CHAPTER 10

Massive Open Online Courses and the Future of Higher Education

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Introduction

The global economic crisis of 2008 coincided with the emergence of new technologies for scaling up secondary and tertiary instruction. Initiated in Canada in 2008, and brought to global prominence by the big three massive open online courses (MOOC) platforms—edX, Coursera, and Udacity in 2012, which were rapidly copied by platforms in the UK, Europe, Australia, and elsewhere—early MOOCs promised to bring free university courses by global super-star professors at top-ranked universities to any student with Internet access, anywhere in the world. Anant Agarwal of edX said in his often viewed 2013 TED talk that "the last big innovation in education was the printing press" but MOOCs will be the next one—and it is starting now (Agarwal 2013). Just what are MOOCs and what are their likely contributions to the future of Higher Education?

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O. O. Adesope, A. G. Rud (eds.), *Contemporary Technologies in Education*, https://doi.org/10.1007/978-3-319-89680-9_10

What Are MOOCs?

The first course to be *called* a MOOC, "Connectivism and Connected Knowledge," was offered in 2008 by George Siemens of Athabasca University—Canada's Open University—and Stephen Downes of the Canadian National Research Council.[1] Siemens and Downes produced videos offering introductory definitions and ideas *about* connectivist learning theory, and student participants—both in-person and online—then critiqued and augmented them on blog posts, threaded discussions on Moodle (a free open source course management system), and social media. The course was an experimental "distributed" seminar. Dave Cormier of the University of Prince Edward Island called this experiment a MOOC—for Massive Open Online Course. Stephen Downes has labeled such experiments "c-MOOCs" (for connectivism).

In 2012, a different kind of massive online course emerged on the first three MOOC platforms—Udacity, edX, and Coursera—leading the New York Times to dub 2012 "The Year of the MOOC." Stephen Downes coined the term x-MOOC ("x" for extension, as TEDx is an extension of the TED Conference and edX began as an extension of Harvard and MIT), to differentiate the courses on these platforms from the connectivist MOOCs that he dubbed c-MOOCs (Downes 2012, 2013).

While each of the four terms contributing to the MOOC acronym—massive, open, online, and course—have been interpreted in different and sometimes conflicting ways, more or less standard meanings have emerged.

Massive The colossal size of the first MOOCs by Thrun and Agarwal in 2011 and 2012 gave the term *massive* the vague meaning of "very very big". But few successive MOOCs could boast student populations in the hundreds of thousands. A typical MOOC on a major platform might have 25,000 students (Jordan 2015). Smaller MOOCs on less prestigious organizations may have just a few hundred students or less. "Massive" has come to mean that the course can be scaled elastically and indefinitely—that there is no practical technological limit to the number of participants.

Open The term *open* in relation to MOOCs has come to mean "open to anyone at no or very low cost". For the MOOC founders, the key was *open access to world class education*—defined as education from the world's

[1] Other organizations such as ALISON had previously offered free online courses, but these were not labeled "MOOCs" until the term came into general use after 2012.

leading universities—with no-cost or low-cost *certificates of learning* for course completion. MOOCs have not in general been open in the sense of permitting their component parts to be "mashed up"—disassembled and re-used in new configurations.

Online MOOCs were initially conceived as online courses. But as MOOC developers came to understand the central importance of social interaction in learning, they built some face-to-face social elements into the MOOC experience. These have included student meetups and faculty roadshows.

Course A course is generally composed of a number of educational experiences—lectures, discussions, quizzes, projects—*sequenced for completion*. Initial MOOCs were sequenced like traditional college courses, starting on a specified date and closing down after the final exam. But MOOCs have gravitated away from the university course model, remaining open continuously on a self-paced basis, while Mini-MOOCs—brief lessons or lesson sequences—are now also common.[2]

Early Promises and Missteps

In the most developed nations, MOOCs promised to bring higher education to those poor and "middle class" students now excluded by rising tuition and stagnant or declining incomes. In the developing nations, MOOCs promised to contribute substantially—and at a manageable cost—to the underdeveloped secondary and post-secondary educational infrastructure, making advanced education and training broadly available. MOOCs, in short, promised to "level the playing field" globally (Kanani 2014).

These early claims were soon refuted. Few secondary or college-age students took an interest in MOOCs; they considered MOOCs irrelevant because their certificates could not be traded in for college credits. 96% of MOOC enrollees dropped out—often before completing a single lesson. The social environment for learning was discovered to be more motivating and engaging than isolated online learning—as though we needed a study to prove this—and the social element in MOOCs—the discussion boards—were so boring that students avoided or sabotaged them. MOOC platforms searched in vain for sustainable business models.

[2] See the MOOC platform Coursmos, https://coursmos.com/

To add to the growing disillusionment, a notorious case study at San Jose State College concluded that academically challenged students in a remedial math MOOC from the Udacity Platform performed significantly worse than a control group of matched students in a more "social" face-to-face class. This highly visible failure led Udacity CEO Sebastian Thrun to declare that his MOOCs were "a lousy product" and to withdraw from the college course market (Chafkin 2013). Udacity instead refocused on professional development, as the most engaged MOOC users turned out to be professionals with university degrees. Instead of "leveling the playing field" in higher education, MOOCs paradoxically added to educational inequality via the Matthew Principle: "those who had much got more, while those who had little got less—or nothing".

Three Contributions: Return, Revenue, and Revolution

Nonetheless, reflecting on the painful lessons of the early MOOCs, MOOC leaders have learned important lessons about how MOOCs can contribute to the crisis in higher education, and have made significant improvements—often under the media radar. In this chapter, rather than speaking in the abstract about MOOCs, I will be examining actual MOOCs that point to future developments. I locate three areas where MOOCs can make a positive difference. I organize these contributions under three headings: return, revenue, and revolution.

The first two—return and revenue—contribute to university students, faculty, and administrative leaders within the entrenched university. The "return" category indicates ways MOOCs can improve the "value proposition" or the rate of return for students and their families on their private investment of money, time, and energy in higher education. The "revenue" category includes the various ways that MOOCs can help universities earn additional revenues and hence improve their financial condition.

