

# *Analysis on the Supporting Mechanism of MOOC in Continuing Education*

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**Abstract**—As a product of the integration of education with information technology, MOOC has brought about an important change in the field of education in recent years. However there are various problems in MOOC platforms when they are used in continuing education. This paper first analyzes the basic functions, performance requirements as well as the general structure of a MOOC platform. Then basing on the analysis of the characteristics of continuing education, this paper points out the shortcomings of MOOC in dealing with skill and application based knowledge, personalized learning, convenient user experience, sufficient interaction and multiple objective evaluation methods. At last it promotes several feasible suggestions to improve the supporting mechanism of MOOC platforms, and illustrates in detail how to provide the operational and experimental teaching measures, personalized learning support, and reasonable design of the interface, all along management and control tool and comprehensive valuation methods.

**Keywords**—Continuing Education; MOOC; Supporting Mechanism; Personalized education

## I. INTRODUCTION

In recent years MOOC, i.e. the Massive Open Online Courses, has become more and more popular in education all over the world. Many educational institutions, educational authorities and commercial companies have invested in the research and practice of MOOC in China since 2012 [1-4]. From the perspective of participation mode, these participants can be divided into two categories, i.e. providers for curriculums on MOOC and constructors of the MOOC platform. The former focuses on the presentation of good curriculum resources, while the latter is responsible for the development of the MOOC platform. Most of the current curriculums in MOOC are oriented to higher education. Colleges or universities build MOOC curriculums basing on their own high-quality traditional courses. These kinds of curriculums are suitable for higher education which can be used as an auxiliary or supplementary means to classroom education. In order to achieve a certain teaching effect there has to be some corresponding supporting mechanism for video playing in MOOC, such as the test, the learning log, the questions and the discussions. In this paper we take the MOOC platform used in continuing education as the object, discuss its characteristics and corresponding supporting mechanism.

## II. COMPOSITION OF A MOOC PLATFORM

As a large-scale online learning system, MOOC platform must support the whole process of teaching and learning, so its function is complex and needs a high performance. Next will first analyze the basic functions and performance needed by a MOOC platform, and then explain its structure composition.

### A. Basic functions of a MOOC platform

The basic functions that a MOOC platform needs include:

- 1) Functions that support the open enrollment and online learning of a course.
- 2) Provide multiple teaching means for a teacher to meet different needs of a variety of courses.
- 3) Provide some interaction means to support online communication, discussion, counseling, practice, examination, evaluation, etc.
- 4) Provide the function to select and play teaching videos.
- 5) Provide ways to trace the learning process and record any important data, such as the homework, the discussion, etc.

### B. Basic performance requirements of a MOOC platform

The basic performances required of a MOOC platform are as follows.

#### 1) High scalability

A MOOC platform should support for a large number of students to register and a large number of new courses to be open.

#### 2) High concurrency

A MOOC platform should support for a large number of users learning online simultaneously.

#### 3) Real time

A MOOC platform should ensure the fluency of the user's on line learning.

#### 4) Stability

It is necessary for a platform to ensure that the system can be used by teachers and student at any time.

#### 5) Openness

A MOOC platform should be accessed by any users at any place in the whole network.

#### 6) Portability

A MOOC platform should support for a variety of user terminals and a variety of browsers.

### C. General structure of a MOOC platform

Based on the above functional and performance requirements, A MOOC platform system should include the following modules.

#### 1) Course learning subsystem

This is the visible part of the system for students. The students use the learning subsystem for curriculum selection and learning. This subsystem generally uses the web browser as the user UI, embeds some of the necessary plugins, such as the video playing plugins, flash plugins, etc. Many MOOC platforms also provide mobile client APPs, for users to learn lessons on the mobile devices. In terms of performance, the learning subsystem should take the students as the center of consideration, and pay more attention to the students' experience in using the system.

#### 2) Curriculum management subsystem

This is the application for teachers to create and manage a curriculum. The curriculum creation team usually uses the curriculum management system to create and update a curriculum, communicate with the students, collect their homework, view the learning situation of students and execute other functions. In terms of performance, the curriculum management subsystem should take the teacher as the center of consideration, and concentrate on providing convenient and quick means for the teacher to create a course.

#### 3) Platform management subsystem

This subsystem is object oriented to platform managers. Its functions include service management, network management, user management, course review, background analysis and other management functions. In terms of performance, the platform management subsystem should provide dynamic, customizable and convenient management tools and environment.

#### 4) Data support subsystem.

A MOOC platform needs a large number of data storage. The data support subsystem provides data storage, database access interface and management tools. The above three subsystems can share data to achieve data level interactions by this subsystem. In EDX system [4], the information of the courses stored in the Mongo database, the main video files are stored on YouTube and Amazon's storage cloud, and information about the learners is stored in the MySQL database, where the students' learning and interaction information are also stored here for analysis and reporting. The data support subsystem has a high requirement on the storage performance of the database and the concurrent performance of data access.

