Online Education and Blended Learning Practice at Tsinghua University

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Abstract. Tsinghua University (THU) launched the online MOOC platform XuetangX and its first 5 MOOCs in 2013. After 5 years' development, THU has built around 250 MOOCs and launched more than 1800 blended learning courses with both SPOCs and the learning tool "Rainclassroom". THU is leading the trend in online learning in China. The university has made a great progress in promoting educational equality and quality. This report will illustrate the practices of THU has made towards online education.

Keywords: MOOC production, Online education, blended learning, Education innovation

1 THU Attaches Great Importance to Online Education Work

The development of online education in Tsinghua University starts with the school's strong policy support on education. In 2013, THU established the Online Education Office and was decided to build a leading group of online education. Meanwhile, THU launched XuetangX MOOC platform and published the first batch of five MOOCs worldwide. On Dec.17th, the Higher Education Department of Ministry of Education approved the establishment of the national online education research center at THU.

In 2014, THU issued ***Opinions of Tsinghua university on strengthening online education work***, clearly stated that "actively promoting online education work is the strategic deployment of the school for the future".

2 Construction of MOOCs in THU

2.1 Progress in the Construction of MOOCs

So far, around 250 MOOCs have been built, covering a wide range of courses, including science and technology, humanities, social sciences, medicine, sports and art. Approximately 8 million students from 209 countries and regions around the world have taken THU MOOCs.

Moreover, the MOOCs gave us a chance to introduce Chinese language and Chinese culture. In 2016, "Tsinghua Chinese" MOOC won the second place in the global new MOOC ranking; in 2018, “Tsinghua Chinese" MOOC won the TOP50 most popular courses.

2.2 First MOOC Taught by Students in Tsinghua

In October 2018, the "youth AI self-improvement project -- computer vision course" taught by the graduate students in THU was launched. More significantly, in Thu, it is the first MOOC taught by students. The course is problem-oriented and focuses on entry-level hands-on skills, aiming to help learners without no prior knowledge on programming to understand the basic ideas and solving practical AI problems. From the perspectives of students, the course has received many positive feedback, such as ‘this MOOC is enjoyable and has enabled me to learn the knowledge that were not taught by the professors in classes’.

2.3 Construction of Online Certification Programs

In order to improve the systematic construction of online courses, learners' academic and professional competitiveness, In June 2018, THU released the first batch of online authentication certificate projects, including authentication for Public Administration and Data Science. After completing the courses and passing the exams on XuetangX platform, students will be awarded the certificate jointly recognized by the online education office and relevant departments in THU.

3 Progress of Blended Learning Construction

THU combines traditional education with MOOCs to enhance the interaction between teachers and students, and transferred to student-centered teaching models. At present, THU has more than 1,800 blended learning courses, covering 44,000 students.

Theses blended learning courses were applied by different methods, including deeply blended courses and slightly blended courses. For deeply blended courses, students will watch the MOOCs and do the exercises online before class. In class, teachers will organize problem oriented discussion and organize flipped classroom. For example, the teacher may ask a student to teach knowledge instead of him, or he may organize a team presentation. After class, students need to do group assignment or read related materials.

For slightly blended learning, the courses do not change a lot from the traditional courses, but teachers more focus on the interaction during classes and the feedback from students. Students preview few materials online before the class, in class there will be some interact activities carried out by intelligent teaching tools (which will be introduce in section 6). After class, students will do online exercise, review knowledge point and so on. All the students' learning data will be sent to teacher so that he can exactly know how well the students are.

Taking the course "Principles of Electric Circuits" as an example. This course was published online in 2013， and started blended learning on campus in the same year. Up to now, 16 rounds have been conducted, and nearly 520 students have taken the course.

The teacher sends the slides and videos to students before the class so that they can learn the basic knowledge. During class, he introduce expanded knowledge and ask the students to send their questions or opinions by using the "bullet screen". He adjust his content according to students' opinions at any time and he set spare time to answer the questions on each class. Also, on class, he send some quiz to students by the teaching tools to make sure they are following him. After class, students can review the PPT slides and other learning materials sent by the teacher.

From 2013 to 2016, the students in blended learning classes have taken the same examinations with the traditional classes. As shown in graph 3.1, the average score of the blended learning classes is higher than those in the traditional classes [1].