By "revolution" I mean the shift from the entrenched university paradigm to an "Education 2.0" paradigm—the revolution of access to online learning where outcomes can be documented through badges, certificates, and nanodiplomas, placed in searchable digital portfolios, and discovered by firms and organizations seeking workers with demonstrated capabilities. Higher Education 2.0 offers a revolutionary pathway to employment that completely by-passes conventional universities—and MOOCs can play a significant role in this revolution.

Contribution I: Return on Investment

Daphne Koller, the founder of Coursera, has stated that colleges are going to have to clarify their value proposition, and then deliver on it (High 2013). With the decline of full-time jobs with benefits for college graduates, the promise of college, in itself, is no longer that attractive; families are now carefully weighing costs and benefits, and withdrawing if the value proposition does not add up. Colleges can offer a better value proposition by reducing costs or increasing benefits. MOOCs can help in both ways. Here I consider (1) tuition reduction, (2) instructional improvement, and (3) new high-value curriculum content.

MOOCs Can Help to Reduce Tuition and Fees

MOOCs can help reduce costs by reducing tuition and fees—this is particularly important in the United States and those other advanced nations that impose high tuition fees for university study. They can also do so by enabling students to reduce food and lodging costs by living at home while studying, and by reducing the opportunity costs of education by making it easier to study while gainfully employed. These "helps" are useful everywhere, but perhaps particularly so for those students in lower income groups and in developing nations.

Let me offer some examples of how MOOCs can help to reduce tuitions and fees.

(i) Transfer Credits for Certificates First, MOOCs can enable students to obtain certificates that can be accepted as transfer credits in degree-granting universities. This was an early hope but has not played out as initially expected. Nonetheless, some recent steps are promising.

Agarwal, the founder of edX, predicted in 2012 that within a year many colleges would be accepting edX courses for credit. If they accept a physics course for credit from a local 2-year community college, he argued, they certainly would accept a physics course for credit from MIT or Harvard.

How wrong he was! EdX and Coursera both submitted MOOCs for approval as full-fledged college courses by the American Council on Education (ACE), and several were rapidly approved. Nonetheless, very

few universities accepted these certificates for transfer credit. And the reason is not hard to find. Universities are now almost completely dependent upon tuition revenues—which are declining. If they accept MOOC certificates for credit, more ACE approved MOOCs will be offered and more students will present certificates for free or low-cost credits. Economically, accepting these certificates would be suicidal for most colleges and universities.

Nonetheless, some institutions have accepted them. University College, a school for adult learners at the University of Maryland, has long accepted "life experiences" for college credit. (Fain 2012). If such institutions accept work experiences for credit, how can they not accept MIT physics?

Or consider Ashford College in Iowa, a for-profit college known for luring underprepared learners into enrolling in its programs and paying tuition through government guaranteed student loans. Most Ashford students failed to complete courses and landed in debt, as did Ashford itself. Iowa Senator Tom Harkin labeled Ashford a "scam. " But the college has recently reorganized and now accepts up to 90 transfer credits (out of 120 needed for graduation). They grant credit for any ACE approved MOOC certificate (Biemiller 2014). Ashford may survive on tuition revenues from the remaining 30+ credits—which is 30+ credits of tuition revenue more than what they might otherwise get. For those students merely wishing to get a degree from an accredited college to pass through the college job filter, opportunities like those at Ashford are already available and more will open.

(ii) MOOC + CLEP The Advanced Placement program of the College Board is widely known, and MOOCs can help AP students gain college credits (more on this below). Perhaps less well known is the College Level Examination program (CLEP), also administered through the College Board. CLEP offers competency-based exams in 33 basic college subjects, and students who pass these exams can gain credit for some or all of them in almost 3000 colleges and universities. As the College Board exclaims in the CLEP website "Average College Course—$700. CLEP Exam—$80. You Do the Math!" Some thought leaders are now urging students to prepare for CLEP exams by taking MOOCs. A recent book lays out a plan for completing college in a single year using the MOOC + CLEP strategy (Warburg 2015).

(iii) Facilitating Success in High School Advanced Placement Courses Another method is helping students get college credit for advanced *high school* courses—a practice that is already well-entrenched. This method has several variants. First, some MOOCs are now being offered—by the University of Houston and others—to *augment* high school Advanced Placement courses and help students raise AP scores; those with high enough scores can transfer their AP courses for credit Second, MOOCs are now available to *train teachers* both to teach AP courses better and to raise their students' AP test scores (Schaffhauser 2014). Third, some universities including Rice University in Texas, are offering *entire* AP courses in the MOOC format (Anderson 2014). Students take the MOOC i*n place of* AP courses, and some high schools then grant high school credit to those who pass with a high enough score.

Offering more advanced placement credits in their degree programs to those with AP will reduce university tuition revenues, but it is difficult to see how they can stop the practice—as competitors who continue it will be correctly seen as offering talented recruits a better deal.

(iv) Cut-Rate Credits Some universities offer cut-rate credits for MOOC-based courses. The University of Alberta led with a MOOC in dinosaur studies—one of its strongest areas. Students who take the MOOC version instead of the face-to-face version pay only half of the tuition fee (Coughlan 2013).

(v) Course Waivers for Certificates Some universities now accept MOOC certificates as *course waivers.* Temple University's business school now offers the first three foundation courses in its business school as MOOCs (Lausch 2013). Students who complete the MOOCs and pass the final exams "pass out of" these courses and can thus take three additional courses for the regular total tuition cost. While this does not reduce tuition costs for students, it does provide three additional advanced courses—almost a complete additional semester—for the same tuition price tag as its regular program. Students get a more powerful education—and one more relevant to employer requirements—without paying more.

MOOCs Can Improve Instructional Effectiveness

Three of the important lessons learned in 2013, the *année miserable* for MOOCs, were that many less academically prepared students cannot learn college-level material successfully from MOOCs (the Udacity Pivot), that effective use of video (replacing talking heads with animations, on-location shoots, interviews, and demonstrations) introduces a "new" visual language of instruction that is both effective and welcomed by learners, and that learning is social—students who learn together in flipped classrooms or learning hubs do much better than isolated MOOC learners. How can these lessons help us make MOOC instruction effective and at the same time improve conventional classroom instruction at the same time?

