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Blending Massive Open Online Courses (MOOCs) in higher education

Belinda (Wan Qi) Jin
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ABSTRACT

Massive Open Online Courses (MOOCs) have become more and more popular in the global online learning industry. In recent years, many educators have been rapidly implementing MOOCs in order to enhance students' learning experiences on campus. In this paper, I will explore the current use of MOOC techniques in the blended format and discuss how blending MOOC approaches bring opportunities/benefits for both students and teachers.
Keywords: MOOCs, Blended Learning, bMOOCs, User experiences

1. INTRODUCTION

The development of information technologies in the 21st century has significantly improved the speed and quality with which innovations have been diffused, greatly ameliorating the way students communicate and gather learning information. As Kitsantas (2013) states in his research, technology usage among students and teachers has been growing. Statistics provided by the *National Centre for Education Statistics* (2010) support Kitsantas's finding, as they report that the ratio of students using instructional computers in the classroom every day has increased from 6 to 1 in 2000 to 3 to 1 in 2008 in the US. By 2009, 97% of teachers had one or more computers located in the classroom. Besides using computers during instructional time, the report also notes that teachers often used different technological devices, like LCD (liquid crystal display), interactive whiteboards, and digital cameras (National Center for Education Statistics, 2010). As many educators brought technological devices into their face-to-face (F2F) lectures, the use and blend of technologies to represent knowledge have created new educational practices, and significantly changed the nature F2F setting of the class (Morris, 2014). This paper will focus on a particular digital learning tool, MOOCs (Massive Open Online Courses). By reviewing current studies, a new option for using MOOCs will be proposed - bMOOCs (blending MOOC courses into F2F classrooms). In addition, the benefits and opportunities that MOOCs might bring to blended course will be illustrated by reviewing existing MOOC implementations in post-secondary education.

2. LEARNING CONCERN

Although some empirical evidence has shown that technology-based learning environment can support learners' learning experiences (Ahmed Mohamed, Chatti, Schroeder, & Wosnitza, 2015), there are still some visible problems for both students and educators in this digital learning and teaching environment. Regarding students, Howard Rheingold (2010) point out that technologies diverge students' attention from lecture, distracting students' attention and decreasing the effectiveness of the lecture. Regarding educators, the challenge is to discern how to use the technology to teach students real-life problem solving and to shift "from one of information transfer to a role supporting students to curate, filter and critique information" (Morris, 2014, p.401). Based on those issues, Garrison and Kanuka (2004) have suggested that academic institutions should recognize the need to revolutionize higher education "… with many introducing 'e-learning', 'blended learning' and more recently 'digital' strategies to support the changes in curriculum design, academic practice, infrastructure, and training" (as cited in Morris, 2014, p.401).

Massive Open Online Courses (MOOCs) is a new form of technology present a new opportunity for enhancing learning (Ahmed Mohamed et al., 2015, Bruff, Fisher, McEwen, & Smith, 2013). MOOCs have attracted public attention since 2008, where the goal has been to provide high-quality education. Massive, open, online courses have become popular in the education setting and beyond and beyond. Traditional education (including both F2F and online formats) is mainly teaching centered and advocates "the teachers as the main body, …teaching as the main teaching method, this method limits the students' own initiative" (Liqin, Ning, & Chunhui, 2015, p.997). However, MOOCs have brought freedom for students to choose their learning contents, and offered open space for global learners, peers and professors to communicate, facilitate and share

knowledge during their learning. Additionally, all the courses on MOOC platforms are stand-alone applications and are made by professors from prestigious academic institutions. The way MOOCs emerge in F2F class has the potential to solve the issues of the traditional classroom's lack of excellent teachers and provide high-quality courses for interpreting learners' perceptions (Liqin et al., 2015).

In this way, some researchers, teachers, and universities began to utilize MOOCs in their traditional classroom settings to support face-to-face (F2F) learning experiences in a blended format. The central purpose of this review to investigate the recent user experiences of bMOOCs (blending MOOCs into F2F learning environments). The exposition will be presented in three sections. The first briefly overviews the history of MOOCs and address the opportunities and issues the present. The second reviews existing MOOC implementations in post-secondary education and considers how the current literature has addressed on bMOOCs. The final section includes a summary and recommendation for professors.

