

Undergraduates' Novel Experiences with Massive Open Online Courses

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Abstract

Massive open online courses (MOOCs) have revolutionized e-learning contexts through improvising new technology on its pedagogical features. Recently, much debate has been directed to the application of MOOCs in relation to higher education. However, research regarding students' experiences of MOOCs is scant. Therefore, the present study aims to fill in the gap by examining undergraduates experiences with MOOCs. Data were collected from 29 undergraduates attending various degree programs at a public university in Malaysia. Undergraduates' logbook notes were used for collecting data for this study. Results showed that most of the participants expressed positive attitudes towards learning in the MOOC. They valued the MOOC instructional features and tools and showed strong satisfaction in learning in the MOOCs environment. The empirical findings of the study have contributed to a better understanding of the nature of learning and participation in a MOOC environment from the perspective of undergraduate students.

Massive Open Online Courses (MOOCs) have succeeded to create massive attention among educators, researchers, students, media, and stakeholders as elite universities from developed countries formed consortia to offer free courses on various disciplines. MOOC started with the promises to offer free education for all (Kop, Fournier, & Mak, 2011). A few number of commercial start-ups such as Udacity, Edx, Futurelearn and Coursera have been launched in collaboration with leading universities to deliver free courses online for massive participation. Many academic institutions, especially those in North America such as Duke University, Harvard University, MIT, and Stanford University have been offering courses in cooperation with MOOC providers. Big commercial institutions such as Google and Pearson are also planning to contribute to higher education by adopting MOOC instructional format (Yuan, Powell, & CETIS, 2013). While MOOCs are mushrooming in higher education, empirical research in the area is still very limited. Therefore, the present study aims to contribute some effort to this gap by scanning a small group of tertiary level students' novel experiences with MOOC instructional features. The following part of the study deals with the background of the development of MOOC and its theoretical underpinnings.

Background of MOOC

Massive open online courses (MOOCs) are online courses with massive participations that promise free education for all (Daniel, 2013; Kop et al., 2011; Fini, 2009). The idea of MOOC was inspired by the open educational resources (OER) movement, which aims to provide learning and teaching materials for free (Kop et al., 2011). OER movement initiates to curb the commodification of knowledge and deliver an alternative route of learning and teaching resources for enhancement of educational paradigm (Kauppinen, 2013). The term MOOC was first articulated by Dave Cormier in 2008 during a course called "Connectivism and Connective Knowledge (Rodriguez, 2013). However, MOOC gets its popularity in 2012 when New York Times referred 2012 as "the year of the MOOC" as several well-financed providers associated with top universities emerged, including Coursera, Udacity, and edX (Pappano, 2012).

Typically most MOOCs contain a series of video lectures, quizzes, and assignments (Pappano, 2012; Malliga, 2013). EdX, Coursera, Udacity and Futurelearn are few of the popular online platforms that host MOOCs. Each platform offers its own course features, software, and business model. For example, Coursera and Udacity are two for-profit organizations whereas edX is a non-profit organization that has made the core code of the platform as open source (Sandeen, 2013). Additional features of MOOCs include that they typically have no fee for participation, require no pre-requisites, and do not offer formal credit for participation (Adamopoulos, 2013; McAuley, Stewart, Siemens, & Cormier, 2010). However, on the 6th of September, 2012, Colorado State University announced plans to offer academic credit that is transferable toward a degree with completion of a free Udacity computer science MOOC (Mangan, 2012). At present, MOOCs providers work with a number of higher education institutions offer courses in social science, computer-science, mathematics, business, engineering, humanities, medicine, biology, physics, and other subjects (Malliga, 2013).

