

An Empirical study on Massive Open Online Courses(MOOCs)

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Abstract— The term Massive Open Online Courses (MOOCs) have drawn a lot of attention from various institutions across the world. There is an immense amount of idealism and altruism in the words of drivers who are making the MOOC movement. It is perhaps the most versatile form of educating interested learners because of its openness and availability. Over the recent years, it has brought upon a very innovative way of learning and made Technology Enhanced Learning (TEL) effective. An encouragement has been brought upon the elite universities in setting up learning platforms like the edX, Coursera, Udacity and various others. In other words, the data being collected through this learning platform can be used to retrieve useful information and henceforth be used to help students on having improvements academically. It is therefore crucial for modern learners to understand the concept of MOOCs. This empirical study has been carried out to give insights about what MOOCs actually is. The history, the motivation behind the development of this style of education, the different forms of MOOCs and some of the major challenges which the designers are still struggling to overcome have been identified and discussed in this paper.

Keywords— Massive Open Online Courses (MOOCs), Technology Enhanced Learning (TEL), e-assignment, Higher Education (HE), peer assessment, Open Educational Resources (OER)

I. INTRODUCTION

MOOCs (Massive Online Open Courses) have become very popular and received a massive deal of interest in the field of education. It was built up as an innovation to promote a sense of lifelong learning with a great potential. Online education has been expanded in ways one could have never imagine. It came into existence with a promise of providing cutting edge courses to learners around the world freely and potentially disrupt the models of Higher Education which are already existing. Nowadays, it has been widely used and considered among most of the institutions across the globe as a means to provide education or learning opportunities to a large number of learners through internet. It's availability of free courses online has been the major advantage among many disadvantaged or underprivileged learners who can't afford higher education college fees. As the courses are freely accessible online, it does not matter to which corner of the world the learner belongs to. Renowned corporations like Google and Pearson are also planning to develop the role of global players and become a part of MOOCs. But even though MOOCs have brought upon a new revolution in the field of education among the modern learners, institutions are now concerned of the quality of the education that is being provided through this platform. There is a requirement of commitment significantly of personal time and resources

which the institutions can provide. It is important to address the clarity it lacks and also to check if it is even worth creating considering the resources it provides. It has been always deeply analyzed by prominent universities from across the world because it is still in an infancy state despite its popularity. There are many challenges which have still yet to be overcome [2] [4].

The first part of this paper gives a review of the related work. The second part describes about an overview of MOOCs and its importance. The third part discusses about the types of MOOCs. The fourth part deals with the major challenges which the MOOCs designers are still trying to overcome.

II. RELATED WORK

As MOOCs is a relatively new area, we have actually selected some of the research papers which have some pretty good citations over the internet. The survey has focused more onto the general concepts of MOOCs. Providing quality education has always been one of the major concerns of MOOCs. The research work carried out by Judy Kay, Bob Kummerfeld, Elliot Diebold and Peter Reimann have described about the potential of MOOCs and its many learners [6]. Jeffrey A. Greene Christopher A. Oswald Jeffrey Pomerantz have pointed the importance of predictors for retention [13]. Thanasis Daradoumis has given a review

about the way how MOOCs operate especially when it comes to the concern of the design, the delivery and the assessment [1]. Larian M Nkomo came up with a strategy through which association rule mining has been applied to Moodle LMS data to discover the ways how students actually learn from these online courses [5]. Ahmed Mohamed Fahmy Yousef and his colleagues have explained about the state and art of MOOCs and the assurance of quality education. Daniel T. Seaton, Yoav Bergner, Isaac Chuang, Piotr Mitros, and David E. Pritchard have given an insight regarding the respective roles of the participants in the edX MOOCs platform [14]. There are some other major research papers which were being considered. The study combines all of these information being collected and summarize everything to understand the concept of MOOCs by dealing with only the major key points.