3. REVIEW OF MOOCS LITERATURE

3.1 What are MOOCs

MOOCs (Massive Open Online Courses) are free completely online courses that deliver unlimited opportunities for people from all over the world to participate and learn in digital online environment (Israel, 2015; Knox, 2014; Morrison, Patrarca, Hughes, & Laffier, 2015; Porter, 2015). They do not only offer "a middle ground for [both] teaching and learning between the highly organized and structured classroom" (Morrison et al., 2015, p.993), but also provide a common online discussion space for learners, professors, and teacher assistants (TAs) to interact with each other. MOOCs can be categorized into two particular formats including the cMOOC and xMOOC, and each of them has its unique underlying learning theory (Siemens 2013).

3.2 History of MOOCs (cMOOCs & xMOOCs)

The first MOOC course was introduced in 2008. George Siemens (University of Texas Arlington) and Stephen Downes (National Research Council) designed and offered a twelve weeks online course, entitled *Connectivism and Connective Knowledge (CCK08),* at University of Manitoba (Liqin, Ning, &Chunhui, 2015; Siemens 2013), which has attracted more than 2300 students taking it for free credits. Initially, the pedagogical philosophy of this course was based on connectivist principles showing how future learning will be supported by emerging technologies (Knox, 2014). The course also brought a unique learning experience to leaners to facilitate and collaborate in learning with peers through an online interactive environment (Fournier & Kop, 2015). Downes called his course "cMOOC", and the content in cMOOC "serves merely as a catalyst, a mechanism for getting our projects, discussions and interactions off the ground. It may be useful to some people, but it isn't the end product, and goodness knows we don't want people memorizing it" (Downes, 2011, p.607). In short, a cMOOC is a starting point for its further development.

Three years later, Sebastian Thurn and Pater Norvig launched as *Introduction to Artificial Intelligence course*, which was distinct from "cMOOC" in that it was more like a post-secondary

course and it attracted more that 160,000 learners from 190 countries (Morrison et al., 2015; Porter, 2015). This sort of course is known as "xMOOC" (Morrison et al., 2015; Porter, 2015). Downes (2011) claimed that xMOOC is differed from cMOOC because it utilizes a behaviourist pedagogical approach, primarily relying on knowledge transmission, assignments completion, and peer assessments. Many xMOOCs providers emerged within a few years (including Udacity, Coursera, and edX) and many educational institutions and individual to joining them (Zhang, 2013). By the end of 2012, the New York Times officially declared 2012 was "*The Year of the MOOC*" (Doherty, Harbutt, &Sharma, 2015; Fournier & Kop, 2015).

3.3 Opportunities and Issues of MOOC

Today, many millions of people have signed up for xMOOC courses and the scale of MOOCs has seen massive growth globally since 2011 (Park, Jung, & Reeves, 2015; Porter, 2015). Shah (2015), in *Class Central,* reports that, by January 2014, there were over 8.5 million students from all over the world registered with the "big three" MOOC platforms: Coursera, Edx, and Udacity. By 2015, the total number of students in the world "who signed up for at least one course has crossed 35 million-up from an estimated 16-18 million from the previous year" (Shah, 2015, para.1). Ahmed Mohamed et al. (2015) and Kevan et al. (2016) attribute this growing trend to the openness of the format. Many courses on MOOC platforms are free and appeal to students with various learning purposes. Some of them focus on learning contents, provide multimedia learning materials, and formal schedules; in contrast, others are more about student-centered learning and require intense discussion between participants (Kevan, Menchaca, & Hoffman, 2016). This shows that the mixed pedagogical design of MOOC courses not only provide opportunities for massive number of students to obtain free education, it also offers them a wide range of choice in different areas and disciplines to satisfy the 'needs' for the society (Ahmed Mohamed et al., 2015).

As large numbers of students enroll MOOC courses, many challenges in both teaching and learning have arisen (Ahmed Mohamed et al., 2015; Fournier & Kop, 2015; Firmin et al., 2014; Marrone, Mantai, & Luzia, 2013; Ozturk, 2015; Park et al., 2015; Zhang, 2013). Most notable among these problems are low student completion rates and lack of effective social interaction between participants (Ahmed Mohamed et al., 2015; Griffiths et al., 2014; Israel, 2015; Kevan et al., 2016; Liqin et al., 2015). Some concerns are summarized here: The current completion rate of xMOOC is 10% or less, and most people did not even get through the first lecture (Gose, 2012; Israel, 2015; Kevan et al., 2016; Porter, 2015;). Besides that, because of the massiveness and openness, online discussion forums have been overloaded by the large amount of information from student comments (Gose, 2012). On top of this, students usually feel very isolated because they cannot get help with their questions from both their professors and peers (Gose, 2012). As a result, such problem can be the reason that is directly linked to large dropout rates.

