Review Article

MOTIVATIONS AND CHALLENGES OF USING MASSIVE OPEN ONLINE COURSES BY STUDENTS AND INSTRUCTORS

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ABSTRACT

The massive open online course (MOOC) is among the latest e-learning initiative to attain widespread popularity students, professors, and teaching assistants (TAs). A systematic review focusing on the use of MOOCs by students and instructors was conducted to summarize the accumulated state of knowledge concerning the main motivations and challenges of using MOOCs, as well as to identify issues that have yet to be fully addressed or resolved. The findings suggest four reasons why students sign up for MOOCs: the desire to learn about a new topic or to extend current knowledge, they were curious about MOOCs, for personal challenge, and the desire to collect as many completion certificates as possible. The drop out is due mainly to reasons including a lack of incentive, failure to understand the content material and having no one to turn to for help, and having other priorities to fulfill. The findings suggest three main reasons why instructors wish to teach MOOCs: being motivated by a sense of intrigue, the desire to gain some personal rewards, or a sense of altruism. Four key challenges of teaching MOOCs are also surfaced: difficulty in evaluating students’ work, having a sense of speaking into a vacuum due to the absence of student immediate feedback, being burdened by the heavy demands of time and money, and encountering a lack of student participation in online forums. Finally, two issues that have yet to be fully resolved, i.e., the quality of MOOC education and the assessment of student work, were also discussed.

Keywords: MOOC; Online learning; E-learning; Motivation; Challenge; Massive open online course

INTRODUCTION

Researchers and educators have always been intrigued with the potential of technology to improve student learning and help transform education [1]. One such technology is the use of the Internet to deliver courses; typically known as e-learning. Over the past few years, the practices of e-learning have undergone a number of initiatives, particularly with regard to the openness of the learning environment [2]. One specific initiative that is fast increasing in popularity with instructors, educational researchers, and learners is the massive open online course (MOOC). The MOOC initiative may be situated within the larger framework of open educational resources which is typically defined as digitized materials offered freely and openly for students, educators, and self-learners to use and reuse for learning, teaching, and research” [3]. Figure 1 shows the meaning of the words “Massive Open Online Course”. The MOOC is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive user forums to support community interactions among students, professors, and teaching assistants. MOOCs are a recent and widely researched development in distance education which were first introduced in 2008 and emerged as a popular mode of learning in 2012 [4]. The term MOOC was originally used by George Siemens and Stephen Downes in 2008, and since then has gained popularity in the USA especially when Sebastian Thrun, a Stanford professor offered an artificial intelligence course for free [5]. Basically, any individual with an Internet connection can join a MOOC, to access the available resources, interact with other students, reflect and share what they have learned with others [6]. Enrollment sizes of MOOCs tend to be high, generally over 500 participants [7]. MOOCs are generally offered by universities in partnership with providers such as Coursera, and Udacity. Currently, one of the fastest growing MOOC providers is Coursera which has more than 30 university partners including Princeton, Brown, Columbia, Duke, Stanford, and Johns Hopkins, and has registered 2.8 million students and sees 1.4 million course enrollments every month [8]. Figure 2 shows the key elements of MOOCs.

Figure 1. Meaning of the words “Massive Open Online Course”.

Massive open online course (MOOC)

- Large scale worldwide
  - Free of charge
  - No requirements
  - OER
- Access at any time around the globe
- Synchronous and asynchronous communication

Figure 2. Key elements of MOOCs.
Advo ces of the MOOC initiative believe that it can offer educational benefits to students, professors, and higher education institutes. For example, some believe that MOOCs represent the ultimate democratization of education, by making education more accessible to as many people as possible [9]. In most cases participants sign up for MOOCs free of charge and in some cases for a small or minimal fee to obtain a completion certificate. Others believe that MOOCs can increase an institution’s prestige, or as a tool for universities to market themselves to potential students, faculty, and donors as well as allowing professors to experiment with the pedagogy of teaching online courses to large number of students. On the other hand, skepticism voice concerns that MOOCs will offer a watered-down education, harm less prestigious education institutes, and increase the risk of further state school budget cuts [10].

