MOOCs in Higher Education: Opportunities and Challenges

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Abstract. In the modern era of Information Age, higher education has been gradually transferred from the activities based on individual experiences to a systemic and complicated project with the large amount of information and its own team. MOOCs are the outcome of the current times, which have injected new vitality to higher education and driven its reform. Compared with the traditional teaching, MOOCs bear the outstanding features of free and open registration, an open curriculum, and open-ended outcomes, which make its wide popularity around the world. MOOCs have brought in golden opportunities for learners to access high quality courses more easily and for instructors to present their teaching capability on a larger platform. At the same time, MOOCs are faced with challenges such as the high rate of dropout compared with the high rate of enrollment, and the lack of effective evaluation system. The further development of MOOCs lies in the blended teaching combining the traditional classroom teaching and online teaching, the relationship between which is complementary.

1. Introduction

MOOCs (Massive Online Open Courses) are a new trend of education development pushed forward by digital media and internet technologies. The term of MOOC was coined and employed by David Cormier and Bryan Alexander in 2008 in order to introduce the course of Connectivism and Connective Knowledge developed by Stephen Downes and George Siemens [1, 2]. The presence of MOOC is the transmission and development of the open-minded teaching concept rather than an accidental event. It was firstly referred to as cMOOCs, where the individual is regarded as the knowledge knot. Functioning both as students and teachers, learners work together to form a connecting network and the course is like a learning community. While cMOOCs reflect a teaching ideal which is open, connective and learner-oriented, the courses with xMOOCs as the blueprint are presented by the well-known universities around the world and lead to huge influence.

In 2012, promoted by the three leading enterprises of Udacity, edX and Coursera, MOOCs attracted extensive attention from the international society and became a hot issue in the fields of governing, media, business and education in many countries like America, Canada, Britain, Germany, Australia and China. Based on MOOC, several new learning modes have appeared, such as SPOC (Small, Private Online Course), Meta-MOOC, DLMOOC (Deep Learning MOOC), MobiMOOC, MOOL (Massive Open Online Lab), DOCC (Distributed Open Collaborative Course), PMOOC (Personalized MOOC), MOOR (Massive Open Online Research), SMOC (Synchronous Massive Online Course).

Wikipedia defines MOOC as "an online course aimed at unlimited participation and open access via the web." [3] This definition tells that with the online media MOOCs can help as many learners as possible learn the quality courses from famous teachers in famous universities and offer the certificates to show the learners have finished the course and passed the test. They embody the prominent features of large scale of participation, openness and distributed learning [4]. These basic features of MOOCs derive from the teaching idea of the sharing of resources, which emphasizes that the gaining of knowledge should not be restricted by population, ethic groups, economy, districts or

other factors. MOOCs have challenged the credit system and the degree program mode in traditional universities, which distinguish them from other open educational resources.

In recent years, studies on MOOCs are increasingly fruitful and have shifted their topics from the relatively macro perspectives of the introduction and values of MOOCs to the various perspectives such as policy, business, culture, society, teaching, technology and so on. The hot issues on MOOCs are their differences from traditional teaching in forms, teaching methods and ideas, their future and their effects on higher education. The case analysis and summary concerning different platforms and courses often appears in current literature [5, 6]. The following are the summary of the present literature on MOOCs studies. (1) Studies on the introduction and review of MOOCs. Literature of this kind mainly focuses on the introduction of the background, connotation, features, classification, value and development of MOOCs in the first few years after its rise in the year of 2012. Some scholars analyze the structure of MOOCs and their influence on higher education from the perspectives of open education, online teaching, system and cultural strategies. For example, Baggaley (2013) [7] introduces how MOOCs rise, their characteristics and types and explores the nature of MOOCs and their impacts on the future of distance education. Zimmerman *et al.* (2013) [8] summarizes MOOCs' status quo, analyzes their achievements and challenges from the angle of online teaching and predicts the development of MOOCs in the field of higher education. (2) Studies on the relationship between MOOCs and the reform in higher education. MOOCs have created challenges and opportunities for the talent cultivation, teaching, human resources and function innovation in universities. For example, Subbian (2013) [9] analyzes the positive influences of MOOCs on higher education in the five aspects of computer-aided learning, cross-disciplinary education, non-technology skills, teaching technology and students' evaluation, and explores how MOOCs promote STEM teaching by using the teaching case in Coursera. (3) Studies on the educational system of MOOCs. Wagner *et al.* (2013) [10] construct the 3D virtual learning environments and apply them into the teaching practice. Brinton *et al.* (2015) [11] integrate the technologies of video, text, evaluation and social network into mobile app and develop the platform of MIIC (Mobile Integrated and Individualized Course). (4) Studies on the construction, application and spreading of MOOCs. For example, Hew *et al.* (2014) [12] find out that students' motivation for applying MOOCs is to learn new knowledge and satisfy their curiosity and teachers' motion is to gain individual interests.

