Online Education and Teaching Reform on Higher Education Development in China

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Abstract

Lifelong Education has changed the old view of the end of education, and promoted sustainable development of education, which is a strategic goal of social development. Lifelong education exhibit new features to further achieve educational equity with the technical support of MOOC/SPOC. In recent years, teaching reform of applied chemistry profession promoted by Department of higher education has gradually gone deeper, but there are still some problems and difficulties, such as contradictions among basic of specialized subject, teaching hours and teaching content, difficulties of lifting of the teaching content and improvement of teaching quality, which restrict teaching reform process. Teaching practice experience of SPOC in applied chemistry profession is simply introduced, proposing countermeasure for SPOC in college teaching applications designed to enhance the quality of teaching for reference.
Keywords: Teaching reform, Applied chemistry, MOOC; SPOC, Teaching methods

1. Introduction

In 1965, the beginning of the world of lifelong education, adult education French theorist and activist Paul Lengrand firstly proposed the concept of "lifelong education" in international conferences to promote adult education in UNESCO. Educational thought full of vitality in the history of education is in line with the needs of the times and gain a positive response from the international community. Lifelong education covers all kinds of learning activities of acquisition and improvement of knowledge, skills, abilities and qualities, and breaks through the limitations of traditional school education, so that education can be extended to the entire space of human social life to promote the socialization of teaching and learning (Klug et al., 2014).

In the current information age, education time, space and way change with the development of the times. The traditional education concept is overturned, and emergence and application of massive open online course (MOOC) and small private online courses (SPOC) provide lifelong education with a broader platform and opportunities (Duke & Hinzen, 2014). In recent years, some foreign researches on lifelong education mainly focus on sustainable development of lifelong learning, application of modern technology, the role of higher education institutions and foster of lifelong learning concept. As learning forms across time and space in the information age, online learning receives much attention from western scholars, and becomes a huge driving force to the development of lifelong learning. Online learning has a unique

advantage in meeting the diverse needs of all types of learners, in particular in: (i) low cost; (ii) repeated learn, re-watch to understand; (iii) great flexibility in learning time and space. The blended learning is a combination of internet-support virtual space and face to face, which gives important attention from lifelong education experts. Flipped classroom is used and makes innovation of education resources, learning method and changing role of teachers and students.

However, scholars also objectively and dispassionately think world Lifelong Education. In April 2000, World Education Forum in Dakar noted that many young people and adults still do not have the opportunity to learn the culture and the skills and knowledge of employment in necessary for social life. If universal education for all (EFA) does not progress rapidly, the goal of the international community to eradicate poverty will not be achieved. Therefore, inequality between countries will be further intensified. Even now, 15 years later, as one means of achieving international fair, out of poverty, the development of lifelong education has been greatly restricted, which give way to school in resources, ideas and so on. Neoliberal trend reduces social service properties of university, so the evaluation criteria has shifted, papers and student enrollment scores are the main criteria to judge university level. Thus, development of lifelong learning is greatly reduced.

As a new birth of curriculum model, MOOC has inevitably many imperfections. It just can inspire and attract bright minds around the world and their wisdom to solve this series of contemporary issues. As the trend of a kind of network of course, MOOC is ascendant. SPOC is critical and beyond MOOC, but more is supplement and perfect on MOOC (Lin et al., 2015). For nearly a century, the Chinese people are accustomed to follow the West. In education, we followed Westerners, who put forward the "flipped classroom", Chinese school classrooms from primary to universities also went to flip up. MOOC in China has just landed for one year, but many universities want to deny and substituted with the SPOC. This presentation and introduction of foreign cultural and educational way are more harmful to the development of Chinese universities education. SPOC and MOOC are inherently integrated, which not only is an effective strategy for online course development, but also is the only way.

2. MOOC/SPOC in higher education

2.1 MOOC/SPOC is technical support for the development of lifelong education

Universities are an important source of teachers for basic education (Davidson, 2014). The habits and attitudes of lifelong learning in the basic education stage rely heavily on modern teaching teachers' awareness and means. Therefore, the university has to be the cradle, in which educators have the concept and heritage awareness of lifelong learning. The development of MOOC/SPOC curriculum relies mainly on human and intellectual resources in colleges and universities. Rich MOOC provides an inexhaustible resource for lifelong learning. Meanwhile, as a blended learning model, SPOC development makes up disadvantage of MOOC to improve teaching quality and efficiency (Abdiraiymova et al., 2014).