OBJECTIVE

Notwithstanding the debate between the advocates and skeptics of MOOCs, current popular discourse in mainstream media has created a bubble of hype and a desire to embrace MOOCs [11]. In this context, it may be necessary to gain a better understanding of MOOCs in higher education for a thematic analysis of related studies. Specifically, the focus of this study is on the motivations and challenges related to instructors’ or students’ use of MOOCs. These include student motives for signing up MOOC, student attitudes toward MOOC, student challenges of learning in a MOOC, instructor motivations for offering MOOCs, as well as their methods used to engage students, and the various challenges encountered in teaching a MOOC. This review also identifies important issues that have yet to be fully addressed which can suggest directions for further study.

STUDENT PERSPECTIVE

Motives for signing up

Overall, the analysis suggests four reasons why learners enroll in a MOOC. First and foremost, most learners enrolled in MOOCs mainly because they wanted to learn about a certain topic, or to increase their knowledge, to refresh what they had learned before, or to learn a “just-in-time” topic that could help them in their work, somewhat akin to borrowing a textbook from the library to learn [4]. The fact that almost all MOOCs are free also acts as an additional incentive for these learners to enroll [12]. Many learners do not seek credit toward any credential [8]. Figure 3 shows the learner choices. The choices position MOOC where they are at the moment with developments changing their characteristics along the axis depending on the different packages put together by institutions that offer greater levels of support and greater degrees of formal recognition of learning.

Challenges of learning in a MOOC

Although students have the convenience of working through a MOOC at their own time and pace, up to 90% drop out. Students drop out due to a variety of reasons such as a lack of incentive, insufficient prior knowledge (e.g., lack of math skills), a lack of focus on the discussion forum (e.g., off-track posts), failure to understand the content and have no one to turn to for help, ambiguous assignments and course expectations, and lack of time due to having other priorities and commitments to fulfill which resulted in procrastination and eventually dropping out [19]. Furthermore, since many students attend MOOCs based on personal interests, it is reasonable to assume that some might only be interested in a particular topic of the course; hence they quit after they have gone through the particular topic [20].

In order to motivate students to finish a course, many MOOC providers give out some form of incentives such as completion certificates. For example, as many as 74% of the MOOCs in the corpus offered free certificates to students who completed them. Although about two-thirds of 1834 respondents indicated that they would be more likely to complete if MOOCs offered completion certificates, it really remains to be seen how useful an incentive MOOC certificates will actually be [20]. As one of Coursera’s founders Andrew Ng admitted, MOOC certificates are not the real deal because they will never be as valuable as traditional degrees from a university [21]. Even some students themselves do not think that a completion certificate issued either by the instructor or the MOOC provider would be a sufficient reason for them to finish a MOOC [22].

However, if universities were to start offering actual course credits to students who have completed MOOCs, this incentive will work. The American Council on Education recently endorsed five MOOCs from Coursera for credit, which means that students who pass a MOOC could redeem their learning for credit toward a traditional degree [6]. Some students indeed reported that participation in a MOOC for credit had indeed made them more committed to finishing the course and improved their understanding of the topic [23].

But it is worth noting that in a survey of 103 professors, as many as 72% of the respondents did not think that students who succeed in their MOOCs deserve to get formal course credit from their home institutions [24]. Further, as many as 66% of professors did not believe that their
home institutions would eventually grant formal credit to students who succeeded in their MOOCs. Hence, it remains unclear, how seriously viable is the notion of awarding formal course credit to MOOC students. One of the greatest concerns is to ensure that the person who submits a piece of work is indeed the person taking the MOOC.

**INSTRUCTOR PERSPECTIVE**

Higher education has remained relatively stable for many years, comprising teaching and research activities in different proportions depending on the characteristics of any particular institution. However, the financial model that supports teaching has changed significantly in recent times in countries like England and Australia, as state funding has been largely withdrawn and replaced by state loans. The opportunity and challenge presented by MOOCs is how to develop a viable business model that includes open online learning that is attractive to students and fits the characteristics and needs of a particular institution.

