

Chinese MOOCs on the Way: Opportunities and Challenges

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As China attempts to achieve mass higher education,¹ its quality and efficiency have drawn attention and been questioned widely (Li et al. 2013). In addition, students from different backgrounds do not have equal opportunities for high quality education because of existing huge disparities in basic education and among universities. Furthermore, higher education institutions use traditional teaching methods and a pedagogical ideology that focus more on teaching than learning. This situation seems to have repercussions in the world of work. Employers often complain that college graduates lack creativity and the professional skills that jobs require. Despite of being common worldwide, these problems have attracted close attention from different sectors in China in recent years.

Innovation in education has been prompted by the rapidly developing information technologies. For instance, Massive Open Online Courses (MOOCs) emerged in 2012 and became an educational buzzword. Different from the traditional long-distance education and open online courses, MOOCs are based on well-designed pedagogy, emphasize instructional design, employ diverse social interaction platforms, and collect big data² used for data mining and learning analytics.³ These characteristics are used to improve teaching quality and the online course systems (Zhang and Li 2013). MOOCs, with their unprecedented openness, transparency, and accessibility, bring more opportunities to higher education (Li, et al. 2013).

Upon the launching of three major platforms, edX, Coursera, and Udacity, many institutions in the United States have adopted MOOCs. To the present, four leading Chinese universities have joined edX and the Coursera Consortium. Among them, China's top two universities, Tsinghua University and Peking University, are pioneering in this field. Having joined edX on 21 May 2013, Tsinghua University hopes to take advantage of high-quality educa-

tional resources and best practices from the world, while developing its own MOOCs. Compatible with international platforms, Chinese MOOCs will, in turn, contribute to education worldwide and facilitate the transformation of the country's higher education.

Tsinghua University has delivered five courses through edX by March 2014. In order to properly develop this project, the Center for Massive Online Education in Tsinghua University (CMOE) has been co-founded by the Institute of Computer Science, the Institute for Interdisciplinary Information Sciences, the Institute of Education, and the Department of Psychology. Currently, CMOE is creating the online platform and constructing the MOOCs. The next section presents our previous studies on the topic.

Learning Analytics and Education Assessment Based on Big Data Generated from MOOCs

Considering the development of technology and learning sciences, there are high expectations that MOOCs will transform education by designing massive teaching based on individual differences. Learning analytics and educational data mining are useful to achieve this. In a study published in 2013, Zhang and Li discuss big data definition and analysis, new ideas of learning analytics and education assessment, and problems and challenges. They conclude that analysis on online course big data will significantly improve education assessment, learning analytics, and education quality.

However, China's challenges cannot be ignored. At the policy level, one of the challenges is the shortage of analysts and managers to conduct learning analysis and data mining. Effective policies are necessary to encourage and ensure cooperation and data sharing among different sectors, in order to achieve holistic and systematic analysis on learners. Furthermore, privacy protection is a premise

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in data collection and analysis to avoid legal and moral pressures. At technical level, big data analytics and data transfer require adequate hardware and software resources.

Needs Analysis of MOOC Learners in China

In order to better serve MOOCs' users, it is important to understand and consider what students need and how to improve their learning experience when constructing China's MOOCs. In response, Liu and Huang conducted an empirical study in May 2013 to analyze the experiences and needs of Chinese online learners. The study provided preliminary empirical evidence of online education research and practical experience of curriculum design and teaching. Data were collected from a discussion forum on Guokr Study Room (<http://www.guokr.com/>), a Chinese social network site founded in October 2012 that targets young people interested in science and technology.

Among 30,000 users, there were 746 entries posted on Guokr Study Room before 1 June 2013 related to learning and MOOCs; they were the sample for this study. The postings were classified into 11 categories based on the topic, such as personal experience, language, technology, information on course selection, course certification. Postings and replies were calculated thereafter.

The study concludes that: First, individual learners need support from both online and offline discussion groups. Second, access and speed of internet connection are still bottlenecks that limit learning and results. Third, students experience language barriers in courses, which are mostly taught in English. This is a major concern for Chinese MOOC designers. Fourth, course certificates are necessary in the long run and it needs to be regulated by national education policy.

A Qualitative Study on the Future of MOOC

Instructors

A qualitative study was conducted by Yang Liu and Zhenzhong Huang (Liu, et al. 2013) in June, 2013 to explore the process and problems to develop MOOCs at Tsinghua University. Three instructors and an online platform provider were interviewed about the process of

developing MOOCs and course evaluation. At that time, three courses were offered in Tsinghua University, including "Software Engineering" (a course offered through Coursera), "Foundations on Circuits" (a traditional online course), and "Open Hardware-based Citizen Science" that was under development.