MOOC Providers

There are more than 16 MOOC providers offering courses on various disciplines in collaboration with well-known institutions around the world. Coursera, Udacity and edX are the three major MOOC providers who are offering courses in collaboration with prestigious universities such as Stanford, MIT, Duke, and Harvard. Coursera, a for-profit educational technology company initiated by Andrew Ng and Daphne Koller from Stanford University, is the leading MOOC provider offering 959 courses on various disciplines in collaboration with 118 elite institutions having more than 10 million users (Coursera, 2015) (see Table 1).

Table 1: Coursera

Founder (s)	Andrew Ng and Daphne Koller
Users	11,572,029 Courserians (19 February, 2015)
Website	www.coursera.org
Courses available in	English, Spanish, French, Chinese, Arabic, Russian, Portuguese, Turkish, Ukrainian, Hebrew, German, Italian, Portuguese
Launched	April 2012
No of courses	959
Partner Universities	118 institutions

Reviewed Literature

There is currently limited information available on participants' perceptions of MOOCs (Murray, 2014). Thus, Murray (2014) initiates a study at the University of Edinburg to examine perceptions of a group of MOOC learners who participated in a course named Equine Nutrition. A self-completion survey consisting of series of question (Likert scale) was administered to find out the learners' general perception towards MOOCs. The participants of Murray's study highly appreciated and rated the course features positively. However, Murray (2014) recommended further studies on the lack of interaction that exists in the MOOC environment.

Another researcher, Veletsianos (2013) expressed similar ideas that current conversations around educational innovations in general and MOOCs in particular, lack learners' voices. His e-book entitled *Learner Experiences with MOOCs and Open Online Learning*, where several MOOC learners functioned as authors, described and reflected upon the learning experiences, thus contributing to

better understanding of MOOCs. The reported studies show a mixed perception from learners' who participated in the MOOCs. For example, Ramirez (2013) claimed that the MOOC was a valuable learning experience and it did not present too many challenges. The peer-to-peer interaction had supported student-centered learning. On the other hand, Ota (2013) commented on the MOOC instructional design, and he suggested that MOOC providers should revise the courses in the ways the course content was delivered. He added that the greatest departure from good instructional design practice found in the MOOC was in the questions and assessments. Moreover, the design of the video lectures and text-based materials failed to engage learners with the course content. However, Ota (2013) did not provide any suggestion that could enhance learning engagement with the course.

A few empirical studies have shed light on learners' learning experience and engagement with MOOC. For example, Milligan, Littlejohn, & Margaryan (2013) investigated learners' patterns of engagement in a cMOOC course titled *Change11* which was a large-scale cMOOC starting from September 2011 to May 2011. Their study identified three types of learners: active participants, passive participants, and lurkers. The study concludes that different learners have different learning strategies and styles while attending MOOCs. Milligan et al. (2013) added that learners' patterns of engagement in the CCK2011 cMOOC were affected by multiple factors including student confidence with technology, prior experience with a cMOOC, and motivation. Hill (2013) added another type of learners which he called "drop-ins": learners who are active participants but only for a selected topic or discussion. Not all MOOC learners are serious learners because some of them browse through MOOCs out of curiosity (Kizilcec, Piech, & Schneider, 2013). Thus, the completion rate of MOOCs average fewer than 10% (Jordan, 2013), with Coursera courses reporting closer to 5% (Koller, Ng, Do, Chen, 2013). Koller et al. (2013) differentiated "committed learners" from students who only browse courses. They further sub-grouped the "committed learners" into three levels: active participants, passive participants, and community contributors. Active participants are "course completers" who are engaged in all course contents of the MOOC whereas passive participants engage only with watching video lectures, attempt a few assignments, and have limited forum participation, while community contributors are those active participants who produce new content such as through discussion forum.

The educational benefits of MOOCs have been appreciated by many academics, yet the idea has not been researched adequately in higher education contexts. So far, a few empirical studies have documented learners learning experience with this new form of education. However, very few researchers have sought to provide a deep, qualitative, and multidimensional understanding of learner experiences in MOOC especially in higher education contexts. In meeting such a gap and need, the present case study was designed to examine undergraduate' learning experience in a MOOC environment. More specifically, it investigated how the participants perceived MOOCs, and what they liked or did not like about MOOCs.

