

BACK TO THE FUTURE WITH MOOCs?

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Abstract

Massive Online Open Courses (MOOCs), whereby tens of thousands of students can join free higher education courses online, have made dramatic strides recently. This paper traces their origins back to ideas about e-universities in the previous millennium and asks what is different this time? Discussed is the relationship of MOOCs to developments such as Virtual Learning Environments/Learning Management Systems and Open Educational Resources. Also examined are the drivers and enablers in the global economy and emerging business models that are fuelling this explosive growth. Considered as well is the likely impact of MOOCs on universities worldwide.

Introduction

Sweeping global economic changes are forcing universities in many countries to reappraise how they do things and to contemplate radical changes in order to survive and prosper (Fawson, 2011). New technology has long been championed as both a driver and a facilitator for change in universities (Bates, 2001; Cuban, 2001; DfES, 2003; Oppenheimer, 2003; Ryan, Scott, Freeman, & Patel 2000) but, notwithstanding some successes, has rarely or for long lived up to the promises of its proponents. Despite a long list of innovations such as e-learning, m-learning, VLEs/LMS, PLEs, e-Universities, virtual worlds, Reusable Learning Objects, Open Educational Resources, social networking, Bring Your Own Device, learning analytics, gamification, etc. for most universities the scale and rate of change has been rather modest (Bell, Bush, Nicholson, O'Brien, & Tran, 2002; Carr, 2003; Chester, 2006; Hannafin & Kim, 2003; Means, Toyama, Murphy, Baka, & Jones, 2009; Oliver, 2005; Sharpe, Benfield, Roberts, & Francis, 2006). In late 2011 a new phenomenon caught the attention of news media: Massive Online Open Courses (MOOCs). Stanford University made the news by offering three free computing courses online to unlimited applicants, each of which enrolled around 100,000 students (Pérez-Peña, 2012). In just over a year the MOOC phenomenon exploded into several large international consortia of major universities and multi-million dollar commercial investments. These developments are largely confined so far to North America and the UK, but they may have the potential to transform the higher education landscape in coming years. The discussion addresses three key questions: Do MOOCs work? Are they affordable? How might they affect the way we do things?

The MOOC Phenomenon

MOOCs are a form of Web based distance learning. MOOCs as originally conceived had no entry requirements, no course fees and no limitations on the number of places available. They typically offer no academic course credits but some provide a course completion certificate for successful completion of associated assignments. According to Futurelearn, a free, open, online platform for courses from multiple UK universities and other organizations:

Most existing MOOCs have a specific start and finish date and students sign up online. The courses are usually offered two to three times a year and tend to last for weeks rather than months. A student can use a wide range of media and interactive online tools to engage with other participants and learn alongside them. These might include video lectures, online discussion boards, blogs, wikis and social networking sites such as Twitter and Facebook. In addition to this online engagement some courses also include opportunities for students to meet each other face to face. Due to the large number of students studying MOOCs, learning support comes from the online learning community rather than academic staff. Equally, assessment of MOOC courses includes peer-assessed written assignments and computer marked tests. MOOCs attempt to encourage students to be independent and self-motivating. Students that really embrace the course are rewarded with authentic online networks and peer relationships that can continue beyond the end of the course.¹

Arguably the first true MOOC was the “Connectivism and Connective Knowledge” course (CCK08) offered by Stephen Downes and George Siemens at the University of Manitoba in 2008, attracting 2,200 participants worldwide (Downes, 2009; Fini, 2009), although its antecedents can be traced back through a number of open online learning experiments such as the INST 7150 Introduction to Open Education² and EC & I 831 Social Media & Open Education³, both run in late 2007, and the Open Educational Resources (OER) movement more generally (Iiyoshi & Kumar, 2008). MOOCs might have remained an interesting footnote in the history of education, but in late 2011 Stanford University made the news by offering three free computing courses online to unlimited applicants, each of which enrolled around 100,000 students (Pérez-Peña, 2012). The most popular of these, "Introduction to Artificial Intelligence," led by Sebastian Thrun and Google Research Director Peter Norvig, attracted over 160,000 students from more than 190 countries.⁴ These courses were very different from the Downes and Siemens MOOC model because they were not centred around networking, peer learning and learner autonomy. They instead employed the more traditional behaviourist strategy of providing instructional materials, split into small manageable chunks and supported by multiple choice assessments that learners could use to monitor their own performance against the stated learning objectives.