(i) Better Precollege Preparation for University Studies Udacity's highly visible flop at San Jose State with less prepared students brought a lot of attention in the MOOC community to improving college readiness for these learners. Underprepared students pay dearly when they flounder in college in several ways: by failing to complete and thus foregoing the benefits of a diploma while undergoing unsustainable debt, or by extending their years of study—and their total tuition expenditures. Improving their readiness for university study would alleviate some of these burdens. Doing so is equally important for universities; they lose tuition dollars when they fail to retain such students through graduation. So how can MOOCs help?

College Prep Subject-Matter MOOCs First, some MOOCs offer supplemental materials for conventional secondary-level subject-matter courses needed for college success. A good example is the "College Readiness Math MOOC" offered by the University of Wisconsin at Lacrosse (University of Wisconsin LaCrosse 2012).

College Orientation MOOCs Shortly after Udacity's San Jose debacle, several MOOC platforms introduced MOOCs designed to orient incoming college students—especially those from less advantaged families lacking previous college experience. Some good examples of this genre include East Anglia University's course "Preparing for Uni" MOOC on the FutureLearn platform, and Charles Sturt University's "What's Uni Like?" MOOC. According to Professor Garry Marchant, Charles Sturt's Deputy Vice Provost, "The 'What's Uni Like?'" project aims to encourage students

from low SES backgrounds to aspire to higher education and to improve their understanding of university culture and expectations in order to support their effective participation (Charles Sturt University 2014).

(ii) Backup MOOCs for Conventional College Courses Courses offered face to face in conventional college classrooms, of necessity, are aimed at the middle ability-level students in that class. The highest level students get held back—leading to boredom—while the lowest level students get by-passed, leading to frustration and failure. Back-up MOOCs have effectively addressed this problem by allowing students to view lectures and take practice tests as often as needed to master course material. Meanwhile, MOOCs offering advanced content for extra credit can keep the most academically talented moving ahead.

(iii) Blended Learning in Flipped and Wrapped Classrooms Face-to-Face courses using MOOCs in place of classroom lectures can devote more time to supervised discussion and problem-solving.

Khosrow Ghadiri, a professor of electrical engineering at San Jose State University, piloted a flipped classroom model for his course on circuit design. The goal was to enrich the content and increase the pass rate for this daunting course. The pass rates in the blended pilot rose to 91%, as compared to a 59% pass rate in the previous year's face-to-face lecture class. The evaluation study concluded that "high quality MOOC content using a blended approach in conjunction with a highly structured in-class team-based approach can produce significant benefits in transforming student learning and success" (Ghadiri et al. n.d.).

A variation on the flipped course is the *wrapped* course, where instructors offer a period (perhaps a week) of conventional F2F introductory classes, then use MOOCs for course content with weekly F2F sessions for discussion and problem-solving, and conclude with a period (perhaps another week or two) for summary discussions and exam preparation. The wrapped course has a good division of labor between live and MOOC instruction, with each component used for its highest value function.

(iv) Video as a "New Visual Language of Instruction" One of the largest complaints about conventional college education is its reliance on large lecture classes in which a "sage on the stage" delivers impersonal content to hundreds of students. Some early MOOCs did little more than

scale up this kind of teaching, replacing "sages on the stage" with "talking heads" on the screen. But other early MOOCs, such as the Greek Heroes MOOC from Harvard X, made effective use of video to replace the professorial talking head. Students viewed performances of Greek tragedies, joined virtual guided tours of Greek cities and museums, and watched interviews with the leading experts (Haber 2014).

Another good example is the popular "Lean Launchpad MOOC" taught by Stanford professor Steve Blank on the Udacity platform. The first iteration of this MOOC was created by taking Blank's classroom lectures and slicing and dicing them into six-minute segments—the length that research showed to be optimal for student attention. This approach was unsatisfactory—students found it boring. The MOOC was recreated with visually engaging animations of the concepts and processes presented, with Blank providing a voice over. The second iteration has proven immensely popular (Udacity n.d.).

Jonathan Haber, a scholar who took forty MOOCs in one year as part of his study of MOOC learning, concluded that MOOCs have generated a "new visual language of learning". Subsequent research has shown that this language is both considerably more engaging than conventional lectures and better at prompting sustained learning (Haber 2014).

(v) Increasing Social Interaction Early MOOCs failed to engage isolated, online learners because learning is greatly enhanced when it is placed in a social context. As noted, the discussion boards could not provide a substitute for either classroom discussions (not that adequate time is set aside for discussions in large lecture courses) or student bull sessions.

MOOC leaders responded by adding additional social dimensions to MOOC learning. We have already mentioned the use of MOOCs in blended learning in flipped classrooms, to facilitate discussion and group problem-solving. Here are some other promising examples: Coursera has established face-to-face MOOC learning hubs in a number of cities. The city of Boston partnered with edX to create "Boston x" a program to establish MOOC learning centers throughout the city (Fox 2013), a practice that has been copied by a few other cities. EdX has also partnered with the New York Public Library system to create MOOC learning centers at two or more branch libraries in each of New York's boroughs—making MOOC learning groups readily accessible for learners throughout the city (Enis 2014).

Finally, through the use of social media sites such as Facebook, Twitter, and LinkedIn, MOOC learners and community volunteers are organizing informal MOOC learning hubs in coffee houses, pubs, and libraries. This trend is sometimes referred to as "Starbucks University".

MOOCs Can Help to Add High-Value (Twenty-first Century) Experiences

In preparing this chapter I examined several lists of so-called twenty-first-century skills, and discovered significant overlap. What are called twenty-first-century skills are just those skills and attitudes most desired by employers in the contingent workplace—skills for obtaining and performing "gigs": Technical Capability, Entrepreneurship, Marketing, Networking, Initiative, Self-Management, Listening, Amiability, Flexibility, and Collaboration—skills needed to market freelance services and perform in short-term jobs. These skills are not the focus of the received, conventional college curriculum. When employers complain that college graduates are unprepared for the contemporary workplace, they have a point—changes in the workplace have made the college curriculum less relevant, and the expectations for professional careers bred by college life less appropriate.