Theoretical and conceptual underpinnings of the concept MOOC

Most of the MOOCs are based on connectivist theory which emphasizes that learning and knowledge emerge from a network of connections (Kop et al., 2011; Rodriguez, 2013). Connectivist learning theory sees learning as the process of creating connections and elaborating a network (Kop & Hill, 2008; Rodrigues, 2013). MOOCs providers such as edx, Udacity, and Coursera offer courses in a more traditional way, a centralized approach (sometimes called xMOOCs) (Kop & Hill, 2008).

Two very different formats of massive open online courses are cMOOCs and x-MOOCs (Kop & Hill, 2008). Their pedagogical foundations and the different ways in which social interactions happen during the courses sets them apart. cMOOCs emphasize connectivist pedagogy

while x-MOOC into the cognitive-behaviorist pedagogy (Rodriguez, 2013). x-MOOCs capture a more traditional approach to learning with video recorded lectures, online quizzes, and weekly assignments and are based on an instructor-centric instructional design that establishes a one-to-many relationship to reach massive numbers (Siemens, 2012). On the other hand, in c-MOOCs, the learners' autonomy, peer-to-peer learning and social networking are emphasized. In x-MOOCs a professor takes the lead and the learning-experience is organized top-down. However, some x-MOOCs seem to adopt a more blended approach incorporating both cMOOC and x-MOOC pedagogy.

Method

The purpose of this study was to investigate undergraduates' first experiences with MOOCs. The research design was qualitative in nature and adheres to the exploratory case study strategy. The target population of this study consisted of 29 undergraduates coming from different disciplines from a public university in Malaysia. Participants were asked to attend a course from any MOOC platform. Twenty-nine undergraduates registered for 14 MOOC courses from Coursera (see Table 2). The duration of each course ranges from five weeks to thirteen weeks long.

Table 2: Name of the course, name of the university offered those courses, number of student registered in each course

SL No	Name of the Courses	Name of the University	No. of students registered
1.	An Introduction to Interactive Programming in Python	Rice University	3
2.	Democratic Development	Stanford University	1
3.	Science, Technology, and Society in China II	The Hong Kong University of Science and Technology	6
4.	Child Nutrition and Cooking	Stanford University	1
5.	Grow to Greatness: Smart Growth for Private Businesses	University of Virginia	1
6.	Healthcare Innovation and Entrepreneurship	Duke University	1
7.	Introduction to Psychology as a Science	Georgia Institute of Technology	2
8.	Introduction to Guitar	Berklee College of Music	2
9.	Sports and Society	Duke University	3
10.	Citizenship and U.S. Immigration	Emory University	1
11.	Crafting an Effective Writer: Tools of the Trade	Mt. San Jacinto College	1
12.	Community Change in Public Health	Johns Hopkins University	2
13.	History of Rock, Part One	University of Rochester	3
14.	Introduction to Music Production	Berklee College of Music	2

To collect data regarding students' experiences of MOOC, the researcher used a logbook. Participants were asked to pen their daily activities into logbook each time they logged into the courses. They were also asked to discuss the perceived strengths and weaknesses of the MOOC

course they have experienced. For strengths, participants tended to focus on the features and tools of MOOC that helped them with the learning process. For weaknesses, the students tended to focus on the difficulties they have experienced with MOOC instructional model. Moreover, participants were asked to pen the reason for attending the course they have taken. The study translated/transcribed 29 logbooks (reflection notes). Each transcribed logbook was reviewed and coded manually to discover participants' attitudes and perceptions toward learning in the MOOC environment. The study counted the recorded themes, repeated words, patterns, and positive or negative attitudes toward MOOC, centering on the details in the logbook notes. Recurring themes were identified when a student repeated the same words, phrases, or sentences several times as well as negative or positive reactions to each aspect of the learning process. Then the recurring themes of each student were compared with those of the other students' logbooks.

