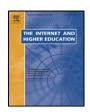Contents lists available at ScienceDirect

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Virtually unlimited classrooms: Pedagogical practices in massive open online courses

Brit Toven-Lindsey *, Robert A. Rhoads, Jennifer Berdan Lozano

Department of Education, University of California, Los Angeles, United States

ABSTRACT

Massive open online courses (MOOCs) have become a prominent feature of the higher education discourse in recent years. Yet, little is known about the effectiveness of these online courses in engaging participants in the learning process. This study explores the range of pedagogical tools used in 24 MOOCs, including the epistemological and social dimensions of instruction, to consider the extent to which these courses provide students with high-quality, collaborative learning experiences. Findings suggest that the range of pedagogical practices currently used in MOOCs tends toward an objectivist-individual approach, with some efforts to incorporate more constructivist and group-oriented approaches. By examining MOOCs through the lens of engaged teaching and learning, this study raises concerns about the degree to which MOOCs are actually revolutionizing higher education by using technology to improve quality, and challenges educators to strive for more creative and empowering forms of open online learning.

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1. Introduction

Online education is the fastest growing segment of higher education (Deming, Goldin, & Katz, 2012). More than 6.1 million students participated in a fully online course during fall 2010, a 10 percent increase over the previous year (Allen & Seaman, 2011). Online instruction, including web-facilitated, blended, hybrid, and fully online courses, has become a fixture of the higher education landscape during the past twenty years, with private, public, and for-profit institutions offering individual courses and degree programs that attempt to replicate and build upon the traditional classroom experience. In 2012, one particular form of online learning – the massive open online course (MOOC) – took center stage in the discourse and sparked debate about the potential of open online education to solve the challenges of access and affordability in higher education. In fact, *The New York Times* went so far as to declare 2012 as "The Year of the MOOC," (Pappano, 2012).

A MOOC is a model for education delivery typically defined as, "*massive*, with theoretically no limit to enrollment; *open*, allowing anyone to participate, usually at no cost; *online*, with learning activities typically taking place over the web; and a *course*, structured around a set of learning goals in a defined area of study" (Educause, 2013, p. 1). Instructors at hundreds of colleges and universities around the world are now offering MOOCs in a broad range of disciplines, from Dinosaur Paleobiology at the University of Alberta to Shakespeare at Wellesley College to Corporate Finance at the University of Pennsylvania. At the same time, a handful of key players, including Coursera, edX, and Udacity, have been instrumental in the development of the movement. According to Daphne Koller, co-founder of Coursera, MOOCs will transform, not disrupt, higher education and leverage technology to improve quality (Korn, 2013). She states, "We don't believe that computers should replace teachers. We think computers can enhance the work of teachers" (Korn, 2013, para. 17).

As a relatively new phenomenon in higher education, research related to MOOCs is limited. These open courses have the potential to challenge traditional notions of classroom, and even online, instruction, yet few empirical studies have examined student learning in MOOCs and little is known about the ways that these courses may challenge the growing stratification of educational opportunities globally. The original MOOCs set out to create an open, collaborative online learning community centered around "the active engagement of several hundred to several thousand 'students' who self-organize their participation according to learning goals, prior knowledge and skills, and common interests," (McAuley, Stewart, Siemens, & Cormier, 2010, p. 4). These learner-centered pedagogical practices and constructivist approaches encouraged student engagement in the learning process. Yet, in many ways the goals of the MOOC movement have shifted to encompass the massification of existing courses and the potential for revenue generation, with elite American universities and private companies leading the charge. The purpose of this study is to consider the extent to which MOOCs provide students with high-quality, collaborative learning experiences. Through case study analysis, we examine the range of pedagogical practices utilized in 24 MOOCs offered by a diverse group of providers and consider how these practices contribute to student engagement in the learning process.

* Corresponding author at: Graduate School of Education and Information Studies, University of California, Los Angeles, 3321 Moore Hall, Box 951521, Los Angeles, CA 90095-1521, United States. Tel.: +1 310 825 5560.
  E-mail address: btovenlindsey@ucla.edu (B. Toven-Lindsey).

Three main research questions guide the study, including: (1) What instructional tools and pedagogical practices are being utilized in MOOCs? (2) How are new digital and networked technologies impacting the delivery of MOOCs? (3) To what extent are MOOCs able to provide a space for critical inquiry and active student engagement in the learning process? In the following section, we will provide a brief introduction to the relevant literature on MOOCs and student engagement in online learning environments. We will then discuss the study methodology, including constructivist learning theories and study methods, followed by a presentation of study findings and a discussion of the range and role of pedagogical practices in MOOCs.

2. Literature review

Massive open online courses (MOOCs) have grown out of the Open Educational Resources (OER) movement that flourished in the 1990s, when new online technologies paved the way for interactive and collaborative computer-based learning (Bonk, 2009). OER is defined as educational resources offered online for free to educators, students, and self-learners to enhance teaching and learning (McMartin, 2008; Organization for Economic Cooperation and Development [OECD], 2007). The OER movement "aims to break down…barriers and to encourage and enable sharing content freely" (OECD, 2007, p. 30). Advocates argue that open online education enhances higher education by increasing access to educational materials previously reserved for a limited number of enrolled students and by improving instruction through shared materials and the feedback among educators and learners (Bissell, 2009; Huijser, Bedford, & Bull, 2008). Successful implementation requires a combination of technology, support from faculty and institutional leaders, open licensing, and a diverse community of educators and learners ready to engage in the process (Bissell, 2009; McMartin, 2008). As digital technologies progressed to facilitate more advanced online interaction and collaboration, the principles of OER have been utilized to develop a new kind of open online course.