(i) High-Tech, Entrepreneurship, Team-Building and Collaboration Skills MOOCs exist in abundance to address every twenty-first-century skill. It goes without saying that many MOOCs address computer programming languages and high-tech basics. I've already mentioned Steve Blank's "Lean Launchpad MOOC" on Udacity, providing step-by-step guidance for entrepreneurs creating start-up firms (Empson 2013). Other "startup" MOOCs, moreover, can be found on most MOOC platforms.

At Harvard Business School, Professor Regina Herzlinger uses the software package Project Lever, which she developed with a colleague, to link students in her "Innovating in Health Care" MOOC on edX with those with complementary interests and capabilities, in virtual working groups with virtual advisors. The students meet up through video-conferencing to form innovative business projects. Project Lever has been described as the "e-harmony for business groups" (Choi 2014).

Some MOOCs transform their inchoate massive learner cohorts into large working teams. Cathy Davidson, a leader in interdisciplinary humanities formerly located at Duke University in North Carolina and now at

the City University of New York, offered a noticeable and much-discussed MOOC on the "History and Future of (Mostly) Higher Education" in early 2014 on the Coursera platform. In this MOOC, as Davidson (2013) explained, each learner would be assigned to conduct research on a niche historical or contemporary topic in higher education. In the event, one group of learners studied early colleges in their regions. Another looked into new initiatives in today's universities. In the final project, the massive group, working as a whole through social media, assembled a comprehensive document and global map of higher education and published it on Davidson's project website. Meanwhile, the students in Davidson's simultaneous face-to-face section of the course at Duke networked with students in other course sections offered simultaneously at other elite universities and served as course leaders for the MOOC participants. In the process, these students learned how to manage complex large group projects engaging temporary virtual members. One can quarrel with this arrangement as reproducing the hierarchical structure of managers and workers; the point here is simply that it introduces real-world social processes into MOOC experiences.

Other MOOCs focus on collaboration. Stanford University, which spawned both Udacity and Coursera, has introduced a new MOOC platform, NovoEd, focusing exclusively on innovation and collaboration (Corcoran 2013). Designed by Stanford professor Amin Saberi and Ph.D. student Farnaz Ronaghi, the NovoEd platform claims that it facilitates the division of massive learner cohorts into small collaborative working teams (Empson 2013).

(ii) MOOCs for Experience in the Real Economy Some MOOCs package all of these skills together by placing students in real-world virtual "gigs". The Business Strategy MOOC from the Darden School of Business at the University of Virginia employs the Coursolve software package to crowdsource small- and medium-sized businesses seeking free help in its strategic planning efforts from business students. In this MOOC, hundreds of firms sought assistance and thousands of MOOC student volunteers provided it. Through video-conferencing and other modalities, 73% of the student volunteers participated directly in strategic planning of these firms as "consultants".

Another example is Buck Goldstein's "Big Idea" MOOC from the University of North Carolina, also on the Coursera platform (University of North Carolina n.d.). In this MOOC learners can either take the lecture

course or add a practicum in entrepreneurship. The students opting for the practicum are guided in creating a start-up firm and then competing for real venture capital. Those winning the competition are then funded and trained in a virtual business incubator run by Goldstein at the university. Unlike Blank's Udacity "Lean Launchpad" MOOC, which offers "ideas" about entrepreneurship, the "Big Idea" MOOC practicum engages students directly as entrepreneurs in the real economy.

The point here is hardly to glorify either the gig economy or the twenty-first-century skills that support it. Until recently, university students prepared for lifetime careers in professions, by digging deeply into real knowledge. Those days are mostly over. Some twenty-first-century skills and attitudes are superficial—like the amiable smile on the face of the McDonald's associate asking whether you want fries with that Big Mac; or soul-destroying—like the skill of networking with people to use them or marketing worthless goods and services to vulnerable people. Some, however, can be beneficial. MOOCs may be better positioned than slow moving conventional university programs to develop them—and thus add to the value proposition of advanced education.

Contribution 2: Revenue

While MOOCs are often touted as tools for reducing student costs, their most important contribution may in the end be enhancing university revenues by attracting tuition-paying students, government and corporate grants, and private donations. In this section, I consider three ways that MOOCs can contribute to the revenue side of the higher education equation. First, MOOCs offer a relatively inexpensive tool for positioning and niche marketing of universities and their specialized educational programs. Second, MOOCs can be instruments for profitable special projects. Finally, MOOCs can be used as tools for retraining and reorienting faculty members to make them more economically productive in current circumstances.

MOOCs Can Help with Positioning and Niche Marketing

(i) Positioning Universities are caught up in the reputation game. They are subject to ranking by *U.S. News and World Report*, among others, to which tuition-paying students and their counselors attend. Universities thus need to *position* themselves to preserve and extend their reputations

to tap into both tuition revenues from lucrative domestic and overseas markets and to acquire the best and the brightest students, (2) to obtain government and corporate grants, and (3) to get generous donations from alumni.

By "positioning" I mean situating an organization in its competitive landscape in a way that makes it visible and thus "well positioned" both to attract unpredictable opportunities and to market goods and services. Positioning is about broad market visibility and differentiation in a shifting competitive landscape. It prepares the organization to make specific marketing offers.

The term was first used in the business literature by Jack Trout (1969). Trout argued that in such landscapes consumers and other revenue sources are overwhelmed and develop a defensive posture toward any information not already possessing a comfortable place in their minds. Positioning establishes such a place, and thus renders prospective revenue sources deaf to competitors' communications. As co-author Al Ries and Trout (1981) put it, positioning is "an organized system for finding a window in the mind" (p.19). Positioning differentiates the organization as the best, or the first or the fastest, or the least expensive.