III. AN OVERVIEW OF MOOCs

MOOCs can be simply defined as an efficient means to provide free online courses to a large number of learners across the world. It thereby supports social networking and various forms of connectivity. It draws its power from the engagement of an enormous number of learners and the connectivity they build through the course platform. Most significantly, the concept of MOOCs has opened a doorway to have strategic discussions on how it can disrupt Higher Education potentially, making it something relatively new to be reckoned with. As a matter of fact, HE institutions need to come up with an informed decision and understand the different needs of learners in an educational market which is rapidly changing.

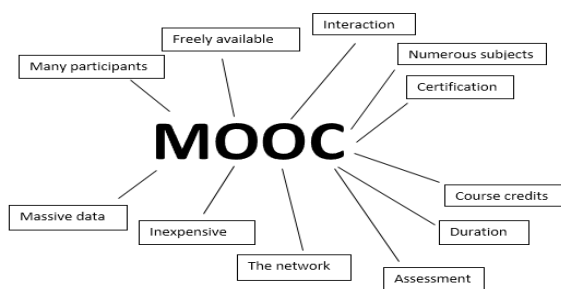


Figure 1. Different elements of MOOC

A. History

The term Massive Open Online Courses (MOOCs) came into existence in the year 2008. The title was coined by Dave Cormier with relevance to the course developed by Downes and Siemens “Connectivism and Connective Knowledge” [1]. It was initially designed and created for a total of only 25 students who actually paid fees to study for credit and later it was opened to all the learners who have registered worldwide. In the end, when the registration was made

possible, over 2,300 learners across the world started participating in the course freely without any payment and also to gain some credit. One of the very first courses was the course entitled “Introduction to Artificial Intelligence” which Sebastian Thrun was teaching at the Stanford University with some of his colleagues in the year 2011. This course attracted over 160,000 learners around the world making MOOCs a label for a number of recent online courses which were initiated earlier by stakeholders such as the various institutions and many other commercial organizations. This media attention led to the evolution of three online courses in 2011 which were developed by the Stanford University.

This movement has drawn the attention of various stakeholders and has paved a way towards the development of many other online courses. For instance, this new style of learning has brought the government officials, institutions and other organizations develop an interest in bringing a new revolution in the field of education. Currently there are many platforms which provides a wide range of various online courses. Some of the most prominent ones are Udacity, Coursera and edX. Udacity was launched in the year 2012 by Sebastian Thrun and Peter Norvig as a profit model of MOOCs. With the passage of time and the recognition of this new form of education, Daphne Koller and Andrew Ng led to the development of Coursera which comprises of various online courses by collaborating with many well renowned universities aiming to provide quality education. Another platform which rise into prominence along with these platforms is the edX (launched by the Harvard University and the Massachusetts Institute of Technology). [5][9][11].

MOOCs was developed to bring openness in the field of education. It came into existence with a desire and an intuition to provide education to a large number of learners regardless of the geographical location, economic and demographic constraints. It has unique features that can make Technology Enhanced Learning (TEL) effective [3]. Recently, new MOOC providers like the Cognitive Class and Moodle 3.4.2 also got launched in the year 2015 and 2018 respectively. There are different forms of MOOCs. Some of them are very interactive (interaction among the participants) while some of them are not that much interactive and instead comes along with more study materials and more resources. There have been many challenges as well as this new style of education is very fresh and new [4] [7].

B. What motivates the MOOC providers?

- MOOCs has been widely known for its open nature and the scalability. Therefore, it provides a great deal of opportunities in Higher Education (HE) for

expanding access and to carry out experimentation in online education [6].

- It will also allow universities to reach out to the interested learners internationally and get recognized.
- The ‘digital footprints’ left by the learners can be analyzed properly to get useful insights. This will indirectly help in identifying various patterns which can be used to improve student learning strategy [10].
- From a political point of view, the development of MOOCs overcomes the budget constraints and helps in reducing the cost for the various degree courses.
- From a commercial organization point of view, this new form of education will definitely help on making collaborations and to develop partnerships with other organizations. This will thereby led to the exploration of new delivery models in Higher Education.

