics; certificates awarded; structured start and end; peer evaluation in some courses; mostly free; cost for certification; large enrollments; for-profit; currently partnered with 62 universities to provide content (Kolowich, 2013). They announced in May of 2013 that they have 3.4 million students with 350 courses.

Udacity (udacity.com): smaller number of courses; no structured start and finish; open start dates; work at your own pace; certificates awarded; some with proctored exam; for-profit.

edX (edx.org): MIT and Harvard collaboration; non-profit; structured start and end; a few additional universities have joined; not for credit; may offer certifications in the future.

NovoED (formerly Venture Labs) (novoed.com or venture-lab.org): Mostly Stanford U. faculty; free; specified start and end dates; some peer evaluation.

Udemy (udemy.com): Smaller number of courses; no start and finish; open start dates; work at your own pace; for-profit; usually a fee to enroll; some free. Learn skills from experts.

All have seen expanded course offerings and student enrollments. Several MOOCs have been funded by venture capitalists but are currently providing free access to all the courses. This may be analogous to early web site giants such as Google that give away many services, email, e.g. However, this is not a sustainable long term business model. Many internet startups ran out of money without finding a viable revenue source. Google and Facebook have found reliable revenue streams in some business activities (fees or advertising) to cover the costs of the free services. Several MOOCs, such as Coursera, are starting to charge for the course, or just for certification for successful course completion.

MOOCs that are now free will need to develop a business model that generates sufficient revenue to be profitable. At this time there are large expenses of coding, taping, and bandwidth that are being paid for by startup capital. At some point, revenue streams will need to be developed.

There are several possibilities:

1. MOOCs charge for taking the course, such as what udemy.com does.
2. MOOCs charge if the course is completed for certification or credit.
3. MOOCs partner with colleges and universities and have students pay a fee (similar to students buying textbooks), or the university pay the MOOC a fee out of the tuition revenue.

MOOCs are continuing to develop more courses, attract more students, and develop procedures to remedy some of the problems that exist.

THE TROUBLE WITH MOOCs

In addition to the business revenue problem, a number of issues have surfaced that will have an impact on the sustainability of MOOCs unless addressed satisfactorily:

- Grading
- Cheating
- Course credit
- Interaction with the instructor and learner to learner
- Prerequisites

Grading

If enrollments are large, then grading individual student assignments would not be possible without a cadre of instructors. Since the whole intent of MOOCs is to be available to massive audiences, the grading scheme is not economically viable unless the assignments can be machine graded, or a significant fee is paid to afford the graders. Math courses are the most likely candidates for machine grading. However, who is really taking the exams or writing the papers?

Cheating

With open courses, anyone can join in, and there may not be a secure way to verify who is actually completing the assignments. Coursera is now offering a “Verified Certificate.” Once a student pays a fee, takes part in a writing sample, the student using a webcam to take a picture of their face and a picture of a photo ID. The student is then verified. When the student submits work, a webcam picture is taken again and compared to the previous picture to verify the student. However, it is still not clear how this could

prevent a student from having someone else write the paper or take the exam, then submits the exam under the original identity. Udacity and edX are now using proctored exams in some courses.

Course Credit

Most universities at this time do not recognize a MOOC completion for credit. It is not clear with most MOOCs what would be the equivalent credit hours. In many cases, the certificates may or may not be from the university offering the course, although some Coursera courses offer a certificate from the university. The American Council on Education (ACE) is reviewing five MOOC courses for credit worthiness (Lederman, 2013). If the courses meet the standards, they will be deemed worthy of course credit. Coursera recently announced that 10 universities have agreed to utilize MOOCs in on-campus and online courses (Pope, 2013). This particular problem has generated a number of interesting potential solutions rapidly. However, a number of faculty from elite and prestigious universities are raising significant concerns about the use of MOOCs.

The Problem with Interaction

The large scale typically associated with MOOC's results in serious challenges for high quality interaction between Instructors and Learners (I-L). While one-on-one, synchronous I-L interaction is probably not feasible, some viable alternatives have been explored. For some video platforms coupled with threaded discussion that automatically link to a time index in the video, systems are available (e.g Echo 360). These allow for "virtual" one-to-one interaction in an asynchronous setting even over several semesters and over successive semesters. Feedback has been surprisingly positive, suggesting that participants find available interaction to be an acceptable substitute that rivals real-time face-to-face interaction (Zimmerman, 2011). Instructors can react to specific questions by learners that are linked to points in the lecture or learning package. This can then provide the basis for further discussion between learners or between the instructor and learners.

Scale is not a primary challenge for Learner to Learner (L-L) interaction. Designers can design reasonable peer groups that can conduct guided discussions either synchronously or asynchronously, and key aspects of this interaction can be shared via blogs or bulletin boards.

The actual quality of interaction (both I-L and L-L) depends on the sophistication of the learning platform used and MOOC's provide far greater challenges for high quality interaction when compared to other delivery methods.

Prerequisites

MOOCs generally do not suggest prerequisites before taking a course. At some time when a course credit process is developed, prerequisites will need to be checked.

THE FUTURE

Will MOOCs revolutionize education or are they another step in the evolution of education pedagogy? MOOC providers are rapidly developing processes that address the key issues noted earlier. However, if they are able to overcome some of the obstacles, can MOOCs be used effectively in higher education?