We can view MOOCs as positioning efforts intended to create revenue streams through reputation management. With edX, MIT and Harvard positioned themselves as MOOC *pioneers*—further cementing their reputation for innovation and excellence. Stanford did likewise with Udacity and Coursera, both based on in-house Stanford software. Other prestigious universities jumped on board to prevent being eclipsed by these leaders. EdX and Coursera rapidly acquired the most visible and highest ranked universities globally as partners and positioned themselves as *dominant*. With their MOOCs, Wharton and Johns Hopkins positioned themselves globally as top business and health sciences schools, respectively. UK, Europe, Australia and Asia, sensing that they were losing out to the United States, established competitor platforms, the most successful of which were soon dubbed the "Coursera" or the "EdX" of their respective regions. The UK entry, FutureLearn, was created explicitly to sell the concept that UK is the world leader in higher education; FutureLearn's failure to recruit Oxford and Cambridge as partners, however, undercut that effort. Other regional platforms are competing on specialized knowledge and unique relevance to regional needs.

Karl Ulrich, Vice Dean of Innovation, Wharton, and Christian Terwiesch, Wharton Research Professor, conducted a cost/benefit analysis of MOOCs. They concluded that relative to any other form of global positioning, MOOCs are very cheap. In a recent interview (University of Pennsylvania, 2014), Terwiesch stated:

> We, elite universities are in the business of creating a reputation. Reputation will drive our demand; it will drive how our graduates are viewed in the market.
>
> How do you create reputation? The traditional vehicle of reputation building was research. It takes us somewhere around $300,000 to $400,000 of research investments to just get one scholarly article out.
>
> For that money, for one single paper, we can basically create somewhere around three, four, or five MOOCs…

Ulrich added:

> MOOCs are actually not very expensive. MOOCs cost about $70,000, but we reach with a MOOC several hundred thousand students. If you look at it on a per viewer basis — it runs to about 50 cents per person. That's cheaper than almost any other form of outreach. Fifty cents for that kind of engagement is very, very inexpensive.

(ii) Niche Marketing Few universities in the world can compete with MIT, Harvard, Stanford, Wharton, Hopkins, Oxford, Cambridge, etc. for general reputation. But the higher education landscape is littered with niche programs that can claim comparable visibility and authority in their narrow fields. And these organizations have also rapidly moved into MOOC production as they seek to solidify their reputations globally.

Some examples include the Berklee College of Music in Boston, a school specializing in jazz and pop music; the Writers Workshop at the University of Iowa, the top US writing workshop; HEC Paris's program in French Language Business Management; and many others. All of these have been early leaders with MOOCs in their specialties.

Many less visible organizations have also produced MOOCs to call attention to their special curricula: for example, Southern Mississippi State University's Faulkner Studies program.

A "me too" attitude, however, cannot position a university and must be avoided. Southern Birmingham University, for example, offered a "History of Terrorism" MOOC in Spring 2014 on CourseSites by Blackboard—a platform any university with a Blackboard contract can use. The "school is hoping to show the rest of the world that its faculty members are true 'All Stars' in their fields," according to its press release (Canning 2014). Professor Randall Law, the course leader, is no doubt a fine scholar—the press release notes his recent book published by an academic press—but that does not differentiate the university sufficiently to draw even regional students to its programs. In the United States, given the glut of doctoral graduates from leading universities, talented and well-trained professors visible in their specialized fields can be found just about everywhere.

Another caveat: MOOCs are proliferating exponentially and like new blogs, new MOOC platforms and courses have to compete for a MOOC audience whose rate of growth is slowing. Each new entry will have to be calibrated carefully to its potential markets. Even Harvard—yes HARVARD—can no longer count on "massive" audiences for its MOOCs. Lisa New, who teaches poetry MOOCs on HarvardX, chose to record videos of the Harvard men's basketball team reading poems, and post them on popular sports websites, to beef up her numbers (Bernhard and Rothberg 2014).

Many opportunities lie in wait, however, for programs that *can* differentiate themselves by virtue of high-need specialized knowledge or training programs.

MOOCs Can Help with Special Projects

There are several kinds of MOOC-related revenue-enhancing special projects. I will consider four: Special MOOC-based degree programs, Media-Tie-Ins with Super-Star Professors, Government-Sponsored Economic Development Projects and Corporate Partnerships. I will provide an example of each.

(i) Special Degree Programs MOOCs have been used as course components of new university degree programs sponsored by external organizations and aimed at providing high quality job-specific training at greatly reduced cost.

The best known MOOC-based degree program is Georgia Tech's Master's Degree Program in Computer Science on the Udacity platform. Georgia Tech provided the expert faculty, Udacity the expertise in educational technology and course management, and AT&T—which needed a ready source of engineers with industry-specific knowledge—$2 million in funding and two/thirds of the first cohort—230 students. It also plans to employ many of the program's graduates (Georgia Tech 2014). Some prominent leaders in India's education sector see the Georgia Tech program as a model for the global south, because of the large gap between growth opportunities and workers with job-ready skills in these nations (Jain and Balasubramaniam 2014).

Many similar opportunities present themselves. Employers unceasingly claim that they cannot find employees with job-ready skills. In the gig economy firms are not going to provide preparatory training, but they may sponsor MOOC-based programs they can shape to their own needs.

(ii) Super-Star Professors with Media Tie-Ins Many universities have distinguished and media savvy faculty who can draw grant funding from government agencies or private foundations to produce engaging courses for mass audiences.

Larry Sabato, a professor at the University of Virginia Center for Politics, is a leading expert on the Kennedys. As the US Royal family, the Kennedys get unending media attention. Sabato made a Kennedy MOOC entitled "The Kennedy Half Century"—with tie-ins including a PBS Documentary, a book deal, and a major foundation funding. In addition to enhanced visibility, the MOOC project was profitable for the university. A previous Sabato documentary had won an Emmy—television's top award (University of Virginia Center for Politics 2013). At Columbia University in New York, super-star professor Eric Foner has produced a MOOC on the Civil War and the Reconstruction Era in the United States. Foner, a Pulitzer prize winner who makes frequent television appearances, is aware that many of Columbia University's most famous lecturers from Lionel Trilling and Meyer Shapiro to Jacques Barzun were never filmed, wants to preserve his legacy by getting his lecture courses on video for future generations (Colman 2014).

(iii) Government-Sponsored National Development Projects Governments and government-funded agencies around the world draw on their universities to achieve National goals.