Result

The study retrieved many themes after analyzing students' logbooks. The themes are categorized in two main areas: significant challenges and the perceived advantages of the MOOCs instructional design. Out of 29 students, 19 were female and 10 were male from a public university in Malaysia who registered for 14 courses from Coursera, the leading MOOC provider. Students penned the reason for attending MOOCs at the beginning in their logbooks. They also noted some of the facts in their logbooks such as daily tasks completed, skill learned daily, significant challenges and their perceived advantages of the features and the format of the course. Participants wrote about their daily activities, on some MOOCs features and tools such as watching video lectures, taking quizzes, writing assignment, evaluating peers' assignment, contributing to the discussion forums, problems encountered, and perceived advantages.

Almost all of the participants' initial reactions were positive about the MOOC's instructional system. Students greatly appreciated the flexibilities and convenience of the course tools. Everyone was comfortable with sharing and posting class-related materials online, and they valued the learning opportunity inherent in peer feedback. Students' responses were found to be positive about the MOOC instructional design; however, they also reflected various difficulties they faced with MOOC.

The reason that attracted undergraduates to enroll in MOOC is that most of the courses were offered by highly prestigious universities from North America (Participants 4, 7, & 10). Participant (7) commented that "I never thought of attending a lecture of a professor from Stanford University. I would like to thanks Coursera and partnered universities for offering such courses and make my dream come true." In some cases, participants did not care whether they could complete a MOOC or get a completion certificate. Instead, they sought to develop their understanding and basic knowledge of a particular topic. . Participant (10) stated that:

"I just want to learn the basic rules of Java without doing any quizzes and assignments and participating in discussions. I learn it not because I am interested in it but I need to use it. So I just watch the lectures and get a general understanding of Java".

In addition, MOOCs helped students explore and discover fields not related to their college majors. MOOC helps students to become expert in fields, which might not be related to their academic fields. Participant (13) mentioned that:

I chose this course *Introduction to Guitar* because I was always interested to play music especially with the string instruments. Although I know how to play a guitar practically, guitar theory is still an important thing to learn in order to be a good guitarist. So, I took

this advantage to learn to play guitar theoretically since I am into it. Hopefully by choosing this course, I will be able to be a better guitarist in the future.

Participant (7) stated that:

“I have my Bachelor degree in English language. I was interested in Music and wanted to be a musician. MOOC provides me that opportunity by offering a course on How to play Guitar which helped me to develop my knowledge on playing guitar. I would like to thank Coursera for offering courses on Music.”

Participant (19), who took the course *Science, Technology, and Society in China*, stated that “I choose this course because I am interested to know about the growing technology in China and how it develops.” Two other students (Participants 14 & 23) took the same course because the duration of the course is four weeks long. A student attended the course *Healthcare Innovation and Entrepreneurship* added that “I choose this course because I would like to explore more about innovation and entrepreneurship regarding healthcare. Besides, the course only takes 6 weeks to complete”.

Massive participation is another reason that students highlighted to be a motivating factor to join such a big classroom (Participant 3, 5, 11). Finally, getting a MOOC certificate from a prestigious university is another reason for their enrolment and curiosity to find out what MOOC is. In addition, students also mentioned some other possible reasons for enrolling in the MOOC i.e., free of charge, flexibility of schedule, and interaction with others worldwide.

Students' reflection on MOOC instructional design

All MOOC platforms exhibit some common characteristics such as massive participation, online and open access, formatted and short video lectures (5-15 min.), quizzes, live workshop, peer and/or automated assessment and forum for peer support and discussion. Participants of the study liked the MOOC platforms, its features and tools.