Possible Scenarios:

- MOOCs take over higher education, many campuses close!
- MOOCs are bubbles, crash, and become irrelevant.
- College's use MOOCs as supplements to the classroom.
- Colleges become MOOC proctored exam testing sites.
- Universities partner with MOOCs.
- MOOCs receive university accreditation.

- MOOCs as a key tool for competency based education.
- A new method of totally transferable course credit is developed.

MOOCs Take Over

And US universities scrap all football teams and switch to fantasy leagues! There are a few pundits that believe that university closures will happen, though the probability is small. There are just too many counter forces that make the campus an attractive alternative for many students. For example, a residential college education has valuable social aspects that cannot be replicated through online education. Sports teams, social interaction, the first time a student lives away from home. Students can have real time face-to-face with faculty who are the content experts.

MOOCs Are Bubbles

Also another unlikely outcome. There is value in the ability to educate large numbers of students across the globe in an economical way. Employed students may find that courses offer the ability to update skills without going to a physical campus. The large number of enrollees (at zero price) indicates a huge demand for the service.

MOOCs As Supplements In The Classroom

MOOCs by themselves may become useful on-campus as providers of online content for traditional faculty led classes. A very good presentation on a MOOC may provide a better learning experience for students than the in-class faculty lecture. The MOOC lecture could possibly completely replace the in-class lecture, allowing more class time to discussion, problem solving, and other in-class learning activities. Just as students are currently asked to purchase a textbook, future students may be asked to sign up for a MOOC. This is similar to a blended or hybrid course design, but using the MOOC lectures instead of the faculty developed video lectures.

Colleges Become MOOC Proctored Exam Testing Sites

This is another outcome that could be viable, if the MOOCs are able to overcome some of the other issues. If the MOOC is developed around the classic 3 credit hour standard, then universities would see the value in students taking the course without consuming campus resources. Universities would then approve the course as equivalent to the on-campus course, but charge a fee for the student to take proctored exams on campus (or a secure online process, or proctored) that would result in a letter grade for the student. The grade would be posted to the student's transcript and would be used to complete the on-campus degree, or to be transferred to another degree granting institution. The student does all the work online, then makes an appointment with the professor on-campus to take a test or present a paper, or provide the output of various activities assigned on the MOOC.

Universities Partner With MOOC Providers

This is not too different from the previous scenario of the proctored exam site, but with the difference that proctored on-campus exam testing is not necessary. MOOC providers develop secure procedures to overcome the cheating problem, then they are able to provide letter grades directly to a university, which collects a fee from either the student or the MOOC provider. This provides the stamp of authority to have a transcript from an accredited university. MOOCs have already been granted some opportunities to provide remediation courses or courses that are oversubscribed (Selingo, 2013)

MOOCs Receive University Accreditation

This is the scariest scenario to existing universities, as it eliminates the key to university survival: accreditation and ability to give grades and degrees. This could happen, but it may take some time for the accrediting agencies to determine the standards by which accreditation would occur at the degree granting level. As noted earlier, course credit processes are underway and will likely become more common in the near future.

MOOC's As A Key Tool For Competency Based Education

Recent changes in Federal policy to not just permit but actively encourage programs that deploy competency based assessment to apply for Federal student aid (Field, 2013) may increase usage of MOOC's. As credit hours and seat time become decoupled from both the learning process and the eventual awarding of a degree. They could become one of the principal pedagogical tools to prepare students for competency testing.

A New Method

Another very disruptive possibility is that some new, unknown, structure of course credit and credit transferability is created. With the advent of cloud based big data, an organization outside the education industry may be the one to develop this. Universities then may be willing to provide a set of courses that would result in a degree. Students with their cloud transcript would just then transfer those courses to the university and receive the degree. This seems to be what happened at Georgia Tech which has announced that it will offer its Online Master of Science in Computer Science completely through MOOC's. It does so through a collaboration with Udacity and AT&T (Georgia Tech, 2013)

More likely in the short term may be the use of MOOCs in non-disruptive incremental change to courses and programs.

Several of these scenarios could be quite disruptive to the current higher education model. If a faculty member is not teaching a typical class with lectures and exams, the MOOC could conceivably replace all the on-campus faculty's lecture time, or the faculty altogether. Legislators and boards of private universities are not going to sit by and let faculty suddenly have about half their work load removed without something in exchange.

This could be the productivity disruption that many have been looking for. Faculty might be forced to teach twice as many students and classes without any additional class time. Cost considerations are going to make this a very enticing proposition. Could this be a mechanism to increase the course load for faculty without increasing the actual time work load?

The counter argument to all this is that the MOOC may free the instructor from lecture time, but would allow for more interactive classroom learning, thus improving the quality of education. The middle ground may well be more students to reduce costs, but with an increase in quality of the learning experience.

CONCLUSIONS

MOOCs appear to be here to stay. What the role will be in higher education is still evolving. The pressure to lower college tuition costs is real, yet few viable alternatives exist in the current business model to reduce costs. The MOOC may be the answer.

Faculty will be highly resistant to anything that totally disrupts the current university education model. Yet the cost factor will be a significant driving force.

A number of problems inherent with MOOCs now are actively being solved. Partly this is due to the large venture capital funding that has occurred and can fund developmental activities.

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