2. Opportunities brought in by MOOCs

The traditional mode of talent cultivation is often teacher- and textbook-oriented, that is, students learn knowledge under the instruction of teachers who take textbooks as the guide. In the information age, it is impossible for higher education to avoid the the huge wave of this era, which is the background of teaching innovation in today's universities. The fast spreading of MOOCs since the year of 2012 has been causing historical changes to higher education and bringing in golden opportunities for its development.

2.1 Features of MOOCs

The extensive application of MOOCs in the field of education is the realization of the cooperation between the upgrading of the educational resources and other fields outside education in its broad sense and the realization of the teaching aims by employing the internet technology. As a modern teaching mode, MOOCs bear the following features.

Firstly, the diversity of courses is the most outstanding feature of MOOCs. In the aspect of teaching languages, the large quantities of quality courses cover the languges of English, Chinese, French, Japanese, Portuguese, Korean, etc. In the aspect of disciplines, they include not only the theoretical subjects in the fields of humanities and social sciences, science and engineering, medicine, arts, etc. but also the operating courses such as techniques for photography, the statistics tool of SPSS. In the aspects of learners, there are students in universities, employers in enterprises and public institutions, teachers hoping to communicate with their peers. In the aspect of institutions providing

the courses, there are teaching platforms such as Coursera, edX, and OpenLearning, and high-quality courses offered by the first-class universities at home and abroad.

Secondly, autonomy is one of the features which runs through the MOOC teaching. When students enroll the MOOCs, they choose the online courses according to their own interest, which gets rid of the limits of the traditional curriculum schedule. In the learning process, students are not restricted by time and place. They can learn the courses anytime and anywhere, which ensures the enough learning time on the one hand and improves students' learning efficiency on the other hand. At the end of the courses, students can choose to take part in the examinations to finish the course and get the course-completion certificate. Universities in some countries have even set up the credit transferring system, i.e., the scores in MOOCs can be converted to the credits in universities. After finishing the required courses, students can get the graduation certificate or vocational certificate in a relevant field.

Thirdly, the sharing feature of MOOCs is also called the openness, which is presented in the the spreading of courses. Courses in MOOCs are posted on the internet platforms and learners can make their choice at their own will. Most courses are free of charge, and learners across the world can get them from the internet. The positive consequences of these shared courses are that students and scholars from every corner of the world can gather together via internet and discuss a certain topic. They can put forward questions and exchange their views by using the internet communication tools such as Facebook, Twitter, MSN, QQ, WeChat, etc..

The last feature of MOOCs discussed here is the accessibility, which means that you can get the existing quality courses if you want. Different from the traditional teaching mode which costs plenty of time and money, courses on the MOOCs platform can be gained in a much easier way.

2.2 Opportunities for higher education

The traditional teaching mode and talent cultivation pattern can no longer meet the requirement of higher education in the modern era with the information technology as the outstanding feature. Today, the aim of teaching in universities is to construct the "community", where both teachers' and students' innovation is highly valued and the harmonious development of teaching, research, application and social service is stimulated. In this very way, the sticky contradiction between teaching and researching finds an effective way-out.

