# The MOOC model: challenging traditional education

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**ABSTRACT.** MOOCs represent the latest stage in the evolution of open educational resources. Here, the most important points will be shown: a turning point will occur in the higher education model when a MOOC-based program of study leads to a degree from an accredited institution - a trend that has already begun to develop; addressing the quality of the learning experience that MOOCs provide is therefore of paramount importance to their credibility and acceptance; MOOCs represent a postindustrial model of teaching and learning that has the potential to undermine and replace the business model of institutions that depend on recruiting and retaining students for location-bound, proprietary forms of campus-based learning.

***KEYWORDS:*** *Business model quality, Learning environment, MOOC based program, Open educational resources, Research-based methodology*

MOOCs represent the latest stage in the evolution of open educational resources. First was open access to course content, and then access to free online courses. Accredited institutions are now accepting MOOCs as well as free courses and experiential learning as partial credit toward a degree. The next disruptor will likely mark a tipping point: an entirely free online curriculum leading to a degree from an accredited institution. With this new business model, students might still have to pay to certify their credentials, but not for the process leading to their acquisition. If free access to a degree-granting curriculum were to occur, the business model of higher education would dramatically and irreversibly change. As Nathan Harden ominously noted, "recent history shows us that the internet is a great destroyer of any traditional business that relies on the sale of information" (Harden, 2013).

Colleges have a problem here: the way in which the core services of education are rendered is changing, but the underlying business model is not. This widening disconnect threatens not only the financial viability of traditional campuses following the "Law of More" (Denneen, Dretler, 2012) but, more fundamentally, their

rationale.
A number of converging trends pose a challenge to brick-and-mortar institutions:

- the emergence of the learning sciences and their application to educational practice;
- the movement toward competency-based education;
- new business models that effectively combine instructional quality, lower cost, and increased access through unlimited scalability (MOOCs).

A turning point will occur when a MOOC-based program of study leads to a degree from an accredited institution. Indeed, we are already partially there: students can now receive transfer credit toward a degree from an accredited institution for learning not obtained at a college or university.

## The end of nuclear institutions

There is compelling reason to think that unbundling institutional knowledge provision and credentialing is not only gaining momentum but is inevitable. Recent events confirm Peter Stokes's observation that the fusion of the core elements of land-based education (faculty, curriculum, credentials) is no longer inseparably tied to a single institution (Stokes, 2011). The emergence of MOOCs as an alternative to location-bound, proprietary forms of campus-based learning and portals like edX, Coursera, and Udacity that host them undermine the individually crafted course model that sustains the "college credit monopoly" (Carey, 2012). The acceptance of credit for MOOCs by accredited institutions, such as Colorado State University's Global Campus (Mangan, 2012a), Antioch University (De Santis, 2012), San Jose State University (Young, 2013), Georgia State University (New, 2013) and the recently announced MOOC2Degree collaboration between dozens of public universities and Academic Partnerships (Lewin, 2013), the impetus from Gates Foundation grants to develop MOOCs for "high enrollment, low-success" introductory courses (Mangan, 2012b) and the partnership between the Saylor Foundation and Excelsior College and StraigherLine (Fain, 2012) are all opening up

a path to credit for free and low-cost courses. A parallel movement away from seat-time to competency-based learning at Western Governors University, Southern New Hampshire University, and the University of Wisconsin System further erodes the value proposition underlying the traditional model of land-based education.

MOOCs, as currently designed, address two of the three challenges facing postsecondary education: access and cost. MOOC-based degree programs would not only democratize education, but their scalability would help end the unsustainable trajectory of tuition. They are an effective remedy to the "cost disease" plaguing higher education (Thille, Smith, 2009) and a viable solution to the problem of providing global access to educational credentials.

## MOOCs: quality matters

Notwithstanding the importance of their role in reducing cost and expanding access, the remaining unresolved issue facing the acceptance of MOOCs is *access to what?* The major obstacle to their acceptance relates to the third challenge: their quality. As some rightly point out, current course models can aptly be described as "self-service learning and crowdsourced teaching" (Young, 2012) Although self-directed learning and peer mentoring have instructional benefits when part of a well-designed curriculum, most MOOCs (especially in STEM areas) are designed in a way that skews toward autodidacts and more advanced learners. Novice learners needing instructional guidance are largely on their own and no better off perhaps than those in a large gateway course delivered in a lecture hall on campus. Although improving the quality of student learning is one of the priorities of the major MOOC providers, most of their courses currently lack a sophisticated learning architecture that effectively adapts to the individual needs of each learner.