4. BLENDED LEARNING AND MOOCS REVIEW

Many educators and researchers have discussed possible solutions to the issues associated with MOOCs in the literature, such as redesign MOOCs (Knox, 2014; Marrone et al., 2013; Morrison et al.,2015) and blended xMOOCs in traditional F2F lectures (Bruff et al., 2013; Holotescu,

Grosseck, Cretu, & Naaji, 2014; Israel, 2015; Jing 2015; Li, Zhang, Bonk, &Guo, 2015; Najafi et al., 2014; Zhang, 2013). The redesigned MOOCs are intended to applying the best practices of instructional design, principles of e-learning, and learning theories can help improve MOOCs features to "make the learning process meaningful, engaging and motivating" (Morrison et al., 2015, p.997). As many technologies transformed education in both traditional and online setting, much research has also suggested that the blended learning approach should be adopted to MOOCs into higher education (Bruff et al., 2013; Israel, 2015).

4.1 What is blended learning?

The theme of "blended learning" has appeared in the literature. Graham (2006) describes the

> Blended learning approach as the convergence of [F2F] settings, which are characterized by synchronous and human interaction, with Information and Communication Technology (ICT) based settings, which are asynchronous, text based, and involve humans operating independently (as cited in Poon, 2013, para.13).

This kind of combination of deliver methods Poon (2013) has been shown to reduce learners' withdrawal rate from online MOOCs learning while increasing students interaction from F2F. Educators can integrate MOOCs as a part of their high - quality learning content and activities with F2F instruction to enhance optimal teaching processes. They can also improve the relationship with their students in order to develop their learning perceptions through both F2F and online learning environment (Eckerdal et al., 2014; Holotescu et al.,2014; Israel, 2015; Jing, 2015; Liqin et al., 2015; Peterson, 2014; Poon, 2013).

According to Garrison and Vaughan (2008), this combination of knowledge delivery methods has a "significant presence" within both F2F and online learning, and are "associated with higher levels of students perceived learning" (p.27). Students have opportunities to learn in both F2F and online communities and continuous inquiry "in the sense of being connected" (as cited in Garrison & Vaughan, 2008, p.10), which can lead them to be fully engaged with each other through the community. To continue the engagement and interaction in shared community in the pedagogical framework of blended learning, the Community of Inquiry (CoI) framework can illustrate knowledge construction throughout social, technological, and pedagogical processes (Holotescu et al., 2014; Morris, 2014; Poon, 2013). The three primary components of CoI are teaching presence, social presence, and cognitive presence (Garrison & Vaughan, 2008).

Elements	*Categories*	*Indicators (examples only)*
Social presence	Open communication	Enabling risk-free expression
	Group cohesion	Encouraging collaboration
	Affective/personal	Expressing emotions, camaraderie
Cognitive presence	Triggering event	Having sense of puzzlement
	Exploration	Exchanging information
	Integration	Connecting ideas
	Resolution	Applying new ideas
Teaching presence	Design & organization	Setting curriculum and methods
	Facilitation of discourse	Sharing personal meaning
	Direct instruction	Focusing discussion

Figure 1. Community of Inquiry (CoI) Framework

In order to understand the recent user experiences of bMOOCs and the potential benefits of

blending MOOCs, this section will analyze how the current literature has addressed on this topic through the three interdependent elements of the CoI framework: social presence, teaching presence and cognitive development.

4.2 Benefits from bMOOCs in Higher Education:

4.2.1 Social Presence in bMOOC Environments:

Most research studies claim that the impact of incorporating MOOCs in traditional classroom settings are generally better than face-to-face teaching alone. bMOOC learning has become "a dynamic extension of assembling," focused on in-depth classroom sharing, discussion, and problem solving in much of the literature (Jing, 2015, p.65). Many research studies have shown that the bMOOC environment contributes to communication and knowledge contribution among participants (Eckerdal et al.,2014; Israel, 2015). For example, Eckerdal et al. (2014) examine how MOOC offers new opportunities for both learners and teachers of university level computer science courses to facilitate the exchange of ideas virtually. The research has taken place from five continents, 19 countries, more than 90 universities, and more 112,000 undergraduate students. The responses have shown that positive aspects of bMOOCs relating to five subcategories: pedagogy and learning environment, affordances of MOOCs, interaction and collaboration, assessment and certification, and accessibility (Eckerdal et al., 2014). In this study, nearly one-third of the learners mentioned interaction and collaboration. These comments mostly highlighted the social networking or interaction between students: "The peer chats encourage students to lean on and learn from each other, instead of reliance on the professor" (Eckerdal et al., 2014, p.10), which indicates that bMOOC provide a social strategy in F2F setting. Thus, the collaborative opportunities of bMOOCs has successfully created an open space for learner to learner and learner to professor communications.