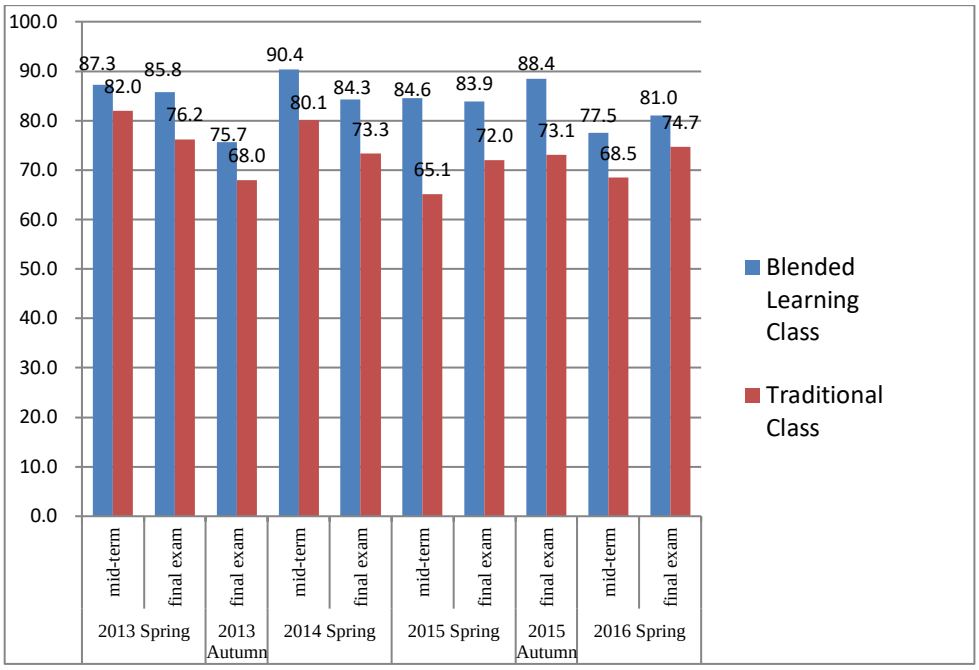

Fig. 1. Score of "Principles of Electric Circuits"

The subsequent performance of students are also outstanding. Some students have obtained the national utility model patent authorization and the first prize of extracurricular scientific and technological activities in the challenge cup of THU. Also, 51 universities in China are using the "circuit principle" MOOC to do their blended learning.

4 Construction Information-based Teaching Ability Improvement Program

In order to introduce the experiences in making MOOCs and carrying out blended learning, and to improve teachers' information-based teaching ability, THU has built three MOOCs, including "introduction to online education", "MOOC: from novice to expert" and "the application of MOOC—Blended learning".

Until now, more than 55,000 learners have taken these courses. These courses are designed to solving practical problems and encouraged students to

discuss online. Also, offline conferences and workshops were organized across the country.

5 Progress of XuetangX MOOC Platform

XuetangX has over 2000 quality courses from Tsinghua University, Peking University, Fudan University, MIT, Stanford University, Berkeley and other first-class universities [2]. The number of registered users has surpassed 14 million. XuetangX has built over 460 SPOC platforms for schools and institutions nationwide [3]. Currently, nearly 1.04 million learners in 98 higher education institutions in China have obtained credits through XuetangX Online MOOC. According to Class Central, a well-known review site for online education ranking institutions, XuetangX is among the top three in the world and first in China by the number of registered users [4]. In June 2016, XuetangX became the online education platform of UNESCO International Center for Engineering Education; The Spanish international assessment test (SIELE) was launched online in November. In May 2017, XuetangX Nigerian Lagos university online education platform was launched and delivering online education resources to Africa. Presently, XuetangX is working closely with international institutions such as edX, FUN MOOC platform (France), Telefonica of Spain, ACCA etc., and has established a two-way channel for foreign course licensing and domestic course output, in the realization of global sharing of high-quality education resources.

6 Intelligent teaching tools

During the traditional classroom, teachers have no idea how well the students can do until they take the exams. Teachers have to ask frequently, "Did you all reviewed the learning materials? Is everybody clear?"After trying blended learning based on MOOCs, we considered that, can we do some slightly change and solve the problem with traditional teaching by using what we have now in the classroom? For teachers who do not want to use MOOCs, how can they improve their education quality? Thus, we tried to develop some intelligent teaching tools to help teachers.

6.1 "RainClassroom"

"Rainclassroom"is an intelligent teaching tool developed by Online Education Office of THU and XuetangX. This tool is based on PowerPoint and WeChat (the most popular social application in China). By using "Rainclassroom",

teachers can send preview courseware with MOOC videos, exercises and voice messages to students' cell phones. The interaction between the teachers and students are further improved by using the in -class quizzes and bullet screen. “RainClassroom” also provides strong data support to teachers, assisting them to understand students better and gaining a greater control of teaching. So far, “RainClassroom” is being used by more than 420,000 classes from 62 countries, with over 6.32 million effective teaching users and an average of over 2.93 million monthly active users. In April 2007, after observing a THU course which used “Rainclassroom”, Baosheng Chen, Minister of Education in China, said that “when students listen to the ‘rigid theory’, they are lack of enthusiasm and interaction. Surely enough, students do not want to listen to such lessons. In today's class, I saw that both the attendance rate and the head-up rate were very high, which turned the mobile phone from a head-down tool into a head-up tool”.

6.2 AI learning partner “XiaoMu”

“XiaoMu” is an AI application developed by the Computer science and technology department of THU and XuetangX. "XiaoMu" is a personalized learning partner who can reduce the burden of teachers and help promoting students’ learning efficiency and enthusiasm. “XiaoMu” was built based on advanced AI and natural language processing technologies. It provides services like auto-answering , making recommendations and social contact. So far, “XiaoMu” has been used in over 200 MOOCs. Looking through these five years of development, THU has made considerable progress in building MOOCs and blended learning. While celebrating the achievements, we are also working on overcoming the challenges, such as how to increase the motivation of teachers, how to reduce the students’ workload and so on. In the future, we aim to find solutions for the challenges and continue to promote education innovation.

References

1. XinjieYu: Student-centered Teaching and Learning： Flipped Classroom Practice based on MOOC. Higher Education Press, Beijing (2015).
2. XuetangX Courses Homepage, http://www.xuetangx.com/courses.
3. XuetangX Cloud Homepage, http://www.xuetangx.com/cloud .
4. Class Central Homepage, https://www.classcentral.com/report/moocs-stats-and-trends-2018/