2.2 Thinking of modern professional education

Why must establish MOOC / SPOC Course in the teaching reform process of applied chemistry profession? Applied chemistry profession includes many specialized courses, "Chemical Engineering

Thermodynamics", "Chemical Reaction Engineering", "instrumentation and automation", "Chemical Engineering Principle", etc., which are important courses benefiting for annual average six million of college students. Up to today, more and more teachers and students recognize that the important influence on students' future innovative thinking is not a topic for answer, and more than just a set of instruments will be used, but students' innovative thinking training (Ma et al., 2015). Construction of MOOC/SPOC course can just solve problems of teaching reform of applied chemistry profession. Although the content system of applied chemistry course is clear, but there was still contradictions among profession basic, teaching content, and teaching hours, which has caused a lot of problems, such as teaching purpose is unclear, the facts are more and thinking are less, explain content shallow, just simply explain the concepts, so that many teachers and students have wrong understanding in their minds, which they think this course has a low function, little effect on this specialty. Many reform-minded schools have no ability to reform, and still confused on how to land creative thinking education, and improve the quality of education level of teachers and so on. How to solve the above problems? I believe efforts to make in two aspects: First, to seek the minimum set of teaching content; the second is to take advantage of advanced teaching methods MOOC / SPOC to crack this contradiction (Lue, 2013).

2.3 MOOC/ SPOC is a means of promoting teaching

2.3.1 The support and promotion aspects

MOOC/SPOC is really a mean of promoting teaching. We not only do not exaggerate its role, but also do not belittle its impact. It just takes advantage of advanced information technology to generate learning platform to support teachers teaching. This support and promotion is reflected in the following aspects:

(1) MOOC/SPOC is the collection and use platform of teaching resources. It can effectively aggregate a variety of teaching resources and teaching outcomes, including: a short video, course guidance document, courseware (PPT), simulation exercises and answers, the topic of discussion, exam and assessment, materials; assignment and completion. These resources can be gathered and effectively used by learner. Teaching effects may be many times greater than the traditional classroom.

(2) MOOC/SPOC is teaching support platform. Teaching reform involves many aspects, such as individualized teaching, research teaching, teaching process and assessment diversification, etc. The specific implementation of MOOC/SPOC course will make a lot of efforts, which involves effectively automatic data collection, automatic evaluation, automatic results processing.

(3) MOOCS/SPOC is platform of accumulation and management data in SPOCs teaching process. Managers evaluate and improve teaching according to teaching process data, which is an important basis not only for teaching managers to analyze, but also for classroom teachers to improve the teaching process.

2.3.2 The difference of MOOCS/SPOC

MOOC is a sharing mean, and SPOC is a student management mean. For the social community and students, there is a difference in teaching activities. From the perspective of openness, the former emphasizes on public and open, while the latter emphasizes private, open only for several classes; from the perspective of learning requirements, the former is interest-based learning, the latter is learning the predetermined content;

from a supervisory point of view, the former is conscious, unsupervised learning, the latter is semi-conscious and supervised learning; from the student level, the former includes all levels, the latter is basically at the same level; from the perspective of the responsibility of teachers, the former teachers have no responsibility, that is, the Students can decide their own learning, while the latter teachers have the responsibility of that every student must successfully complete the study and gain credits (Barak et al., 2016). MOOC is a ruler, while SPOC is a distinctive means of the ruler. For different levels of students, teaching requirements and methods are not the same (Malliga, 2013). For example, good students so easily accept the teaching content that they can learn more content in the certain, while the weaker students may understand the content over again, so as to must compress teaching content to improve student acceptance in the same hours (Watson et al., 2016). Due to similarities and differences, the combination of MOOC and SPOC is needed. MOOC course content can be built as a ruler, and the SPOC course content may be built based on MOOC rule, which may be higher or lower than the "ruler". The so-called "ruler" refers to the complete contents of a curriculum, which should be taught with the depth and breadth degree. The "distinctive" is reflected not only in the content selection, but also in the teaching methods with the same content for the different levels and specialties students.

MOOC courses can (i) ensure the teaching quality, (ii) ensure the students to receive high-quality curriculum in the case of different level of teachers with the purpose of contribution to educational equity, differentiated instruction for different levels of students, and specialties teaching, and (iii) fully mobilize the enthusiasm and initiative of students and teachers.

2.3.3 The difference from flipped classroom

MOOCS / SPOCs provide students with a second class - network classroom, and the first classroom refers to the traditional classroom (Lage et al., 2000). Many people will understand MOOC/SPOCs as "flipped classroom", that is, "teaching and learning" in the traditional classroom and "Discussion and Q & A" after-school are overturned. I believe that flipped classroom is conditional, firstly, the students are confirmed to complete the learning contents prescribed by MOOC /SPOCs; Second, small classes or small groups are more conducive to teach or discuss. For good students accustomed to discuss and ask questions, better effect is achieved through flipped classroom, while students with the weak foundation and less willing to ask questions in class, flipped classroom can affect their interest in learning. The survey in our school shows that students still want teachers to "talk ideas and outline, stress the focus and difficulty of processes and simulation, use less term and list more sample, adopt interactive form with questions and discussions in the classroom, and so on.