The interviews revealed that, in general, MOOCs in China are still in a trial stage. Instructors from Tsinghua University are considering developing MOOCs using their own educational theory and practice and deciding which technologies to use. Hence, it is too early to make generalizations about the process of developing MOOC courses. Moreover, close teamwork involving faculty, teaching staff, platform designers, and business model operators is important to develop the courses.

Research on Technical and Pedagogical Features of MOOCs

As MOOCs are attracting more institutions in China, researchers in the field summarize the technical features of MOOCs as follows (Sun 2013; Li 2013):

1. Short modular units (usually less than 10 minutes) and interactive exercises. A series of short units combined with all kinds of learning materials make the learning process "flexible." Thus, students can manage their pace and get actively involved in their learning.
2. Instant feedback based on interactive exercises. Traditional online courses can serve massive users, but they can only provide learning materials and cram learning without interaction. MOOCs have overcome this limitation. Through auto-grade interactive exercise, learners can get instant feedback, are encouraged to think actively, and get better results.
3. Personalized learning based on big data. Personalized learning is an ideal goal that educators and learners keep pursuing. However, we cannot afford Dalphine Koller's (2012) idea that a society should provide every student with an individual human tutor. Currently, personalized learning is possible by providing each student with a com-

puter or a smart phone. With big data, students can get personalized feedback much more effectively to help them fix their problems. Furthermore, employing data mining and learning analytics allows instructors to know each learner's level and provide them feedback, recommend suitable learning resources, and further improve and design teaching content. As a result, personalized teaching and a research team will produce courses that effectively assist learners (Li 2013).

4. Learners' interaction in social networks. MOOCs rely on interactions in social networks to gain interest and motivate students. Compared to auto-grading, peer-grading is more effective for interactions. Throughout each MOOC, a global community of learners would form a shared intellectual endeavor. Students collaborate in these courses in different ways, for instance, in question-and-answer forums where students post questions and other students respond to them. Because of the size of the online community, learners can interact with each other in more than they do in physical classrooms (Koller 2012). Students also self-assemble into small study groups around common topics of interest such as geography or physics.
5. Campus-like weekly course. The organization of MOOCs is similar to that of on-campus courses. They start on a given day, students watch videos on a weekly basis, and do homework assignments. Assignments are real homework for a grade, with real deadlines (Koller 2012). These are all learning experiences for learners, who get something meaningful for the time and effort invested.

Besides their advantages, MOOCs still have much potential to improve. This can be done by further exploring and enriching interactive exercise, auto-question and auto answer, and auto-grading and virtual laboratory. To maximize their implementation, MOOCs in China should employ more quality teaching resources (which are currently expected), advanced interactive information technologies (which Coursera and edX still

need to improve), and brand-new teaching theory (i.e., micro-video and big data) (Sun 2013).

Challenges for MOOCs in China

Phil Hill (2012) states that in order to become self-sustaining, the concept of MOOC must overcome four challenges: developing revenue models; delivering valuable signifiers of completion such as credentials, badges, or admission into accredited programs; providing experience and perceived value that enable higher course completion rates; and authenticating students in a manner that satisfies accrediting institutions or hiring companies. Moreover, our research also reveals that MOOCs face challenges such as educational equity, completion rates, sustaining revenue models, deskilling professoriate, intellectual property, and plagiarism. Ye and Su (2013) noted that Tsinghua University is also experiencing these challenges.

Researchers will keep working on developing online education platforms, constructing MOOCs, and conducting research about MOOCs. Future studies could look at MOOCs' impact on higher education; development technical platforms for MOOCs; curriculum and learning science; assessment of student learning and evaluation of teaching based on big data; and education policy in the context of MOOCs. Based on previous studies, MOOCs in China would develop their policy, system, assessment, and technology that provide better assistance to Chinese learners worldwide.

Notes

1. China's gross higher education enrollment ratio reached 30 percent in 2012 and it is expected to reach 40 percent by 2020 (http://paper.jyb.cn/zgjyb/html/2013-03/20/content_90270.htm/).
2. Big data is a term used for collection of data that is large and complex. It is difficult to process using on-hand database management tools or traditional data-processing applications (Wikipedia, 1 October 2012).
3. Learning analytics is the measurement, collection, analysis, and report of data about learners and their

contexts, with the purpose of understanding and optimizing learning process and the environments in which it occurs (Wikipedia, 1 October 2012).

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