Figure 4. Framework for assessing and designing new business models. Figure 4 shows the framework for assessing and designing new business models. The framework represents a starting point for identifying an appropriate strategy for the development of provision. Reading from the left, the external strategic challenges and opportunities are followed by an organisational response that in turn produces an appropriate business model. For some, this will cause an institution to review how it interprets its mission, purpose and values, especially if a new strategic direction is proposed. Even where the strategy fits well within an existing institution, it is still likely that there will be significant implications for developing a new business model. The experience of the sector is that for successful online provision to grow, substantial investment is required to develop new capabilities and/or build new external partnerships to bridge any internal capability gaps in technology, institutional processes, working practices and the development and teaching of new types of courses.

**Reasons for offering MOOCs**

Overall, the analysis suggested three general reasons why instructors decide to offer MOOCs. First, there were some instructors who were intrigued by MOOCs, and wanted to experience teaching and connecting to a large and diverse audience throughout the world, which no residential course could boast of [25]. Some had found such experience very useful because the sheer size and diversity of participants helped generate rich perspectives and resources which instructors might not ever encounter on campus [26]. These vast perspectives and resources could later be incorporated by the instructor back into his or her regular on-campus courses; thus enriching the instructor’s own classroom teaching. Moreover, some instructors found the process of preparing MOOC materials such as video lectures a useful way to hone their pedagogical presentation because it was much more challenging to captivate a vast anonymous online audience than a small familiar group of students in a physical classroom [7].

Second, some instructors were impressed about MOOC providers such as Coursera’s success in attracting large number of students to sign up for courses taught by professors at other universities and decided to join the bandwagon by becoming a partner [27]. These instructors were mainly motivated by egocentric motives - some hoped to use MOOCs to increase their personal reputation both among colleagues within their discipline and with the media and the general public, to be the first among their peers to offer a MOOC in order to establish himself or herself as an expert in a particular field, to increase their earning power, or to help get tenure [18]. Indeed, it has been found that when students talked about the courses they had taken, they usually mentioned the professor first rather than the university [28].

Third, there were other instructors who cited altruism as the reason for offering MOOCs. Altruism may be defined as motive that increases the welfare of one or more individuals other than oneself [16]. The most commonly proposed source of altruistic motive is empathic emotion; which can be described as other-oriented feelings that are consistent with the perceived welfare of another person [18]. In the case of the MOOC instructors, the most commonly cited source of empathetic emotion was the desire to increase student access to higher education worldwide [20].

**How instructors try to engage students**

MOOCs may be generally classified into two types of courses, which are known as xMOOCs and cMOOCs [29]. Basically, xMOOCs follow a cognivist-behaviorist approach, and based primarily on video plus multiple-choice quizzes or other types of assignments [30]. Examples of xMOOCs include the Introduction to Databases, Machine Learning, Introduction to Artificial Intelligence, and Python Programming and Building a Search Engine courses [26].

![Image](image-url) Figure 5. Infrastructure plans of xMOOCs. Figure 5 shows the infrastructure plans of xMOOCs. Instructors of xMOOCs tend to structure their courses very similar to traditional higher education courses. To engage students, the instructors had a syllabus, along with a course content that typically consisted of readings, discussions via online forums, assign ments which usually consist of quizzes, essays, or projects, and videos of lectures that are pre-recorded by the instructors prior to the lessons [31]. The video lectures were generally between three and fifteen minute long. Typically, students would start each week’s lesson by watching the video lectures, read the assigned material, participate in online discussions with other learners, and complete the quizzes, assignments, or tests on the course material. Students could view and pause the video lectures at their own pace to take notes. Students could email the instructors via the course email system or post their questions on the course discussion forums should they have anything to ask [32]. Although instructor participation in discussion forums varied, most instructors tend to post at least once or twice every week [18].

Some instructors of xMOOCs strived to further engage their students by incorporating online simulations, and game-related elements in their courses [33]. Other instructors made use of online office hours to answer selected questions from a pool proposed and voted by students [34]. There was also an instructor who arranged live exchanges with students via a video chat room, in which six to eight students listened to either the live stream or recordings of their peers. Other instructors made use of virtual simulations, and game-based learning resources to provide students with the opportunity to learn in a meaningful and engaging way [35].