The British Council has partnered with UK's Open University and the FutureLearn MOOC platform to produce "the world's largest English class" (British Council n.d.). The Council, an independent agency funded by the UK government's Foreign and Commonwealth Office, was founded prior to World War II to engage in "cultural propaganda" to promote British interests globally by offering instruction in the English language and British culture. The Council's English language MOOC has enrolled more than 20,000 students (FutureLearn 2015).

GCHQ, the British Spy Service, has produced a MOOC on Cybersecurity. The service is eager to build a strong base of cybersecurity skills throughout the population and to encourage young people to consider careers as spies (Pinsent Masons 2014).

Singapore's Infocomm Development Authority is depending on MOOCs to achieve the national goal of making Singapore a "Smart Nation and a global leader in "'big data" (Yu 2014). The "Smart Nation initiative" aims to improve government, business and the lives of ordinary citizens. Singapore has developed a suite of Big Data MOOCs for university students and knowledge workers, to spread Big Data Analytics skills throughout the nation (Prime Minister's Office Singapore (n.d.).

Many opportunities exist on national, regional, and global levels for similar uses of MOOCs. If nations want to "position" themselves by educating large fragments of their populations in specialized areas of national or global need, MOOCs—with their unlimited cohort sizes—are ideal vehicles.

(iv) Corporate MOOC Partnerships A notable MOOC trend after 2013 is a shift away from college student audiences. MOOC production has also spread from universities to business firms, government agencies, and non-governmental organizations. Some corporate MOOCs have been produced without university partners, while others have relied directly on university resources.

SAP, a multinational software firm in Germany that has been an early a leader in corporate MOOCs, relies on its suite of software MOOCs to train employees and outside contractors, to educate clients and supply chains in order to fuel demand, and to position themselves in the global

marketplace. SAP has turned to MOOCs because of their broad reach and relatively low cost (Open SAP n.d.).

M&S, a large British retailer, offers a Futurelearn MOOC through a partnership with the University of Leeds on innovation is business (Education News 2014). Like all corporations, M&S has a large inventory of documents and training materials that can be repurposed for broad educational use. Corporations lack internal resources for designing engaging courses for general audiences. Like M&S, they can partner with universities to produce MOOCs that will provide visibility and goodwill for both.

Universities and corporations can find many other opportunities for partnerships where corporations shape content while universities provide underlying research and course production.

MOOCs Can Help Universities in Faculty Reorientation and Retraining Efforts

Earlier, I spoke of the changing occupational order, the shift from the job economy to the "gig" economy—to what Daniel Pink calls "Free Agent Nation" (Pink 2001). I suggested that we can gain some leverage on the otherwise empty phrase "21st Century Skills" by conceiving them as the skills and attitudes needed for adjustment to the gig economy—of contingent workers on temporary teams—often as "consultants" without benefits—marketing their services as entrepreneurs, collaborating with people they hardly know on unpredicted tasks requiring flexibility and adaptability.

The gig economy has already impacted the university. Adjuncts and temps bear an ever-increasing share of the teaching load. Departments and programs close as tuition and research revenues contract. Professors are corralled in composite units—holding areas for several disciplines and fields. They are increasingly pressured to cut costs and generate revenues by functioning as "project shops" like consulting firms—hustling for money by doing whatever the client will pay for. These short-term extra-academic projects often require interdisciplinary teams, and professors are discovering that their disciplinary knowledge and skill are either inadequate or thoroughly irrelevant. Faculty members are, like all other workers, adjusting to the gig economy and need some twenty-first-century-skills of their own.

Making and using MOOCs can help, by placing faculty in situations calling forth these new capabilities. To make a MOOC—or to use a MOOC in a blended classroom—requires imagination and a willingness to

experiment with new modes of behavior. MOOCs shaped by new research on learning (e.g. the six-minute rule) or using the new visual language of instruction, or forging close connections with real-world learning opportunities, are gradually establishing new standards and expectation for organizing and presenting instruction in face-to-face settings.

While most faculty members retain negative attitudes about online learning experiences and especially about MOOCs, those who have produced them are largely positive. According to *Inside Higher Ed's* survey of 2251 professors' attitudes about technology, conducted by Gallup, only one in five think online courses can achieve learning outcomes equivalent to those of in-person courses. But appreciation for the quality and effectiveness of online learning grows with instructors' experiences with it. Of those with MOOC experience, 50% agree or strongly agree that online courses in their own department or discipline produce equivalent learning outcomes to in-person courses, compared to just 13% of professors who have not taught online (Lederman and Jaschik 2013).

Making a MOOC is like producing a movie and this can be challenging and invigorating. Faculty "stars' have to relate to many other professionals: writers and editors, designers, videographers, journalists, and other media professionals, as well as faculty from other "silos." They also have to adjust to new teaching environments—media studios on campus or off.

Some universities are explicitly using MOOCs to generate twenty-first-century faculty skills. Johns Hopkins University, which has positioned itself as the leader in health and medicine, is using its MOOCs to bring faculty together from every college in the university. The University of Pittsburgh is using MOOCs and blended classrooms explicitly to move its faculty toward learning how to use technology to enhance learning. The University of Georgia System has produced a MOOC for faculty and other members of the university community to brainstorm together about the future of the university. The university's officers present content about current trends and uncertainties in higher education and university stakeholders think collaboratively about future possibilities. The goal of the MOOC is to call attention away from the urgent crisis of today and toward collective positive visions the community may realize by 2030 (Raths 2014). At the University of Pennsylvania, faculty members have been recruited to offer a blended course for high school students based on Penn Prof. Peter Struck's MOOC on Greek and Roman mythology. One goal of the program is to make faculty members aware of the creative possibilities of online education.

New opportunities in the lucrative online education and training industry open up once these tech skills are broadly distributed throughout the faculty. MOOCs and blended classrooms are the training grounds for revenue generating research and consulting projects for elementary and high schools, 2- and 4-year colleges, government agencies, and corporations—where online learning is trimming millions of dollars from training budgets. I expect universities to compete more aggressively in the online education and training industry; if they do not, firms like Udacity will "eat their lunch."