With the integrated system of homework, exams and discussion, these courses spread quickly and attract more and more students and universities. The presidents and teaching leaders in universities begin to realize that the rise of MOOCs will definitely drive the reform in university teaching. The wave of curriculum innovation introduced by MOOCs is still playing a considerable role in higher education. Teaching is the everlasting theme of higher education. Nowadays, under the background of the deepening teaching reform of higher education and the imbalanced distribution of quality education, the fast development of information technology has become the strong impetus to improve higher education and the integration of technology and education provides a new way to solve the existing problems. As a typical representative of this integration, MOOCs have successfully opened the running mode of "internet + education" and highlighted the implied question of the quality of teaching in the international competition of higher education, which has stirred the higher education pattern and realized the share and spreading of the top higher education around the world. In other words, the development of MOOCs has impacted the supplies of traditional education and stimulated the distribution of education resources in a fairer way or even reconstructed the present mode of educational supplies. This has satisfied people's strong desire for knowledge and brought in the opportunity for universities to reform in their teaching content, teaching method, teaching mode and teaching organization.

Nowadays, MOOCs are playing a leading role in the curriculum innovation and teaching reform in universities, which functions as the crucial opportunity for the development of teaching and researching in universities. MOOCs emphasize learners' participation in courses, which lead to two transfers in teaching. One is the transfer from the traditional class to the effective class with the

innovation in teaching mode as the characteristic. The other is the transfer from the teacher-centered to the learner-centered teaching structure. The integration of MOOCs into higher education stresses the integrated experience of both teachers and students. In the innovation process of teaching process and teaching mode, the teacher-student roles have been changed. Different from the one-way knowledge transmission in former online courses, MOOCs focus on learners' interest and learning needs. Under the teaching environment supported by MOOCs, students have transferred from the former passive knowledge receivers to the active automatic learners and become the real learning body. For teachers, MOOCs' openness has caused potential impact on their courses and made them increasingly realize the importance of the participation in the "internet teaching" and learning from the other courses in the aspects of course purposes, teaching content, teaching design, evaluation means and the employment of media. On the other hand, the shortening of teaching time and the lengthening of learning time means that teachers are no longer the body and authority of knowledge extension and application. They should first of all learn and integrate the learning resources, coordinate the teaching and learning team, and sometimes, they have to function as the organizers, leaders and servers to organize, guide and evaluate these learning activities and solve the learners' problems.

Undoubtedly, MOOCs' setting up has benefited learners around the world. As MOOCs' providers, universities have also benefited a lot. They are platforms for teachers to present their teaching skills and universities to construct their image, which can be compared with the corresponding counterparts around the world. MOOCs' rising means that the competition among universities will show not only in the research statistics such as papers and research projects but also in the courses which are actually the basic unit in university teaching. More and more professors in universities begin to leave their labs or offices, and join in MOOCs to present their capability in teaching. A successful course on the MOOC platform often attracts thousands of or even millions of learners, which brings to the professors the huge achievement equivalent to any other research. For the young teachers keen to teaching, this is a unique and effective way of their academic growth in today's fierce competition in research. MOOCs require teachers to devote themselves in teaching, study the teaching achievements of their peers around the world and form a team to construct the courses and develop their teaching. In this sense, MOOCs have become a systematized project for teaching innovation and the team integrating research and teaching will finally benefit both of them.

It is safe to say that courses like these are the important academic achievements. The openness of the massive online courses has created a brand new way to openly present teaching fruits, which has long been the pursuit of relevant researchers. In the past, teaching fruits could only be presented in the ways of teaching papers, teaching archives and students' memories, which caused the loss of much information. Due to the limit of the ways to present their teaching process and the universities' skeptical attitude towards the academic nature of teaching, many teachers have not been rewarded for their hard work in teaching. MOOCs can present the whole teaching process in a complete way, covering the teaching syllabus, interpreting video, answering questions, discussion in class, students' homework and teachers' feedback. What's more, the big data collection and the artificial analysis system helps to present learners' dynamic learning process and learning achievements, which makes them the most complete and objective way to show teaching fruits till now.

In addition, MOOCs offer the opportunity for the development of the competitive courses and disciplines in some colleges or universities. These courses and disciplines are often closely connected with the relative industries and playing a leading role in their development. When they are presented on the platform of MOOCs, more popularity will be gained. At the same time, learners who are interested in them have more chances to access them, which realizes the sharing of the resources.

3. Challenges MOOCs are faced with

In recent years, MOOCs have been extensively applied in higher education and benefited a lot of learners and teachers. Meanwhile, they are faced with some challenges.