On the other hand, the cMOOCs are based on a philosophy of connectivism [35]. Connectivism has been offered, but has not yet been universally accepted, as a new learning paradigm for a digital age [36]. Connectivism basically posits that learning is a process of a student seeking information from human or non-human sources and to share the information with other participants [35]. The main examples of cMOOCs include Connectivism and Connective Knowledge, Personal Learning Environments, MOOCs - mobile learning, and EduMOOC - online learning today and tomorrow courses [36]. Figure 6 shows the key concepts of cMOOCs.
Instructors of cMOOCs also provided a course outline but the actual course materials and course content were defined by students as the course progressed, rather than defined by the instructors before the course [35]. Learner autonomy such as students’ choices of how, and how much to engage with the course is typically emphasized in a cMOOC [36]. Therefore, this may result in multiple topics or areas being examined depending on the interests of various students.

In cMOOCs, students were encouraged to create their own personal learning environments and networks of co-learners, instead of depending on the instructor for guidance [35]. However, since a course content usually evolves while it is being developed, it becomes difficult for learners to know in advance if a course is suitable for them. Further, learning in many cMOOCs was not assessed as it was difficult to give credit when all participants are not doing the same work. The role played by an instructor of cMOOCs resembled more a discussion moderator than that of a tutor as played by instructors of xMOOCs [36].

Finally, although MOOCs have been classified as either xMOOCs or cMOOCs, some scholars argue that such a classification is too simplistic. It has been suggested that a MOOC classification scheme consists of twelve dimensions: the degree of openness, the scale of participation, the amount of use of multimedia, the amount of communication, the extent to which collaboration is included, the type of learner pathway (from learner centered to teacher-centered and highly structured), the level of quality assurance, the extent to which reflection is encouraged, the level of assessment, how informal or formal it is, autonomy, and diversity [37]. However, it is still too early at this moment, to determine how well this new classification scheme would be adopted by other scholars.

Challenges of teaching MOOC

Generally, the challenges of teaching MOOCs included the following: (A) a lack of student response in the online discussion; (B) a sensation of speaking into a vacuum due to the absence of student immediate feedback; (C) heavy demands of time and money; and (D) issues about evaluating student work. It has been found that the online discussion board in his MOOC is a disappointment with most threads consisting of little more than a posted question he had answered. Other researchers found that a majority of students, ranging from 85% to 97%, were either lurkers or failed to even access the online discussions [38]. Some instructors also found it difficult to teach when not facing a real audience of students, particularly when producing video lectures to be recorded and uploaded onto the Internet. The experience was like speaking into a vacuum or to a wall without the instant feedback (e.g., bored looks, frowns) that an instructor typically gets from students when they are talking to them in a face-to-face classroom [38].

The demands of energy and time could also pose problems especially to instructors who are untenured or who do not have any grant to support their teaching a MOOC [6]. Spending so much time and energy on preparing a MOOC, which may count nothing more than a mere line item in a teaching portfolio, could rob untenured instructors of time to do other duties such as writing and publishing papers, committee service, or traditional teaching [11]. It is therefore not surprising that a survey of one hundred and three instructors who have taught a MOOC revealed that two-thirds of instructors were already tenured, with most having more than a decade of college teaching experience under their belt. Most respondents also reported that teaching a MOOC distracted them from their normal on-campus duties and responsibilities because many colleges currently do not yet have a protocol to integrate their instructors’ work on MOOCs into normal faculty work flow or classroom teaching load [26].

Instructors were also daunted with the prospect of evaluating the work of their students in a MOOC. Since it is close to impossible for an instructor or teaching assistants to assess each written assignment from thousands of students, some instructors rely on multiple-choice questions which could be easily auto-graded by the computer, while some employ peer assessment [16]. Some instructors, on other hand, do away with assessment completely. In recent years, some universities have been experimenting with the use of computers to grade student essays. Such technology, however, is not perfect [18].

Figure 7 shows MOOCs being in the midst of a hype cycle with expectations undergoing a wild swing. From the beginning, MOOCs have received more than their share of media attention and, yes, hype. The case gets made for them, and the case gets made against them, and then those cases get made over and over and over again. And eventually, people just get tired of it.