But whether or not flipped, classroom teaching mode should be changed. Several teaching mode can be selected, such as "classroom-based, network-supplemented" "classroom-supplemented, network-based," "online and offline complementary mode" and so on. Specifically, (i) the complete teaching content may be placed on network platform, and students can freely choose what to learn; classroom teaching select less and fine content for detailed lecture, so that try to take care of most students. (ii) Online teaching is more suitable for the fragmentation of knowledge to concisely explain the difficulty of the content, and offline teaching should be more emphasis on the idea of the content, explain the difficulties of content through

interactive communication to guide students to learn more network course. (iii) Online Class is more suitable for self-learning with freedom of learning space and time, while the small classes can easily carry out discussions and exchanges, the shows of results and reviews to promote independent learning. Currently, blended teaching model based MOOC/SPOCs have been considered to be the future direction of education reform in universities (Yuan ＆ Powell, 2013).

2.3.4 How to build MOOCS / SPOCs courses?

Many ideas and suggestions are as follows. (i) More school may construct open courses of MOOC and SPOC Share combination. In terms of our practices, I think that a complete course consists of two dimensions. The horizontal dimension is the complete course content recognized by everyone and content division; the vertical dimension for the same course content is course resources of same or different categories constructed by teachers in different the schools. This established a complete teaching resource library open to all teachers and students. (ii) Construction of courses is suitable to learner of different classes and levels. I recommend that the same course may be constructed into courses adapt to the learners at different levels, so that MOOC is not only "universal" but also "high-level". The word "universal" refers to that all learners can be harvested, and "high-level" refers to the level of the course cannot be reduced, reflecting the breadth and depth of the curriculum. Students can study in the same course, depending on their interests and learning process to autonomous, dynamic select beginner, intermediate or advanced class. In other words, learner only select courses level before graduation. Beginner, intermediate and advanced classes are covered complete course content, but the video may be different in depth, the end assessment is also different.

3. Teaching Reform Practice of SPOC Course

Author and teaching team opened firstly SPOC course "Chemical Engineering Thermodynamics" in self-development self-learning platform of applied chemistry courses. That is the first large-scale SPOC teaching practice. Teaching platform is divided into six parts including instructional videos, electronic courseware, assignments, online testing, discussion, performance records. Teachers can maintain and update the featured content of the course in the background (Massyrova et al., 2015).

In our school, applied chemistry profession has four classes for about 200 students; each class is divided into about 10 groups with about five people in a group. "Chemical Engineering Thermodynamics" Course opened instructional videos for 30 times, shared electronic courseware of seven chapters content (PPT) with corresponding to online test-questions, as well as total simulation exercises. Students can propose their own discussion topics, also be guided by the teachers. Unlike typical SPOC courses, our self-learning platform shows the main features that each group prepare their own courseware PPT, and then uploaded to platform for all other students to learn, and also prepare the corresponding exercises, while in the classroom teaching process, part of chapters in the course can be taught by the student; other students can ask and discuss questions. This formation of teaching atmosphere conducive to provoke students' interest in learning and develop their comprehensive ability, such as students' self-learning ability, cooperate ability, making courseware ability, speech skills and so on. In addition, the platform set up a "Student Guide" to

provide students with the learning content and methods, and set a number of discussion topics combined with online and offline teaching / learning manner, such as "I have some recommendations"" my feelings for this lecture "and so on.

4. Conclusion

Further development of MOOCs obviously is inseparable from technological innovation. Online courses are new forms of teaching developed in the new space-time Internet. Its vitality is clearly subject to impact and constraints from Internet technology. Over the past decade, the structure, function, and the service level of the Internet has greatly improved, and the operating costs continuously reduce, in particular applications of cloud computing, wireless networks, intelligence and other new technologies in the Internet improve humanity, visualization, mobile and intelligent level of the network. This brings a strong impetus to enhance the quality of online courses. On the other hand, we must also recognize that MOOC also exacerbated the "digital divide", manufacturing a variety of "islands of information", exacerbating polarization between prestigious universities and general universities. In addition, MOOC cultivate and foster a new generation of network learners, but also produce a large number of Internet addicts. The terrible negative impact on the education information cannot simply be attributed to the information itself, and we must reveal deep Root in the objective and impartial manner.

The past 15 years, Chinese teaching reform in university courses and higher education information technology has already been done through a lot of practice and theoretical exploration, which has accumulated rich experience and profound lessons. Therefore, we should adopt neither a nihilistic attitude, nor blindly optimistic attitude. As the trend of curriculum reform in worldwide universities, MOOCs should be looked as a qualitative change in the University Teaching. Chinese policy-makers university leaders, academic leaders and the teacher teams of quality courses must get down to seriously study and research. Chinese universities can truly get profound understanding to real change for the world universities, which is extremely important for Chinese universities to the world stage in the 21st century.

Acknowledgements

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