One of the distinct challenges lies in the high rate of dropout compared with the high rate of enrollment, which requires the reflection from the curriculum designers and researchers to find out the reasons behind it. One possible reason is that the courses cannot meet students' personalized learning needs. In the design of the current MOOCs, courses are not updated according to students' instant needs. As a result, it is necessary to improve students' online learning experience by predicting their learning needs on the basis of their learning behaviour data. The openness and the sharing features of MOOCs are a double-edges sword, which offers both convenience for learners and instructors and becomes a challenge for the teaching management in MOOCs. The lack of positive motivation, self-stimulation and effective interaction are some of the reasons for students' dropout from MOOCs. Other reasons include the low coverage of credit certificate, the differences of learners' knowledge background and learning needs. What the open online courses need to do is to start from the perspective of "curriculum", establish the new cultural concept, construct the new ways to organize the courses and combine the online education in mind and in reality. The relevant institutions, universities and platform operators should provide support for MOOCs, pay special attention to learners' needs, enhance the acceptability of the courses and stimulate MOOCs' combination with classroom teaching.

Another challenge comes from the evaluation system. The traditional one mainly focuses on whether students have mastered the knowledge in textbooks or provided by teachers via comparing students' homework or examination papers with the standard answers. This kind of evaluation pattern is similar to the production of goods in assembly line in factories. Its major shortcoming is students' passive role as "being evaluated" and teachers' boring and repetitive work. When it comes to MOOCs, students are much more flexible than the ones in traditional classes for the freedom from the restriction of time and place, which makes it impossible for teachers to supervise their learning process. Besides, MOOC learners are various in both learning manners and learning purposes. The differences and complexity among the learner groups makes the evaluation of their learning consequences a hard job. It is urgent to introduce the modern technologies such as artificial intelligence, cloud computing and big data into the evaluation system of online courses, which requires the blending of the new generation technology and the evaluation pattern. The difficulty lies in the innovation of evaluation, which puts forward the following questions. How to classify learning aims and define on which level learners are? How to realize the inherent combination of the two? Which data should be collected on the learning platform? How to store the collected data in a proper way? How to extract the most important evaluative data from the various courses and learners? How to present the collected data to the online learners or instructors? Answers to these questions are needed to supply support to the extremely complicated learning evaluation system, which will definitely go through a long-term exploring process.

Besides the challenges mentioned above, MOOCs in the era of the sharing of educational resources are faced with the problems of their sustainable development and their intellectual property. Specifically speaking, the unsatisfactory problems with MOOCs are as follows. Many courses are not finished, the teaching modes of some courses do not match the requirements from the online open courses; the contradiction between the fragmentization of online courses and the integrity of the discipline has not been solved yet; the structured design of curriculum cannot attract the personalized needs from individual learners, which causes the unsatisfactory experiences of the learners; the excessive focus on technology often neglects the needs from the interaction in teaching at the deeper level; the obvious presupposition of the online courses pays little attention to the diversity and variation of the teaching process. The list of these challenges is barrier to MOOCs' development and requires effective ways to be solved.

4. Summary MOOCs' development paths

In the era of "big data", the scientific research methods have been transferred from the pursuit of the unidirectional cause-effect relationship to the complicated multiple correlation, which can be

presented vividly, systematically and clearly and offers a brand new idea to reveal the rules behind the complicated phenomena. This new method functions as both a telescope and a microscope for people to explore the unknown world and greatly enhances human's ability to deal with the unpredictability in this easily changeable times. In the complicated research field of higher education, this new concept functions as an indispensable means to realize educational innovation and development. MOOCs are the outcome of this new era. One important thing to be emphasized is that they are the deep fusion of the communication technology, internet platform and the networking idea on the one hand and the education system, cultivation mode and teaching concept on the other hand, rather than the simple adding of internet and education. Considering the opportunities brought in by MOOCs and the challenges they are faced with, the development of MOOCs lies in the blended teaching.