Networking and discussions were incidental to such an approach. This version of MOOCs has become known as “xMOOCs” while the earlier form has been dubbed “cMOOCs” because of their emphasis on Connectivism (Siemens, 2004, itself built on the earlier foundations of Constructivism (Bruner, 1990) and social constructivism (Bruner, 1990; Piaget, 1963). Arguably xMOOCs are thus the antithesis of the learner centred, creative, autonomous, peer learning embodied by cMOOCs (Hill, 2012).

Stanford’s initiative was closely followed by the announcement of MIT’s open online learning initiative, MITx, in November the same year.⁵ By January 2012 Thrun had resigned from Stanford to establish a purely commercial enterprise called Udacity⁶, and in April 2012, two more of the original Stanford professors set up Coursera, a consortium of four major US universities with funding of \$16m. By May 2012 MITx was subsumed within edX, a not-for-profit collaboration between M.I.T. and Harvard, with \$30m funding from each. In July 2012, Edinburgh was among the first non-US universities joining Coursera.⁷ Despite a number of other ventures involving Google, Code Academy, Udemy and others, Udacity, Coursera and edX emerged as the pace setters during 2012 (Watters, 2012). Udacity formed a partnership with educational publishers Pearson⁸, announced additional funding of \$15m and by the end of the year had 370,000 students studying 18 different courses. Coursera expanded to include 33 US universities, 1.7m students studying 197 courses, with \$3.7m extra funding. At edX, MIT and Harvard were joined by the University of California at Berkeley and the University of Texas system, and total funding for MOOCs reached nearly \$100 million.⁹ In December 2012, 12 leading UK universities announced the formation of Futurelearn, a for-profit venture to deliver MOOCs with British content.¹⁰ By March 2013 Coursera boasted 62 university partners, including 16 non-US institutions (from China, France, Spain, the Netherlands, Singapore, Italy, Germany, Denmark, Japan, Mexico, Switzerland), while edX had been joined by further universities from Canada, the Netherlands, Australia as well as the US, bringing their total to 12 partners.¹¹

In the wake of these developments it seems inevitable that governments will take a keen interest. Economies hit by the global recession need to find ways of reducing the costs of educating their populations. Rapid expansion of higher education paralleled expansion of the world economy from the 1960s through to the end of the first decade of the 21st century. Following the global financial crisis that began in 2007/2008 there are signs that these trends are being reversed. For example, the UK government reduced the number of University places by 20,000 in 2012-13¹² with obvious implications for university finances. The government also shifted the balance of higher education costs from the state to the individual consumer (Wyness, 2010). The result is that those who started their degree in 2012 are likely to graduate

with an average debt of £53,330.¹³ The rising cost of study is beginning to affect the numbers entering British universities. A 13 percent decline in 2012-13 student numbers nationally was directly associated with the rise in the cost of a degree, and the highest rate of decline was in England where fees were the highest.¹⁴ There is an established relationship between education and economic performance (OECD, 2012) so these trends are serious matters for concern. Stronger developing economies, such as Brazil and India, have a different problem. In these countries rising populations and economic boom are fuelling an exponential demand for education that parallels the earlier history of northern industrialised nations in the 1960's, outstripping local supply. MOOCs are seen to have the potential to address both these situations. As recently as 23 February 2013, the UK Minister of State for Universities and Science urged UK universities to invest in online courses in order to take advantage of the "historic opportunity" that has arisen, citing the examples of Coursera and Futurelearn¹⁵ and referring both to the opportunities in overseas markets and the need to maintain affordable access to university level education.

We have been here before. In the midst of the 1990s dot com boom, increased student numbers, diversity and expectations, increasingly irregular patterns of student attendance, declining resources and increased competition between providers prompted attempts to establish new ways of delivering and supporting teaching and learning. The convergence of different media into a single networked digital domain, and the rapidly expanding accessibility of such media, both driven by market forces, tempted many HE institutions to develop an on-line presence, individually, via consortia, and in collaboration with commercial partners (Brown, 1998). Ventures such as Western Governors University, California Virtual University, Colorado University 'CU Online', Fathom, Universitas 21, the UK eUniversity and many others appeared during this decade. Most are now gone and in many cases lost their backers considerable sums of money (Walsh, 2011). The most spectacular failure was the UKeU, which closed in 2004 having spent £50 million of public money while attracting only 900 students. The Commons committee concluded, "The UKeU failed largely because it took a supply-driven rather than demand led approach...in an emerging market that did not sustain the high expectations of demand... [and] that there was insufficient market research" (House of Commons, 2005, p. 3).