Addressing the quality of the learning experience that MOOCs provide is therefore of paramount importance to their credibility and acceptance. According to the most recent Babson Research Group survey, institutional decision makers have yet to be convinced of the value of MOOCs. Although not specifically attributing their skepticism to the perceived quality of MOOCs, the report finds

that only 28 percent of chief academic officers believe that they are a sustainable method for offering courses (Allen, Seaman, 2013). What potential, then, do MOOCs have not only to improve learning but to provide the best possible educational experience? Contrary to what some may think, designing the best learning environments does not entail their being taught by the best professors or affiliated with elite universities. Instead of simply using scholarly reputation and institutional prestige as quality standards, we should judge MOOCs by how well they enable the conditions that optimize learning for each student.

Although critics may scoff at the simplistic design of most current MOOCs, it would be shortsighted to dismiss them as hopelessly inferior to classroom-based instruction. If there is one lesson from the history of disruptive innovation, it is that we often wrongly assume that a product or practice that dominates a current market defines enduring standards of optimal quality. It would be a mistake, then, to think that the near-term shortcomings of MOOCs inhibit their potential to improve in quality. MOOCs and other forms of open curricula will transform how people learn only to the extent that they enable effective learning. What, then, might a learning-optimized MOOC look like?

## MOOCs as precision-built courseware

We do not need to look far to find a model. Given the pioneering research of Benjamin Bloom and his colleagues, we do not need to speculate about the conditions that produce effective learning. Of three learning conditions - tutoring, mastery learning, and conventional classroom instruction - the least effective was classroom-based group instruction (Bloom, 1984). The most effective was a combination of one-to-one tutoring and mastery learning: Bloom estimated that about 90 percent of students receiving tutoring and corrective feedback can perform at two standard deviations above the average student taught by conventional group instruction (Bloom, 1968). Subsequent research by Van Lehn found that, although the effect size Bloom claimed for human tutoring might be too high, it supports the general conclusion that intelligent tutoring systems, unlike conventional classrooms, have the potential to approximate Bloom's Two

Sigma effect by customizing feedback and targeted guidance to the individual learning needs of each student (Van Lehn, 2011). When embedded into digital content to provide context-specific coaching and guidance, cognitive tutors and feedback loops can incrementally guide each learner along a personal path toward progressively greater understanding and mastery (Lovett et al., 2008; Van Lehn et al., 2005).

As digital environments that personalize learning, MOOCs have the potential to serve as "educational positioning systems" that precisely navigate students through their curriculum along individual "pathways and routes to maximize student success" (Baer, Campbell, 2012). Initial results indicate that courseware explicitly designed in accordance with effective practices drawn from the learning sciences and enhanced with learning analytics to function as educational positioning systems can have a positive impact on student performance (Evans et al., 2008; Lovett et al., 2009; Schunn, Patchan, 2009) MOOCs can be designed, therefore, as precursors of *course exemplars* - early prototypes of optimized learning environments that continuously improve educational practice through application of the learning sciences. In contrast to go-it-alone legacy practices that combine batch-processed instruction with folk pedagogical approaches to teaching, the design of MOOCs as course exemplars would systematically apply research-based principles and practices to create the conditions that best enable each student to learn (Mazoue, 2012). Innovative MOOC design could therefore act as a catalyst for transitioning from our current handcrafted model of teaching to precision-based exemplars.