4.2.2 Teaching Presence in bMOOC Environments:

Blended MOOCs has offered opportunities for student collaboration; at the same time, the way they blend and deliver knowledge has offered capabilities that allow instructors to "shape course design, facilitate discourse, and direct instruction" in their teaching (Daspit & D'Souza, 2012, p.667), in order to help "reform of teaching methods" in higher education. Both Jing (2015) and Ozturk (2015) believe that bMOOC can be considered a good teaching practice in existing learning environments in that teachers as facilitators encourage learners to engage in active learning. Jing (2015) gives an example of China Peking University improving the quality of both professional and general education curriculums by using MOOCs as open learning resources. The research mainly focusses on how professors use the micro videos and animations from three major MOOC platforms (including Udacity, Coursera, and edX) to expand and enrich the contents of their F2F lectures in the humanities, natural sciences, and information science. Professors are observed to create a blended course design by using MOOC courses in their classes, change the role from the lecturer to facilitator in classroom activities, and provide specific guidance through online teaching links to students. The results not only show the importance MOOCs as free information resources for teachers, but also illustrates how the learning materials from MOOCs can offer a "teaching advantage to promote the effect of a curriculum" (Jing, 2015, p.68). Moreover, the study from Ozturk (2015) also shows that when teachers act as facilitators, they can draw the attention of the learners to the important concepts

and ideas of the courses, "clarify discussions and content via extracting patterns, exclude non-useful information in the networks, and provide the participants with learning resources" (Ozturk, 2015, p.13-14). To summarize, teachers supplement on-campus F2F courses with recorded lectures from MOOCs, facilitating the implementation of the "blended" model where class time is used for discussion of problems with students, which can directly characterize as teaching presence in the Col model.

4.2.3 Cognitive Presence in bMOOC Environments:

Maria Joseph Israel (2015) reviewed the effectiveness of learning outcomes and enhanced learning experiences in bMOOC setting classrooms. The experiments took places in five different universities: University of Puerto Rico Rio Perdras, Vanderbilt University, University of Politehnica Timisoara, San Jose State University, and University System of Maryland. Each university implemented MOOC in different ways, including: selecting MOOC modules as additional reading materials, participating online discussion forums, and using MOOC as both formative and summative assessments. More details on each implementation will be provided in Table 1 (Israel, 2015):

Name of MOOC	University	Field	Blended Learning Approach
Stanford's introduction to databases MOOC	University of Puerto Rico Rio Perdras, Puerto Rico.	Science learning	Students were required to enroll for Stanford' MOOC course and follow the online materials, online discussion, video lectures and assignments. Instructor will provide the same format of in class activities, project, and assessments, which can be easier evaluate students' learning
Stanford University's machine learning MOOC	Vanderbilt University	Engineering & Computer Science	Students were asked to enroll in the MOOC and were required to participate in all activities in this MOOC course; such as watching video lectures, participating online discussion forums, completing quizzes and programming assignments. Then, each of them has to take the screenshots of their works and submitted them to the on-campus instructor to show how they contribute to the course; in order to get their participation grade in the Vanderbilt course. Instructor as facilitator during the in class learning process

Educational Microblogging platform Cirip	University of Politehnica Timisoara, Romania	Engineering & Computer Science	Students can choose their online MOOC that should be matching the content of an on-campus course and participate in at 10% of activities in web programming MOOC as their participation grades
Udacity platform	San Jose State University (SJSU)	Science learning a remedial-algebra survey course (MATH 6L), an introduction to college-level algebra (MATH 8) and an introduction to college-level statistics (STAT 95)	Students watched video lectures online and problem solving through online discussion
Coursera and Open Learning Initiative	Seven university campuses under University Systems	computer science, biology, communications, statistics, and pre-calculus.	Students had to enrol and to complete all the online assignments