Do MOOCs Work?

A key issue with cMOOCs is **scalability**. University staff-student ratios are typically around 1:25 regardless of subject or country (Laurillard, 2013). So in order to work, cMOOCs need to find some way of developing and sustaining effective peer-to-peer networks among thousands of participants, rather than the traditional one-to-many model of teacher-student interactions. Watters

(2012) commented on the high proportion of adult, informal learners with degrees and/or already working in professional roles attracted to cMOOCs. These profiles are not typical of undergraduate student populations where the majority of higher education demand needs to be met. Less mature learners may have more difficulty in exploiting the MOOC environment. Various studies (Clarebout & Elen, 2006) have shown that computer based learning students find it hard to choose appropriate tools, that **high level cognitive skills** covering a broad range of abilities including digital literacy, information literacy, and the ability to effectively use social software to build one's own learning environment are needed (Pettenati, Cigognini, Mangione, & Guerin, 2009).

xMOOCs avoid the scalability issue by employing a more traditional model of content-led learning whereby the content is provided by professional experts (teachers) rather than co-constructed by the learners, and learners assess their competence by answering multiple choice questions rather than by entering into dialogue with others. As the rapid growth in xMOOCs has shown, technically an OOC can be studied by large numbers of students from all over the world. But creating these networks on a large scale is challenging, as evidenced by the spectacular failure of Georgia Tech's "Fundamentals of Online Education: Planning and Application" MOOC at the beginning of February.¹⁶ The course collapsed within a week of its launch because of the inability of its Google docs platform to cope with the needs of its 41,000 students trying to sign up for and create peer study groups. The challenges are not purely technical either.

Completion rates have been widely commented upon although reliable data are hard to obtain.¹⁷ Although completion rates can approach 20%, most MOOCs have completion rates of less than 10% (Jordan, 2013; Kolowich, 2013). For comparison, at public universities in the US, 31.3 percent of students graduate in the traditional four years, versus 52.4 percent for those at private, nonprofit institutions.¹⁸ As MOOC courses tend to run for just a few weeks, or at most months, the level of attrition likely to result from accumulating sufficient credit to earn a degree probably means that completion rates would be significantly lower than 10% on average if institutions attempted to offer degrees via MOOCs. However these figures need to be viewed in context. Firstly, 10% of a huge population is still a large number. Commenting on the low completion rate of MIT's course 6.002x, *Circuits and Electronics*, Agrawal argued "If you look at the numbers in absolute terms, it's as many as might take the course in 40 years at MIT" (Agrawal, A., in Hardesty, 2012, cited by Daniel, 2012, p. 6). So while MOOCs may not seem very impressive in terms of completion rates, judged by **volume of output** they compare favourably with conventional university courses that offer only limited places.

So do MOOCs work? Arguably yes, but so far largely for an already well educated population with well developed learning skills. This suggests that they are currently filling a gap in the professional development market rather than offering an alternative to conventional undergraduate education. Cultural issues may be a further barrier to serious application in countries where respect for teacher authority is traditionally high. Ironically, students from such cultural backgrounds may be particularly attracted by the prestigious reputations of the universities in the MOOC vanguard. However, these largely base their reputations on research excellence and as Daniels (2012, p. 16) noted, “It is a myth that professors distinguished by their research output are competent to create online courses without help.”

Are MOOCs Affordable?

Although ICT has the potential to improve and extend education while reducing costs, the up-front costs of distance learning have always been high compared with traditional face to face learning (Daniels, 2012) and MOOCs are no exception. A recent survey (Kolowich, 2013) reported that MOOCs typically require around 100 hours preparation before they start, plus around 5 hours per week thereafter. Already most of the growth in (non-massive, non-open) online learning provision is from institutions already offering online courses. These are also the largest institutions and were the first to offer online courses (Allen & Seaman, 2010). While MOOCs remain free there is no obvious direct revenue stream for less wealthy institutions. However alternative business models have started to appear:

1. Free and open to all but not for credit (original concept).
2. Free but additional learner support is available for a fee from a third party provider.
3. Free but students pay for certification.
4. Free tuition but students pay for examinations.
5. Fee paying when incorporated as a component of a larger fee paying programme.
6. Not for credit, but can be counted as accredited prior learning (APL) if the learner subsequently registers for a fee paying course.