C. What motivates the MOOCs learners?

- Some participants join the course with a desire to learn something about a subject with no particular goal. They are least bothered about the completion of the course.
- Participants do it for fun and takes this platform as a form of entertainment with an intention to help them gain some social experience.
- The courses being free and easily accessible.
- For the sake of exploring online education.

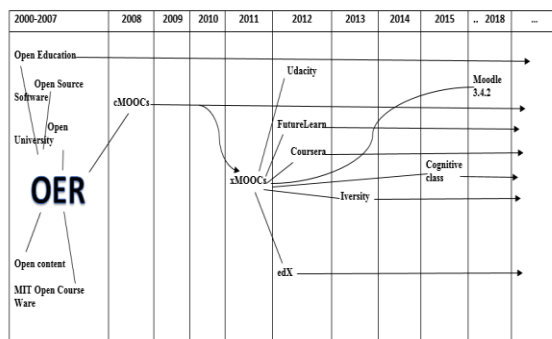


Figure 2. Evolution of MOOCs

IV. FEATURES OF MOOC

MOOCs is actually a combination of four main key characteristics.

- *Massive*

The platform is massive with infinite scalability although some technological costs are involved such as the bandwidth. It has been suggested that the term massive here is not to attract many people but to create or come up with elements which can actually be used in educating as many learners as possible.

- *Open*

It is openly available with no prerequisites for the participating members other than having a mobile phone or a computer to have an access to it via internet. Platform like the Coursera holds legal rights to the materials being provided. The materials cannot be reused without taking a permission. It may even remove the material after the completion of the course. Not every institutions are allowed to simply host MOOCs on its platform. The decision will be made Coursera. Unlike Coursera, edX is more of an open source platform. Any institution is free and have the right to develop MOOCs of their own [12].

- *Online*

MOOCs is something which is made available online to learners regardless of where the learner is from or where the learner studies. Some of the institutions however are negotiating these days to make use of the materials being provided in a blended format. And by this, the institution wants to provide materials through the instructors based on the campus. For example, institution such as the San Joe State University takes the materials required from Udacity and use these materials to educate students by conducting quiz, mini group activities, etc.

- *Courses*

What makes MOOCs different from other open online courses or educational resources is that MOOCs have been arranged and organize to provide a whole course. Some courses give certificates to learners after the completion of a course even though some financial payment have to be done. But still now none of these certificates can actually can be used for admission into Universities.

V. TYPES OF MOOCs

MOOCs are mainly divided into two types “cMOOCs” and “xMOOCs”. cMOOCs also known as the connectivist MOOCs involves the kind of network through which the participants interact with each other and gives feedbacks to each other. The learner are free to define their aims and objectives. Knowledge is shared among the participants through collaborations. The participants use social networking websites and application such as Twitter, Google groups and Facebook to create groups for discussions without any restrictions. cMOOCs are mainly for the like-minded learners or individuals who do not have to worry about or say who are free from any institutional constraints.

Moreover, it uses peer assessment for grading the learners. This form of MOOCs was the first that came into existence. [1] [8] [11].

xMOOCs which is also known as the extension MOOCs uses a behavioral approach. It is more pedagogical in nature and is used more within the institutions. The objectives of the course are pre-defined by the teachers wherein the recorded videos are used as a means to teach the learners. It also includes quizzes, e-assignments, mini projects and other computer automated test to assess the learners. Unlike the cMOOCs, interaction happens mainly within the platform itself. The communication space among the participants is very less and limited. Peer assessment is rarely used. However, xMOOCs is more common.