Student logbook entries frequently mentioned the benefits of watching the video lectures. Participant (8) claimed that it became easier for him to understand the lectures of the professor because of the embedded subtitles on the videos. Participant (6) added that the “videos are so handy that I can download the videos and listen to the lectures anytime, anywhere”. “The videos are designed in such a way that I really did feel like I was in class with some other students, listening and watching” added by Participant (23). In addition, each video lecture included several stops where students were prompted to answer a multiple choice question. Participant (17) opined “at first I found the embedded questions in the video annoying; they interrupted my listening. In time, I came to realize that they confirmed my understanding of the key ideas of the subject.” Some students also wrote about their success in the quizzes and assignments. Another student (Participant 24) added “I have achieved the highest score in week two quiz. It was quite difficult but after watching the video lectures again I was able to score 10 out of 12.”

In relation to the discussion forum, the participants endorsed in their logbooks that the discussion forum had facilitated their interest to discuss various topics. They also highlighted some key issues. For example, one of the positive aspects of the discussion forum was that it allowed them to get many responses from their peers. They commented that the questions were good and the responses were found to be thoughtful, supportive and fun to read. In the same light, Participant 14 commented that “the forum part is the best part of MOOC. We can exchange our opinion on a topic. There are so many topics inside the discussion forum.” However, a few participants could not contribute much in the forum; they could only introduce themselves there. One student

(Participant 20) penned that “I couldn’t contribute anything on the discussion forum because I was busy with other activities such as doing the quizzes and assignment, evaluating peers’ assignment and watching the videos.” She added that she read many thoughtful comments posted by other students. Participant (21), who attended the course *Rock and Music*, commented, “The forum part is the best part of MOOC. We can exchange our opinion on Rock and Music and so on. There are so many topics inside the discussion forum”.

Significant challenges

Despite the advantages of the video lectures, students faced some difficulties while downloading, streaming, and watching the videos due to Internet speed (Participants 4, 7, 11, 12). “Basically, the challenge is the slow Internet connection of the university. It prevents me from learning the course smoothly as the course videos are lagged” (Participant 11). Some students revealed few difficulties with quizzes that in some of the quizzes, they got one attempt and in other quizzes they could take multiple attempts to complete the quizzes. Course designer should state the number of attempt students will get in each quiz. The instructions and rubric should be clearly mentioned for each item of the course.

Participant (4) added that the significant challenge for him was to manage his time for the course, as he had to watch videos of approximately 10 to 15 minutes each (sometimes around 20 minutes), take quizzes, complete assignments and evaluate the peers’ papers. Participant (9) added that “challenges that I had to face while attending this course was that I had to really put my time in a very tight consideration due to my preparation for final year project. Another challenge was that I had to complete two sets of video lecture, quizzes, mini project and peer evaluation for this course”. Out of twenty nine students only three students managed to complete the MOOC successfully and achieved the course completion certificate. These three students attended the same course *Science, Technology and Society in China1: Basic Concepts*. Another difficulty for students was to understand the lecture and different terms of the course they followed. “Another challenge is to understand the scientific terms in the lectures, since I have left out with sciences after my Form 5” was added by Participant (8).

Evaluating peer’s essay is yet another significant challenge the participants faced while participating in the MOOC. Participant 10 commented that “in my opinion, the weakness of this course is that it lets the students give marks by evaluating other students’ assignments; evaluation marks from peers contribute to the overall marks.” Similarly, Participant (13) added that “the evaluation procedures are more difficult than doing an assignment because evaluating peer’s essay requires more time and thoughts than completing an assignment.” However, some of the participants (Participants 3, 4, and 16) commented positively towards peer assessment adding that giving feedback to peers had many advantages such as opportunities to develop their ability to give constructive feedback, getting advice on their drafts, having a broader audience for their written work, and learning from different approaches other students applied in responding to an essay.