2.1. Massive open online courses

The term "massive open online course," or MOOC, was first used to describe a course on learning theory taught by George Siemens and Stephen Downes at the University of Manitoba in 2008. According to Downes, the idea was to "invite the rest of the world to join the 25 students who were taking the course for credit" (Parry, 2010, para. 2). The course attracted 2300 students, and has since become "a landmark in the small but growing push toward 'open teaching'" (Parry, 2010, para. 4). The innovative 12-week open online course, Connectivism and Connective Knowledge, was designed as a collaborative learning experience. According to the 2011 course website, the course was based on four types of activities, namely: (1) to "aggregate" materials, or select course readings and resources of interest to the individual; (2) to "remix" those materials, or catalog the chosen content on a blog, discussion board, or other interactive format; (3) to "repurpose" tools to create one's own content and contribution to the discourse; and (4) to "feed forward" one's own thoughts and interpretations in a public forum (http://cck11.mooc.ca/). Students were not required to share their materials publicly but it was encouraged as an integral part of connectivist learning.

Siemens (2005a) and Downes (2007) have advanced a connectivist theory of learning that integrates principles of chaos, network, complexity, and self-organization theories. According to Siemens (2005a), rapid advances in information and communication technology have changed the landscape of learning and knowledge production, and "including technology and connection making as learning activities begins to move learning theories into a digital age" (p. 3). Within the theory, learning networks encompass data, information, knowledge and meaning, and the optimal environment for meaning generation is an open, adaptive, and reflective network that recognizes patterns and incorporates both cognition and emotional response. Siemens (2005b) argues

that more emphasis should be placed on advancing the learner's skills in navigating and analyzing information. For Siemens, Downes, and other advocates of open learning, the MOOC grew out of a desire to utilize technology to create a platform for greater access, collaboration and engagement in the learning process.

According to Cormier and Gillis (2010), a MOOC is an online course that engages students in the learning process, offers a way for students to connect and collaborate, and provides a platform where course materials are shared and negotiated among participants. MOOCs also emphasize participant autonomy, creating a broad form of legitimate peripheral participation where individuals negotiate their own level of engagement (McAuley et al., 2010). The pedagogical model driving the initial development of MOOCs focused on incorporating high levels of learner control, offering synchronous, or real-time, sessions with the facilitator and other speakers, providing a digital artifact that summarized course activities (i.e. participant blogs, posts, online discussion, external resources), developing dynamic social systems as a means of participant organization and collaboration, and emphasizing the criticality of creation in the learning process (McAuley et al., 2010). Further, the early MOOCs were designed to be tuition-free, openly accessible courses that did not generally incorporate formal assessment or grading (Levy, 2011).

MOOCs hit the mainstream in 2012 when private companies including Coursera and Udacity were established, and set out to partner with top U.S. universities to develop these open courses for mass consumption, and potential revenue generation. As mentioned previously, MOOCs took center stage in the higher education discourse during this period with enthusiasts pointing to the power of technology to lower costs, increase access, and generate support from industry and the public at large. Advocates argue that MOOCs are helping to revolutionize higher education because "nothing has more potential to lift more people out of poverty" by providing access to an affordable education for employment (Friedman, 2013, para. 1). Further, they note that these courses offer an alternative to location-based education and "undermine the individually crafted course model that sustains the 'college credit monopoly'" (Mazoué, 2013, para. 5). Yet not everyone is convinced that MOOCs will "disrupt" higher education in such positive and productive ways. Many faculty members and higher education analysts remain skeptical that MOOCs offer a viable alternative to traditional face-to-face or online education models with regard to instruction, student learning, and access (Allen & Seaman, 2013; Lewin, 2013; Meisenhelder, 2013; Rhoads, Berdan, & Toven-Lindsey, 2013).

Empirical research on teaching strategies and learning outcomes associated with MOOCs is limited. As courses designed to accommodate unlimited enrollments, MOOCs offer minimal support mechanisms and require that participants be self-directed and have a level of critical literacy adequate to navigate the course and engage in the learning community (Kop, 2011). While more experienced and independent students may thrive in this environment, many participants struggle with the lack of structure and instructional support inherent in these courses (Kop, Fournier, & Mak, 2011). In addition, the commercialization of educational materials is changing the way institutions of higher education interact with the private-sector marketplace and share knowledge with students and society at large (Rhoades & Slaughter, 2004). Considering the limitations of research related to MOOCs, studies of student engagement and pedagogy in traditional online learning environments offer a useful point of reference for this study.

2.2. Engagement and pedagogy in online learning communities

Online learning has become an increasingly important part of U.S. higher education throughout the past several decades, with more than 30% of all college students participating in at least one online course (Allen & Seaman, 2011). By utilizing the latest computer-mediated technology, online courses offer students a wide range of engaging and interactive learning environments that have been shown to foster satisfaction, motivation, and persistence among participants (Arbaugh