Blended teaching refers to the teaching combining the traditional classroom teaching and online teaching [13]. Among various teaching patterns in blended teaching, replacement modality and supplement modality are the most common [14]. The former intends to reduce the time for classroom teaching and spend the extra corresponding time on online teaching, while the latter reserves the existing time for classroom teaching and makes full use of the extracurricular time to teach and learn online. This blended teaching pattern combining online teaching and offline teaching is accepted and employed by more and more teachers and universities. The existing MOOCs are integrated into the traditional class where students finish their course learning, pass the examination and gain their credits by the offline learning in the classroom and the online learning on the platform of MOOCs. It is widely acknowledged that teaching is the core of higher education and the crucial link for talent cultivation. Blended teaching links the advantages of traditional classroom teaching and MOOCs and can be regarded as the future of educational development. Students can learn their courses at any time and in any place and discuss their questions and share their views in the classroom. This new teaching pattern makes some requirements for both teachers and students. On the side of teachers, they need to prepare the class according to the teaching aims, post the teaching tasks online and reserve time for discussion. On the side of students, they should learn their courses carefully, think about questions critically and finish their tasks on time. In the face-to-face discussion, teachers can also know about their students' problems in learning, offer suggestions for further learning and help them draw up the personalized learning mode. The combination of MOOCs and classroom teaching in higher education will be definitely an effective means to push forward the current talent cultivation mode, satisfy students' various needs for their own development and markets' needs for diversified talents. In this way, it is expected that the space for students' development will be extended and their construction for knowledge will be realized through their interaction with their teachers.

Two other ways should also be mentioned for MOOCs' development in the future. One is to enhance teachers' awareness of the application of MOOCs since teachers play an essential role in higher education. Teachers should also be encouraged to be innovative in teaching and develop their own quality courses. The other way is to establish and polish MOOCs' credit and education certification system. In this way, students will be stimulated to learn more on MOOCs. Besides, some measures should be taken to make full use of MOOCs' advantages and potentials. On the level of teaching reform, the effective learning pattern based on MOOCs should be explored and the technology support should be supplied. On the level of teaching management, the sharing system of online learning data should be established and course selection and the mutual recognition of credit should be implemented in a more effective way. Since the evaluation system of MOOCs has been criticized for its unsatisfactory performance in online courses, peer evaluation can be employed as another effective way, which encourages students' more involvement and discussion in courses.

All in all, how to improve learners' experience in learning matters a lot in the era of big data. It is necessary for instructors to know that the aim of online courses is to enhance the teacher-student interaction. In the effective teaching, both the teachers' and learners' passion should be inspired. On the one hand, when designing the teaching activities, teachers should keep students' effective learning in mind, and make it happen by the joints efforts from both sides. On the other hand, students need to be responsible for their learning and practice their ability of life-time learning and independent

learning. In this way, both teachers and students can benefit from the process of teaching and learning.

5. Conclusion

MOOCs have brought in both opportunities and challenges to learners and teachers around the world. There are certain problems deserving the reflections from the instructors and researchers, such as how to keep MOOCs' sustainable development and how to get out of the current difficulties in higher education innovation. On the one hand, with the multiple research perspectives, most studies on the theory and practice of MOOCs are still at the preliminary stage and there is a lack of systematized research theme. In the future studies, researchers should focus more on MOOCs' educational value and switch their research from the individual course to the comparison among different learning situations, from the after-event analysis to more more effective teaching design. On the other hand, studies on MOOCs' application and practical pattern are not sufficient. Most current research on MOOCs mainly focuses on the theoretical discussion, management evaluation and investigation on learners' acceptability and satisfaction. As an important drive in higher education reform, MOOCs help to reconstruct the education service pattern, realize the talent cultivation aim and improve learners' spirit of innovation.

Some enlightenment can be gained from the reflections on MOOCs and traditional teaching. For example, the relationship between them is complementation rather than substitution and the combination of the two can make both of them play their roles effectively [15]. MOOCs' functions are multiple: they can help students prepare themselves well for a new term, they can improve universities' popularity, and they can also provide the online learning data to improve traditional courses [16]. As a result, researchers should keep pace with the times and regard MOOCs as the means to reform educational technology. MOOCs comply with the trend of education development in the era of internet and the popularity of information technology makes the cultivation of international talent a mission for more universities [17]. The openness and cultural diversity of MOOCs bring in a series of questions requiring our further research and exploration, such as how to ensure the teaching quality of MOOCs with so many online learners, how to integrate the cross-cultural concept into MOOCs in different courses, and how to improve learners' cross-cultural capability. In future research, more efforts should be paid to enhance the learning opportunities provided by MOOCs.

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