Contribution 3: The Higher Education 2.0 Revolution

From Jobs to "Gigs"

I now want to carry the discussion beyond the entrenched paradigm—to Higher Education 2.0. Today's higher education paradigm came into existence in both the United States and Great Britain only in the late 1870s—rather late in the industrial period—when the scale of production, distribution, and administration reached continental and global scale and organizations needed a large and steady flow of technical and commercial workers with a standard level of knowledge and skill to perform standard professional tasks. A new paradigm of university education as professional training emerged. Even scholarship was reconceived as a scientific profession requiring a Ph. D.

Once a sufficient number of college graduates were available, organizations could adopt the college diploma as a filter for professional employment. Universities produced more and more graduates, and more occupations were redefined as "professions" requiring a diploma. Aspiring young people *had* to go to college. In the developed world today, as a result, a large fragment of the youth cohort has diplomas.

The employment of professionals is, however, costly to organizations. Those identifying themselves as professionals demand high wages, professional discretion, job security, and benefits. Firms have to keep their full-time employees occupied even when they have no tasks demanding their highest value professional skills—even when outsiders can perform these tasks more efficiently at lower cost. Firms bear these costs because the alternative is continually to acquire capabilities in labor markets. The transaction costs of hiring on that basis out-strip the costs of steady employment.

The World Wide Web, however, has changed this equation. Firms can now find highly skilled workers through social networks, with or without diplomas—and hire them to join their firms' work teams on limited contracts for particular projects, and then get them out the door as soon as those projects are completed. Because of the greatly reduced transaction costs of bringing workers on board, firms no longer have to pay a premium of higher wages or steady work or benefits (Shirky 2008). And because of the increased costs of keeping workers occupied—paying high wages and benefits even when the workload is light—firms will avoid long-term employment contracts whenever they can.

Lou Gellos of Microsoft explains why his firm makes such extensive use of contract workers: they do only the part of the project where their capabilities are needed. "They're experts at it. Boom boom, they're finished." Maynard Wells, a former COO at e-bay who now runs the labor services firm Live Ops, stated the primary advantage of contract workers to firms: "You have access to the talent you need. And when the need is gone, the talent disappears" (Coy 2010). That is why "gigs" are replacing "jobs. "

A New Vision

Middle-class incomes are stagnant or falling. The concept of investing in college to gain steady professional employment with decent wages, job security, and benefits is no longer valid. The situation is thus ripe for a new vision of higher education in tune with contemporary realities. Here I want to outline such a vision.

Many free or inexpensive learning opportunities have always been available. These opportunities become devalued, however, when diplomas are used as job filters—a prime cause of inequality in modern societies. The rich have more opportunities for formal education and get richer; the poor get trapped in a catch-up game, and by the time their cohorts get their diplomas, at great cost, the payoffs are meager. This is what Thomas F. Green (1980) called "the law of last entry"—those groups that arrive later at any level of the system get fewer benefits, and those who arrive last get little or nothing because their diplomas differentiate them from nobody.

Today it is possible to acquire personally meaningful, knowledge and many high demand capabilities online for free. Online learners can also make themselves and their capabilities known online for free, and firms can find them. Employers hiring workers do not need to concern themselves with the standard knowledge represented by university diplomas

because they are not making long-term commitments. All they need are ready capabilities for the tasks immediately at hand.

MOOCs contribute to the knowledge and skill mix by providing courses with certificates or badges upon completion. These can all be bundled with other forms of documentation in searchable digital portfolios. The portfolios can also contain goal statements, papers, and reports produced during academic coursework or self-directed study or work projects; statements of specific capabilities claimed, multimedia presentations demonstrating possession of those capabilities, reference letters from teachers, and prior employers and coworkers—especially coworkers who have worked at targeted firms. These forms of documentation are already engendering new forms of low cost higher education. Here are three interesting examples:

First, the NGO Enfants du Mekong in Cambodia finds impoverished students with high academic potential and brings them to its Centre Docteur Christophe Mérieux in Tuol Kork, where they receive housing, educational, and financial support while they attend the local university. Starting in 2014 their studies are augmented with MOOCs. The center's director says that the MOOC format is "exactly what we need" (Murray 2014). Some students are using MOOCs to prepare for exams to obtain competency-based degrees. Others are relying on MOOC certificates for courses not available in their universities. Grant Knuckey, Chief Executive of ANZ Royal Bank in Cambodia, says his company may consider MOOC certificates in hiring decisions if they grow more common in the Kingdom. Like college diplomas at the end of the ninteenth century, MOOC certificates have to reach a critical mass before they can be institutionalized as qualifications. Knuckley notes that MOOCs are becoming "increasingly sophisticated and relevant and cannot be ignored," and adds that firms in the United States and Australia are beginning to take them seriously (Murray 2014).

Second, many nations in Africa and Latin America suffer from underdeveloped educational infrastructure at both secondary and post-secondary levels. Thus, as these nations are brought into the global economy through increased foreign investment, firms cannot find enough capable young people to meet their labor needs. In response, ALISON—the very first MOOC platform—is filling this need with basic short courses with "badges" for completion. ALISON focuses on high-need subjects—basic math, bookkeeping and accounting, marketing, foreign languages, and many others. But academic courses are also offered on the platform.

ALISON MOOCs are shorter than typical MOOCs from Coursera or edX, but ALISON offers them in sequences that culminate in a "diploma" involving more hours of study than a typical MOOC. In Africa, where there are not enough secondary school and university graduates, employers are already recognizing ALISON's MOOCs as qualifications. ALISON shows that young people can obtain a useful education without passing through a compulsory curriculum.