Fortunately, already completed foundational work can be adapted to build a large-scale research infrastructure for supporting the development of MOOCs as precision-built courseware. At the epicenter of applied research in the learning sciences, Carnegie Mellon University's Open Learning Initiative (http://oli.cmu.edu/) and the affiliated Pittsburgh Science of Learning Center (http://www.learnlab.org/) have led the efforts to transform education into a science. Courseware development projects funded through the Community College Open Learning Initiative (http://oli.cmu.edu/get-to-know-oli/get-involved/see-our-current-projects/community-college-oli/), Next Generation Learning Challenge Grants (http://nextgenlearning.org/), and APLU/OLI Multi-institutional Cognitive

Coursewares Design (http://www.aplu.org/page.aspx?pid=2090) initiative use the OLI's research-based methodology and data-driven design model to improve learning systematically through a cyclic process of iterative feedback. Although designing courseware that functions as learning exemplars is not the primary goal of the OLI, MOOCs could be designed using its data-driven model to develop courseware that massively individualizes learning. OLI-designed MOOCs, therefore, offer an opportunity to replace intuitive approaches to teaching with practices that enable more effective and efficient forms of learning.

## A new business model

The emergence of a new educational model based on MOOCs fits the evolutionary pattern of Christensen's theory of disruptive innovation. Christensen and Wessel identified a business model's "extendable core" as the basis of its performance advantage (Wessel, Christensen, 2012). If MOOCs turn out to be more than just a fad, it will be because their extendable core confers a competitive advantage that enables them to attract new customers and extend their customer base (Wessel, Christensen, 2012). The extendable core of precision-built MOOCs would consist of their ability to scale *learning-optimized courseware*. Their principal advantage would not simply consist, then, in their being more convenient or cheaper or "good enough", but in their being more effective in producing better learning.
Five characteristics in particular define the extendable core of precision education:

- Its *research-based methodology* produces learning-optimized course architectures.
- It is maximally effective because it *individualizes learning*.
- It is efficient because it is *competency based*.
- It is *scalable*.
- It is *cost-effective*.

If precision education were adopted as the design standard for MOOCs, it would improve the quality of learning for students across all socioeconomic levels and demographic areas. It would

affect not only students seeking convenient and affordable options but also students enrolling in the "full-service" sector of the educational market dominated by traditional land-based institutions. In closing the quality differential between MOOC-based curricula and locally crafted instruction, precision-built courseware would gradually eliminate the distinction between "high-end" and "low-end" education. There would only be one kind of learning - optimized for each individual. Effectively designed and organized into a coherent curriculum, MOOCs would have the potential to usher in an entirely new business model of higher education.

## The illusion of safety from disruption

In their defense, legacy institutions might counter that Harden's point about the destabilizing effect of the Internet is largely irrelevant because they offer students more than just information. As Christensen pointed out, brick-and-mortar institutions have advantages that are not easily duplicated online: they provide an on-campus experience that offers students (who can afford it) myriad socialization and networking opportunities (Wessel, Christensen, 2012) According to conventional thinking, college campuses, unlike online networks, serve as career and relationship incubators. But are even these advantages safe from disruption?

MOOCs are beginning to compete with one of the key elements of the extendable core of location-based education: they are challenging the proposition that in-person, on-campus networking confers a decided advantage for those seeking to parlay their degrees into jobs. Recently the major for-profit MOOC providers, Coursera and Udacity, disclosed that mining and brokering talent for business clients are primary drivers behind their business model (Young, 2012) Coursera's Career Services (http://blog.coursera.org/post/37200369286/coursera-and-your-career), for example, proposes to use MOOCs to identify and channel talent to high-tech businesses. By taking advantage of MOOC-enabled recruitment opportunities, talented individuals need not wait to earn a degree before successfully marketing their credentials. If MOOCs can be used to create a system that rewards demonstrable competency, then they will further undermine the value of campus-based

networking. When used to connect talent directly to prospective employers, MOOCs can circumvent one of the few remaining rationales for seeking a traditional college experience.
Note that, in the "recruitment services" model, MOOCs do not create talent - they identify it and broker its acquisition. Rather than create intellectual capital, they serve primarily as a means of certifying its possession. Even if MOOCs were used solely as a recruitment tool, however, the rationale for preferring a precision-built model of learning that develops the competencies being measured would still hold. In fact, the for-profit model of MOOCs depends on and presupposes the existence of an optimally designed process that develops the competencies they evaluate. Precision education therefore underlies the rationale for MOOCs as both academic exemplars and as a litmus test for identifying those who possess relevant job-related competencies. Whether the motivation for adopting a MOOC is for-profit or nonprofit, the success of either model depends on a design strategy that optimizes learning.