Table 1. The MOOC implementations from five universities

The five implementations show that both students and professors will set up and follow the rules to make sure they are in alignment/on pace with each other at the beginning of semester. Some of them use MOOC platforms as mandatory for this course and some of them substituted weekly homework with an assessment activity in which each student was required to participate. This review found that, aside from the experiment from San Jose State University where student outcomes were poor, experiments show that the learning outcomes of have been positive when bMOOCs are employed in that they are slightly better than that of their in regular F2F classes (Israel, 2015). The results from most experiments show that students are more interested in using both video lectures and quizzes presented from MOOC platforms. They make efforts to solve problems, view video lectures, and would like to spend more time thinking and studying in bMOOCs compared to F2F classrooms (Israel, 2015). Based on this, Griffiths et al. (2014) notes that bMOOCs have also shown that bMOOCs help in the development of students critical thinking skills during their learning processes. In some of bMOOC environments, students also typically follow rules provided by their professors, but some were purely motivated by participation marks. Students also aim to fulfil/satisfy the practical consideration of obtaining good participation marks through bMOOC courses. Such diverse methods of using bMOOCs have shown how student can be motivated to make use of bMOOC activities (Israel, 2015).

In summary, experiments incorporating the MOOCs with formal F2F courses have been reported by many teachers and researchers in different articles above (Ahmed Mohamed et al., 2015; Burff et al., 2013; Eckerdal et al., 2014; Israel,2015; Li et al., 2015). In this kind of combination of delivery methods, teachers have developed the “teaching presence” by using different methods in their course design and students experience collaborative learning environments during their learning processing which improve their “social presence”. Instead of using online lecture videos and materials, professors will make decisions to design the course by combining their courses with existing MOOCs (Ahmed Mohamed et al., 2015; Bruff et al., 2013; Eckerdal et al., 2014; Israel, 2015; Jing, 2015; Li et al., 2015; Ozturk, 2015; Peterson, 2014). Besides

attending F2F lectures, students were asked to participate in MOOCs activities online. The learning strategy of bMOOCs are to use online resources or activities to support F2F interaction between students/students and students/teachers; at the same time, it also represents knowledge in two different points of views from both online and F2F teaching environment (Bruff et al.,2013; Israel, 2015). Connecting idea and exchanging information between students, peers, and teachers have presented a clear picture of knowledge building processes and cognition development in bMOOC learning environment. Blended MOOCs can be a “significant presence” in higher education, increasing interaction both between instructor/student and among students (Garrison & Vaughan, 2008; Jing, 2015; Poon,2013). By integrating online MOOC contents and activities with F2F learning, the use of bMOOCs potentially elicits practices enhancing the optimal learning process, while learners can actively and socially involve themselves in the learning process (Israel, 2015). Moreover, the community interaction with teachers and peers, problem-solving, and bouncing ideas back and forth among participants within bMOOC, successfully enhances “the mechanism for integrating formative and summative feedbacks in order to boost students' [critical thinking skills and assist their cognitive develop of knowledge]” (Poon, 2013, para.15). Such combined learning layouts show how knowledge is constructed throughout social, technological, and pedagogical processes, which offers contact and convenience for both professor/student and student/student information exchange. Thoughtfully integrating bMOOCs can fundamentally restructure the F2F courses from lecture-centered to student-centered instruction, for effective student engagement (Garrison & Vaughan, 2008).

5. RECOMMENDATION/ CONCLUSION

In summary, the existing literature illustrate that bMOOCs have become very popular among educational institutions, since they can improve participants (instructors and learners) perceptions by blending in-class instructional sequences with the MOOC learning environments. Research has shown that students’ learning performance in bMOOC classes are greater than either traditional alone or pure MOOC online learning alone (Bruff et al., 2013; Eckerdal et al., 2014; Jing, 2015; Li, 2015). In existing bMOOC learning environments, instructors mostly design the mix of teaching strategies with existing MOOC courses to improve their students’ learning experiences and learning outcomes. The purpose of this literature review focuses on exploring recent user experiences of bMOOCs (blending MOOCs into F2F learning environment) in order to understand how technology enhances the learning environment. Specifically, the review has illustrated the role MOOCs play in recent F2F learning environment, the way professors incorporate MOOC contents into F2F learning environments, and the opportunities bMOOC brings for both teachers and students.

Based on the existing literature, the following two recommendations are to be made for professors who are thinking about adopting MOOC for their F2F courses. To use MOOC in traditional classrooms effectively as suggested by Amy Collier (2013), professors should have a clear learning objective and align outcomes for their students. The learning objectives are a "contract" between the learner and teachers. Each professor has different learning objectives for their students to achieve through bMOOC courses. It is important for each professor to know about objectives and understand the learning outcomes before implementing MOOC. Besides that, professors must provide clear use guidelines of MOOC content to learners in class and clarify the opportunities they afford to their learning (Collier, 2013).

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