Finally, Udacity has developed MOOC-based "nanodiplomas" to break higher education up into short, low-cost stages. Upon leaving high school, young people may start with a one year "nanodiploma" course to obtain an entry-level qualification. In their early working years, they may then focus on suitable areas for further study based on experiences and goals, and take additional "nanodiploma" courses to qualify for more advanced positions. This pathway with its nanostepping stones by-passes the use of college diplomas as job filters. It also provides a sensible alternative to the time-consuming, frustrating and expensive search for self in college through repeated failures and changing majors. Coursera and edX have offered their own versions of nanodegrees. Coursera Specializations are sequences of MOOCs in high-demand fields. The website states: "You'll complete a series of rigorous courses, tackle hands-on projects based on real business challenges, and earn a Specialization Certificate to share with your professional network and potential employers."[3] EdX offers "XSeries" programs in similar fields. The pitch on the XSeries website: "Created by world-renowned experts and top universities, XSeries programs provide a deep understanding of exciting and in-demand fields. Earn a certificate of achievement to demonstrate your knowledge."[4]

Mainstream universities are tracking this development closely. A recent article in *Inside Higher Education* states that colleges are now using badges to help students display skills and accomplishments not captured by transcripts. The badges are public credentials designed to assist students to position themselves in the job market. A 2016 survey showed that 20% of college-level institutions have started issuing digital badges, which their students and graduates can place on badge platforms where potential employers can readily find them (Fain 2016). In 2015 Georgetown University made headlines as the first highly prestigious private university to jump on the badging bandwagon; Georgetown joined George Mason

[3] https://blog.coursera.org/about/
[4] https://www.edx.org/xseries

University, University of Maryland Baltimore County, The University of Baltimore and other regional institutions in a badging cohort (Anderson 2015). University-based badge programs appeal to both undergraduates positioning themselves for entry-level opportunities and seasoned professionals with advanced degrees seeking to demonstrate cutting-edge knowledge. The purpose of university badging efforts, says David Schejbal, dean of continuing education at the University of Wisconsin-Extension, is "to create a structure of alternative credentials that students could acquire relatively quickly and inexpensively that will also be immediately useful from an employment perspective" (Zalaznick 2015).

The university-based badging effort may be seen as a defensive maneuver, an attempt to catch up with non-university micro-credentials providers such as the MOOC platforms and Udacity. It is a reflection of the changing occupational structure—the gig economy. As firms shift from full-time "professional workers" to short-term, low obligation contract workers, they search for those who can perform specific tasks at high competence levels without further training. In the process, university degrees and transcripts become less important, searchable credentials of capabilities essential. This has created pressure to break apart or rearrange the elements of a college education. The established pattern includes a two-year program of general education in the liberal arts and sciences followed by a pre-professional or technical major.

Learners now have many opportunities to acquire and demonstrate technical and professional-level *skills*. Nonetheless, the defining features of professional leaders have not changed in the information era. Leaders still have to think conceptually, critically, and strategically, see the big picture, solve unstructured problems creatively, read widely across disciplines and professional fields, and communicate with peers from many professional and cultural backgrounds. No badge or agglomeration of badges is likely to rival a residential university degree program with a serious liberal arts component any time soon.

The expectation that a worker would possess a college degree is of recent origin. As recently as 1950, only one out of three in the United States possessed a high school diploma, the mark of an educated elite. By 2000, that number reached 80%, which, given differences in circumstances and abilities, may approach the upper limit. While just 5% of the adult population had earned a bachelor's degree in 1940, 25% had earned one by 2000 (US Census 2000), a number that kept increasing until 2011. The huge jump from 10% to 25% in the two decades from 1980 to 2000

can be accounted for by de-industrialization and the disappearance of jobs with middle-class wages, job security, and benefits for high school graduates. Young people from working-class families flocked to colleges not because of a sudden yearning for higher learning, but because they came to believe that if you wanted a decent job you had to go to college. Today's cohorts of 18–21-year olds, however, understand that college is no longer a ticket to a decent job, and are seeking alternatives.

These trends pressure for a new pattern for post-secondary education, with MOOC-like experiences before, during, and after university matriculation.

A significant fraction of high school graduates may seek badges (or similar credentials) connecting them rapidly and inexpensively to entry-level employment before college—or after dropping out due to academic, financial, or family difficulties. Once connected to the workforce, these learners can further their education through on-the-job training, self-directed learning, structured MOOC-like badge programs facilitating "badge stacking," or university degree programs.

Universities, having lost their near monopoly in post-secondary education, now compete with MOOC providers at the entry level, but retain their advantage in education for leadership roles. This suggests that we may see a new kind of technical and pre-professional emphasis earlier in the college curriculum, followed by a new kind of liberal arts and science education—geared for older students with greater maturity and workplace experience—later in the college curriculum sequence. Advanced training combining liberal and technical arts may then take shape in graduate programs leading to advanced degrees.

The period after college and graduate school is now characterized by employment turbulence due to mergers, outsourcing, digitization, and obsolescence. Even the best-educated professionals may need to retool from time to time with cutting-edge skills. Those with advanced degrees are likely to find cost-effective MOOC-like badge programs more appealing than additional campus-based advanced degrees.

Conclusion

MOOCs burst upon the higher education scene eight years ago, in response to rising college tuition and declining employment prospects for college graduates. MOOC founders promised to solve these problems by offering free or low-cost college-level courses from leading universities with certificates of completion. The initial MOOCs suffered from a number of technical

problems, which have to some extent been resolved. They also failed to attract much attention from college-age students, because contrary to the expectations of the founders, the certificates of completion have not been widely accepted for college transfer credit.

Nevertheless, MOOCs have helped to improve the "value-proposition" of college in several unexpected ways. They have: reduced total tuition costs for some by providing educational backup for advanced placement and competency-based examinations for college credit; improved instructional effectiveness through new video-enhanced instructional methods and flipped or blended courses; and added to the dollar value of college by introducing new twenty-first-century skills into the curriculum. MOOCs have also helped to support the revenues of colleges and universities through low cost, externally subsidized MOOC-based degree programs and corporate partnerships.

The biggest contribution of MOOCs, however, will be derived from MOOC-like training programs leading to public credentials—badges—in high-demand technical and professional fields. Such programs offer a low-cost alternative to college for young learners—especially from working-class families—seeking entry-level positions. These programs focus narrowly on the skills needed for high-demand fields and are often produced in association with firms seeking such workers. MOOCs also offer seasoned professionals with advanced degrees a way of retooling without taking on the burdens associated with additional advanced degrees.

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