Some of these are potential routes to market and hence revenues, although if all they do is funnel students into existing limited student places there will be no overall increased income. Others offer ways of leveraging MOOCs to generate additional revenue. These need not be restricted to MOOC providers. Universities that do not offer MOOCs could offer to provide learner support and even examinations related to MOOCs offered by others, in return for tuition and examination fees. Other creative ideas include Udacity’s plan to charge employers a fee to see student CVs and the Coursera

partnership agreement refers to sponsorship possibilities and selling the MOOC platform to other organisations. In due course open source platforms may become available, paralleling the switch from proprietary VLEs such as Blackboard, to open source (Moodle). In the short to medium term however, offering MOOCs seems likely to be feasible only for wealthy institutions able to absorb the set-up costs and risks. Less wealthy institutions need to look at the new support service opportunities that MOOCs might create, while seeking to protect their own student revenues from predatory attacks by other organisations with similar ambitions.

Conclusions

Despite their immense popularity current MOOCs are not filling a significant gap in the undergraduate education market. Their primary contribution seems to be to postgraduate/professional development. The primary reason for this situation appears to be minimal student support, requiring successful MOOCers to already have well developed learning skills. If MOOCs are to have a significant impact on either reducing the costs of overstretched HE systems in advanced industrialised nations or rapidly expanding the capacity of such systems in nations experiencing exponential demand for higher education, they will need to overcome issues of scalability, dropout, student motivation and monetisation. Given that thus far MOOCs have been non-fee paying and have experienced high drop out rates it is not clear whether the level of understanding of consumer demand is any better than it was during the dot com fuelled virtual university bonanza.

Ultimately finding a way to generate sufficient revenue to overcome the significant entry costs for participating institutions is likely to be a major determining factor. The range of ideas being put forward for ways of leveraging MOOCs show just how beguiling they are for governments and commercial enterprises alike. These revenue-generating options could change the higher education landscape. For example, if the tuition support, examinations and certification related to a particular MOOC can be provided by other organisations, some of which may be private enterprises, and then the traditionally integrated range of academic services offered by universities may become **unbundled**. At present universities compete for students. In the near future some may compete to supply particular services (and data derived from those services). An obvious question to ask is whether it is sustainable for many universities to teach their own versions of basic introductory first year courses or whether such routine content could be delivered by just a few MOOCs. From a pedagogical perspective the answer has to be “no,” because first year undergraduates are unlikely to possess the metacognitive skills needed to be effective autonomous online learners. For economic and political reasons, however, the answer is likely to be “yes.”

Notes

1. <http://Futurelearn.com/moocs-explained/>
2. http://www.opencontent.org/wiki/index.php?title=Intro_Open_Ed_Syllabus
3. <http://eci831.wikispaces.com/>
4. Udacity Web site
5. <http://web.mit.edu/newsoffice/2011/mitx-education-initiative-1219.html>
6. <https://www.udacity.com/>
7. <http://www.ed.ac.uk/studying/postgraduate/online-distance-learning/programmes/mooc-edinburgh>
8. <http://www.pearson.com/about-us/pearson-at-a-glance.html>
9. <http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform/>
10. <http://Futurelearn.com/>
11. <https://www.edx.org/press/edx-expands-internationally>
12. <http://www.offa.org.uk/press-releases/offa-announces-decisions-on-revised-2012-13-access-agreements/>
13. <http://www.telegraph.co.uk/education/universityeducation/student-finance/9888756/Adding-up-the-true-cost-of-university.html>
14. <http://www.telegraph.co.uk/education/universityeducation/9811776/Fees-backlash-leads-to-sharp-decline-in-student-numbers.html>
15. <http://www.bbc.co.uk/news/education-21603703>
16. <http://www.insidehighered.com/news/2013/02/04/coursera-forced-call-mooc-amid-complaints-about-course>
17. <http://mfeldstein.com/the-most-thorough-summary-to-date-of-mooc-completion-rates/>
18. http://www.cbsnews.com/8301-505145_162-57517143/50-state-universities-with-best-worst-grad-rates/

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