There are some other types of MOOCs which are relatively new. These new forms include the sMOOCs where the number of the participants are smaller and the bMOOCs, which is also known as the blended MOOCs. In bMOOCs, the participants are given the facility to communicate with each other to some extent. It works with the hope of bringing more commitment and enthusiasm among the participants. There is one more form of MOOCs known as the quasi-MOOCs which are technically not courses but intends to provide or bring upon an online educating platform where the learning resources are asynchronous. It neither includes social interaction nor the automated grading process.

cMOOCs	xMOOCs
<ul style="list-style-type: none"> Based on the concept of connectivism. Participants can define their objectives. Uses a network wherein the participants interact with each other to clarify things. It promotes social networking. Uses peer assessment. More informal. 	<ul style="list-style-type: none"> Uses a behavioral approach. The objectives of the courses are already pre-defined by the corresponding instructors. It is individually focused. Uses automated tools and e-assignments to grade the learners. More formal and pedagogical.

Table 1. Comparison between cMOOCs and xMOOCs

VI. CHALLENGES IN MOOCS

Here, we describe some of the major challenges which are currently being face by the designers and the developers.

- Many of the participating institutions still consider MOOCs and the course it offers to be more of a branding activity. This is because of the massiveness and also because of the low teaching involvement. It definitely lacks structure and the concept of the instructor being the central role is rarely considered.
- MOOC providers may have covered or reach out to various parts of the world but when it comes to the concern of reaching out to the individuals, they still have to work it out. It is important to understand the learners' motives and their educational background.
- As we already know that MOOCs contains varieties of multimedia contents to explain the concept of the courses provided in a much better way but it is problem if the leaners can't understand what is there in the content. Not every learners has the same skillset necessary to understand the contents being provided. Language and cultural barrier have always been a major concern during the delivery stage because not every country speaks the same language or follows the same culture. Even if the courses are available freely online, not every people can understand or speak English. The educational backgrounds of the learners have to be considered. Because of the heterogeneity of the leaners, personal customization has to be made possible.
- One of the most important problems which the developers or the designers often face is the high drop-out rate. It has been indicated that only some 5% to 15% of the participants have actually completed the course fully. Rest of the learners observe or make use of the only the materials or the part of the course which is more important to them rather than taking up the entire course. It has been reported by Meyer in the year 2012 that out of 50,000 students, only 7% of the students have actually completed the course of Software Engineering in the Coursera UC Berkeley. The drop-out rates were nearly 80-95% [13] [14].
- The ways how the students are being tested or assessed have to be improved. The question nature has to be changed every time so that students don't cheat and also to checked if they have actually understood the concepts of the subject being taught or not. For example, some of the Coursera courses involves the submission of essay as a part of assignment towards the leaners. This

submission of the essay can be cheated easily by the learners. All they can do is to produce an essay and the plagiarism is being checked through some free online tools. Students generally are less concerned about such things [2] [5].

VII. CONCLUSION

This survey was taken up to deeply understand some of the important concepts of MOOCs as it has become very prominent in the field of education. The evolution of online education, the different forms and the challenges have been highlighted in this paper.

It has been studied that the goal of the MOOC producers to reach out to a wider number of learners and to bring an improvement in the field of education has been achieved to some extent. The geographical coverage for instance has been accomplished but not in terms of reaching out to the different individuals who have fewer educational opportunities. Learners who are highly motivated and who have a proper access to the internet seemed to be major participants. At the same time, most of them who have registered in these courses happened to be the ones who at least completed their bachelor's degree. MOOC producers are educating the ones who are already educated. This has led to the diversion between those who have access to education and the ones who have not a proper exposure to education yet. Even if many institutions have the desire to bring a change in educating participants, it has been observed that there is little financial justifications for the institutions to carry on with the courses except for those participants who are willing to pay it.

The future work tends to focus on the improvements that can be brought upon by directly interacting with some of the major universities and finding out the ways how students are actually learning through this new style of education. Feedbacks can be taken from the instructors and a more detailed document can be formulated.

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