DISCUSSION

Overall, many of the MOOCs reported in the literature resembled xMOOCs which are similar to the structure of traditional courses run by colleges and universities with pre-recorded video lectures by professors, examinations and/or individual final project, and discussions. However, the three main differences between many MOOCs and traditional university courses are: the large and diverse student enrollment in MOOCs, the high drop-out rate of MOOCs compared to that of traditional courses, and the relatively lack of instructor presence or support in MOOCs compared to traditional courses. In this section, two key issues or questions that are currently not fully resolved by current research were discussed: the quality of MOOC education, and the assessment of student work. These two issues were chosen because they were the main unresolved concerns surfaced by most of the students and instructors. The purpose of identifying such issues is to suggest follow-up research that could help advance the knowledge base on MOOCs in higher education contexts.

Quality of MOOC education

Ultimately, how effective are MOOCs in helping students learn? Or how to measure the quality or success of a MOOC? Some researchers quantify a MOOC success or quality by measuring students’ learning outcomes. In perhaps one of the very first studies that empirically carried out predictive analyses to investigate what individual student factors might correlate with their success (i.e., grades earned) in a MOOC, it has been found there is no relationship between age and student achievement, or between gender and achievement, or motivation for enrollment and achievement [39]. However, one interesting finding stands out: that is on average, with all other predictors being equal, a student who worked offline with someone else in the class or someone who knows about the subject would have a predicted score almost three points greater than a student working alone [40].

Although this review is only limited to one MOOC and direct causation could not be actually inferred since the data was correlational, it provides some evidence that student support is a crucial part of learning. Additionally, the finding gives ammunition to critics who say that MOOCs cannot really offer quality education because this review
suggests that many MOOCs lack student-instructor support, as well as student-student support. Furthermore, many professors or teaching assistants do not work offline with their MOOC students [41]. Student-instructor support is a crucial part of learning because it allows weaker students to raise questions or comments that they are not very sure of, and get their doubts cleared by the instructor, and challenge the better students [42].

Some instructors have attempted to circumvent the lack of student-instructor support by hiring teaching assistants or experienced students to guide discussions. But still with a large student to teacher ratio in a MOOC, how much individual attention can a teaching assistant give to each student to mentor them on their ideas?

Besides the lack of student-instructor support, there is also a lack of student-student interaction in many MOOCs. Peer interaction may be considered a form of student-student support because when peers interact with one another, they could generate extra activities as well as additional cognitive mechanisms which may not occur as frequently in individual learning [43]. These extra activities and mechanisms could help broaden students’ own individual understanding and perspective of a particular topic. Currently, this review suggests that many MOOCs offer students the opportunity to interact asynchronously with their peers via a discussion board or forum. However, the mere presence of a forum does not automatically guarantee that active interaction will take place [40]. Certain elements or factors have to be fostered in order to promote peer interaction via discussion forums. More details and suggestions about these factors can be found elsewhere [44].

Assessment of student work

Issues related to assessment of student work are another set of challenges that remains to be resolved in MOOCs. Three main questions are discussed here. First, what is the value or benefit of using automated essay-grading software in MOOCs [45]? Because grading student written work is so labor intensive, some instructors are turning to automated grading software for help. A recent study that compared the scores of more than 16,000 middle school and high school test essays graded by people and computers found that computers were capable of scoring essays as well as human beings do [17]. Does this mean that the era of computer-grading system has finally arrived? It has been found that some automated essay-grading software cannot identify truth, can be easily gamed, is vulnerable to test prep, and sets a very limited standard for what good writing is [46].

Second, how valid is the use of peer assessment in MOOCs? Although peer assessment has been proposed as a means to provide human assessments at scale in MOOCs, it is not without problems [6]. An important assumption underpinning the use of peer grading is that peers or fellow students know enough about the subject matter [36]. But is that valid is such an assumption? Fellow students who are in the same course trying to learn the same subject may not have the necessary knowledge and experience, particularly as far as new topics are concerned. The use of peer grading may therefore lead to uninformed people leading others who are similarly incapable, somewhat like the blind leading the blind. Why then should a student believe the comments of their peers? In addition, many students really have no idea who their peers are given the large number of enrollment, so why should they really care about what their peers have to say [27]?