Discussion

To recapitulate, the present study investigated how a class of undergraduates perceived the MOOC, what they liked or did not like about the courses, how they learned, and what helped them learn. The results from the logbooks showed that many of the participants had positive views toward learning from the MOOCs. They enjoyed the learning, and valued the instructional features and tools. The study revealed that participants appreciated the MOOC instructional system, and the flexibility as well as convenience of the MOOCs’ features. They liked to post

course-related materials online, participate in quizzes, do assignments and watch video lectures. However, they did not feel comfortable with the peer evaluation system. The certificate of accomplishment is another aspect that the participants discussed in their logbooks. MOOCs have the benefit of offering certificates that the participants can use to document professional development or for other uses. Participants of this study who received certificate of accomplishment were found to be excited. However, the question is that if a student completed a MOOC course successfully and received an accomplishment certificate from the organization offering this MOOC, will this certificate be of any value when he/she would apply for a job? Coursera is working with American Council of Education (ACE) to ensure that credits that come from the Signature Track program will be honored by many of ACE's member school such as Amherst University, Boston University, Carnegie Mellon and many others (Gidwani, 2013). Since certificate has a value, however, we cannot ignore the fact that taking a course certainly has inherent value.

MOOCs like Coursera have adopted 'peer assessments' in which students rate each other's work independently (Coursera, 2015). Multiple peer assessments could be performed for each student's work. The participants of both studies questioned about the reliability and validity of peer assessment because they felt that the MOOC learners did not have the expertise or experience to provide accurate and quality feedback to their peers' essays. Assessing such higher-level thoughts in the essays requires human experts and formal evaluation or examination (Sharples et al., 2012). Because there are arguments for and against peer assessments, Sharples et al. (2012) opine that peer assessment is simply an aid to the learning process, but might not be a means of evaluating the learning outcomes.

The design of a MOOC platform is based on a sound pedagogical foundation that aims to help students learn the material quickly and effectively. Hanley (2013) stated that massive participation, open access, formatted and short video lecture, quizzes, forum, and peer assessment are such distinctive features that support learning. A short form of video lecture may engage a sense of belonging and commitment (Bruff, Fisher, Mcewen, & Smith, 2013; Hanley, 2013). In a MOOC discussion forum, learners ask questions, exchange ideas about the course content, and get to know fellow students. Participants of the Writing MOOC were involved in various kinds of networking and community-oriented activities. However, some participants reported difficulties organizing their own learning activities in the MOOC; especially difficult was for learners to track the discussion in the discussion forum. In MOOCs, organizing learning and managing resources require a great deal of autonomy and self-organization (Mackness, Mak, & Williams, 2010). Keeping up with the readings, maintaining interactions with others, creating and sharing materials, and engaging fully in the activities is challenging for many participants. The volume of information flowing in the MOOC can also be disorienting and daunting (McAuley et al., 2010). Learning in the MOOC is reported to be quite overwhelming especially for students expecting instructional processes similar to those of traditional models of higher education.

Conclusion

The finding of the present study is strongly encouraging. Results of the study highlight some motivational factors of MOOC that might promote learning on various course disciplines. The participants of the study appreciated the MOOCs' instructional methods as well as mentioned few problems that they faced while attending the MOOCs. Students enjoyed watching the videos, attending the quizzes, participating in the discussion forum as well as MOOC's certifications. They also penned problems that hampered their learning were slow streaming of the videos, doing the assignment on time, and evaluating the peers' assignments as were time consuming. By examining undergraduates' learning experience with MOOCs the study opens the

doors of e-learning learning researches and practices. The study contributes to the field of e-learning by drawing instructors', researchers', educators' and learners' attention to a new form of online education namely massive open online course (MOOC). Although the practicality of this educational model is generally accepted by people, there is still some fundamental doubt that this educational model will actually be useful in helping students gain a command of particular skill. The limitation of the study is that of small sample size which might not examine the data at a finer level. Nevertheless, some valuable findings have been found, and some issues such as peer assessment and interaction warrant further research.

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