## A postindustrial model of teaching and learning

Precision-built MOOCs challenge the assumption that students need to come to a campus to interact with resident faculty in order to acquire the knowledge and skills necessary for credentialing. They therefore have the potential to undermine the dominant role that campus-based educational institutions have had as exclusive providers of knowledge and credentials. As competition with MOOCs increases, they will face the following dilemma: should they compete with MOOC-based curricula head-to-head, or should they begin to assimilate MOOCs into their traditional, residency-based curriculum? On one hand, for those institutions without the cachet of being highly selective, participation in the for-profit MOOC model is problematic: acting as a talent broker for employers would likely siphon away talented, potential degree-seeking students. It would be great for employers and for students who are qualified to transition into good jobs, but not so great for institutions that depend on cultivating and retaining residential talent. On the other hand, elite private and flagship public universities with established brands might choose to offer MOOCs on the basis that they would not pose a threat to their residential operations.

But precision-built MOOCs will eventually compromise even their residential academic model as well. Students who would still prefer, for nonacademic reasons, to pay a tuition premium for a campus experience would likely be at a competitive disadvantage if their curriculum were locally crafted instead of learning optimized. On the strength of their extendable core, therefore, MOOCs represent a postindustrial model of teaching and learning that has the potential to undermine and replace the business model of all institutions that depend on recruiting and retaining students for on-campus studies.

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## Sintesi

*Il recentissimo contributo fa il punto sul modello dei MOOC (Massive Open Online Courses) – corsi di alta formazione di massa in linea, aperti praticamente a tutti – "lo stadio più recente nello sviluppo evolutivo delle risorse educative aperte", in stabile e rapida espansione: esso rappresenta un nuovo modello economico e, insieme, un nuovo modello postindustriale di insegnamento/apprendimento, capace di sfidare efficacemente il paradigma educativo tradizionale.*

*Se in passato l'accesso era aperto soltanto al contenuto dei corsi online, oggi il tipo MOOC garantisce l'accesso ai corsi online gratuiti nella loro interezza e prefigura già la svolta dell'immediato futuro: l'accesso ad un curriculum online completo, totalmente gratuito, che consentirà di conseguire la laurea da istituzioni accreditate.*

*Grazie a questa innovazione, infatti, gli studenti dovranno ancora pagare per ottenere la certificazione del titolo, ma non più per il processo che li condurrà ad ottenerlo.*

*Il modello MOOC si viene affermando come valida alternativa alle forme di apprendimento basate sul campus universitario classico – proprietarie e vincolate ad una localizzazione fisica precisa – nel contesto globale della crisi che ha colpito drammaticamente l'Higher Education e i suoi consolidati schemi economici, non soltanto nella loro sostenibilità finanziaria, ma pure nella loro logica organizzativo-strutturale. Si profila così, accanto all'ideale tradizionale di corso universitario, prodotto di una elaborazione individuale quasi artigianale, una soluzione promettente, che appare in grado di limitare il controllo monopolistico dell'accreditamento da parte degli atenei. L'apertura a percorsi che assicurano l'accreditamento di corsi gratuiti e a basso costo – un fenomeno in ascesa presso numerose università di eccellenza – si ricollega ad una serie di tendenze convergenti:*

- *lo sviluppo delle scienze dell'apprendimento e la loro crescente applicazione nella pratica educativa;*
- *il predominio degli approcci educativi fondati sulle competenze;*
- *infine, i nuovi modelli di business – fra cui si annovera appunto il MOOC – che combinano con successo la qualità, il basso costo e l'ampliamento significativo dell'accesso grazie ad una scalabilità illimitata.*

*Allo stato attuale, il MOOC riesce ad affrontare positivamente due delle tre questioni cruciali dell'Higher Education contemporanea: l'accesso e il costo.*

*Il terzo problema, ancora irrisolto, è quello della qualità dell'apprendimento, evidentemente determinante per la credibilità del nuovo modello, per la solidità del suo radicamento e per il consenso che può via via guadagnarsi nella sua diffusione.*

*Purtuttavia, in proposito si stanno facendo molti passi avanti – che l'articolo passa puntualmente in rassegna – sia sul piano teorico-metodologico che nella sperimentazione pratica, sì da far presagire, fra breve, il definitivo riconoscimento del MOOC come opzione realmente praticabile a fianco del modello accademico residenziale.*