Furthermore, peers may not be consistent in their quality of feedback. Some students take the peer grading responsibility seriously and gave meaningful comments but others are hardly engaged at all [18]. Reasons for students’ lack of accountability in peer grading include students are not being graded in any way for the reviews, and that there is no intervention or check from the instructor - hence why bother [20]. Furthermore, some of the rubric criteria used for peer grading are so poorly defined and are never discussed prior to their usage [38]. Recent studies have shown that students found peer assessment to be undesirable when guidelines for evaluation were not clearly established in the beginning [46]. Faced with such ambiguity, a student may be beset by confusion when assessing their peers’ contributions.

Third, how do one eliminate cheating and fraudulent practices [47]? Cheating and fraud are, of course, not new issues in online education. But given the great hype over MOOCs, and talk of granting formal course credit to students who succeed in their MOOCs, cheating and fraudulent practices take on a greater significance. Basically, how can one ensure that the individual who submits a piece of work is indeed the person taking the MOOC? It has been reported that despite a nicely written code of honor such as upholding academic honesty and integrity, cheating does happen [28]. One of the ways by which cheating can occur in MOOC is voluntary identity sharing – where a “fake student avatar, now available for a small fee will take your class for you” [48].

Currently, there are two possible ways to eliminate cheating and fraudulent practices. These two methods, however, are not free but require students to pay some fees. The first method is to sign up for a Signature Track option available with some Coursera courses for a fee of US$49.00 to earn a verified certificate issued by Coursera and the participating university [48]. The Signature Track option attempts to eliminate cheating by creating a Signature Profile for each student to link a student’s identity to each piece of coursework he or she submits. The Signature Profile is created by recording a student’s unique typing pattern, taking a webcam photo of the student, and taking a webcam photo of the student’s picture ID. The Signature Profile concept is founded on the assumption that an individual’s typing pattern is unique and different from someone else’s. The students who are cheating need to use a webcam throughout the course. However, it is too soon to establish how really effective the Signature Track option is in curbing cheating. No study has been conducted yet.

The second method, which is probably the only cheat-proof way, is to have proctored assessment where students who have completed a MOOC coursework could go to a specific test location to do the individual exams under a teaching assistant’s or instructor’s supervision.

Conclusion

MOOCs have captured the attention of many higher education institutes around the world. To recall, proponents argue that MOOCs can help make education more accessible to as many people as possible, increase an institution’s reach, and enable professors to experiment with the pedagogy of teaching online courses to large number of diverse students. Opponents, however, denounce MOOCs as a potentially harmful and disruptive technology that offer a watered-down education, and increase the risk of further state school budget cuts.

The evidence has been found to support both sides of the argument to a certain extent. MOOCs can certainly increase an institution’s reach because they tend to attract a large number of students to sign up due to the courses being so easily accessible to anyone around the world with an Internet connection. MOOCs can also help professors teaching a MOOC can help a professor to experiment with the pedagogy of teaching online courses to large number of diverse students. Some professors have found this experience beneficial in terms of honing their own teaching skills, and enriching their on-campus classes.

On the other hand, although MOOCs attract a large number of students to sign up, only about 10% eventually complete the courses. There is also evidence from this review that some students still got good grades from their peers even though they wrote some garbage. This gives ammunition to critics who say that MOOCs offer a watered-down education. In addition, although there may be some benefit to professors teaching a MOOC, a word of caution is necessary, given that teaching MOOC is voluntary identity sharing, which a “fake student avatar, now available for a small fee will take your class for you” [48].

At the moment, it seems that MOOCs are merely another resource for learning, albeit a significantly more interactive content delivery platform as compared to a traditional printed book. Just as there is no one perfect method or solution for learning, MOOCs may be a viable avenue for people who are interested in a particular topic to learn something but are not really interested in gaining a credential. However, It is doubtful that MOOCs can completely replace face-to-face teaching and learning in on-campus colleges or universities.
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