#### 4) Auxiliary tools

In addition to the above basic modules, most of the MOOC platforms also provide some auxiliary tools for teaching,

learning and interactions. For example, in some MOOC platforms, the learning subsystem provides the learning process control, learning communication tools; the curriculum management subsystem provides teachers with curriculum creating tools and learning management tools, etc.

### III. CHARACTERISTICS OF CONTINUING EDUCATION

Continuing education is a higher level additional education for knowledge update or expansion to improve the ability of professionals or technicians. It has the characteristics of specificity, adaptability, flexibility, advanced and lifelong, etc. With the rapid development of our society, the speed of knowledge and technology update has speeded up, it is an urgent need for people to update their knowledge and skills timely, so that continuing education has become an important part of social education.

Due to the wide distribution of employees, it is not only high cost but also not timeless if the traditional education methods are used in continuing education. The popularity of the Internet has made MOOC an ideal platform for continuing education. With the help of the MOOC as an online education way, continuing education can break through time and space boundaries of new knowledge and new technology, not only can increase the opportunities for education, but also can provide a lifelong education system for every people. MOOC may become an important measure to cope with the challenges of new technologies, and evolve to be an important way of building a learning society.

#### A. Characteristics of the user scale

Continuing education involves a large number of users who distribute around a wide range area, thus it is necessary for the teaching platform to have a higher performance.

#### B. Characteristics of the teaching type

The training of skill and applied knowledge are more popular in continuing education. However, it is very difficult for a teacher to direct a student to do an experiment just by explanation the theory, the steps, etc. It is a tough problem to design as well as exert such type of lessons for continuing education on the network.

#### C. Characteristics of the curriculum content

There are various kinds of knowledge provided on MOOC, from basic theory to the usage of a device. Different kinds of knowledge are oriented to different user groups. And the performance and security requirement of them are variant too.

By now a number of well-known universities and research organizations have promoted their MOOC platforms. However, as a kind of technology and application which is comparatively new and in fast evolving, there are still a lot of problems in these current platforms. Next section will first analyze the existing problems in these platforms, and then put forward some feasible improvement suggestions.

#### IV. PROBLEMS EXISTING IN CURRENT MOOC PLATFORMS

Although great progress has been made in all kinds of MOOC platforms, there are still some shortcomings [5,6]. Unless these shortcomings are mended up, the effect brought by this kind of teaching mode of will not emerge, and MOOC will probably become a flash in the pan. Compared with the successful experience in traditional Education, the problems in current MOOC platform can be summarized as the following aspects.

##### A. *Insufficient in support for skill and application based teaching*

On current MOOC platforms, students usually learn knowledge through the videos, interact with teachers as well as classmates through forums or other means of interaction methods, and are assessed by tests. Confined by such means of teaching, curriculums provided in MOOC usually concentrate on theory type, and the contents are generally basic concepts and principles. Few curriculums are concerned to skills, applications, and practice which are in urgent need in continuing education. For example, few lessons are provided to teach students how to operate and maintenance a device.

##### B. *Insufficient in support for personalized learning*

It is a basic need and even an inevitable requirement for personalized instruction in modern education systems. However, on most current MOOC platforms, each course appears as a single release and is same to every student. No mechanisms are provided for learners to create a personalized learning circumstance. As there are big differences among learners of continuing education in terms of age, occupation, education base, background, etc. How to set up the schedule of learning and the depth of knowledge according to the different characteristics of students are too important to be ignored.

##### C. *Insufficient support for convenient user experience*

For most of the current MOOC platforms, the user experience such as user interface, usage of the system, interaction of students, etc. are not convenient and lack of attractiveness, which degrade students' adherence to the courses.

##### D. *Insufficient support for interactions*

In the circumstances where teachers and students, students and students are not face to face, rich and timely interaction is an important means to build a learning atmosphere. MOOC should not just move the course from classroom to the network, and loss traditional classroom interaction. An ideal learning atmosphere on MOOC should be an atmosphere of group learning where teachers and students can interact naturally and friendly, students mutually encourage and learning new knowledge and skill becomes a more interesting thing.

##### E. *Insufficient support for assessing students*

Since teachers and students are not face to face, and because of its large scale characteristics, a teacher could not access a student from multiple aspects in MOOC like that in the traditional education. The existing platforms generally

assess a student only by the tests, some platform may add some other assess methods such as the questions asked or answered, or the discussions a student taken part in. How to make a impartial evaluation for each student is the key for MOOC to act as an effective education method.

#### V. SUGGESTIONS ON IMPROVING THE SUPPORTING MECHANISM OF MOOC PLATFORMS

In view of the above problems existing in the current MOOC platforms, we can improve and make some innovations in the supporting mechanism of MOOC.

##### A. *Provide operational and experimental teaching measures to meet the requirement of training of application type and skill type knowledge.*

For example, in terms of equipment operation and maintenance courses, there are already many simulation systems or teaching systems having been developed. This kind of systems can be reformed appropriately and embedded into the MOOC platform. For those experimental or practical courses, the device simulation software can be embedded into MOOC platform, so that the theoretical study and practical operation study can be integrated appropriately.

##### B. *Provide personalized support by means of historical data analysis*

the MOOC platform should provide some mechanism to tracking the learning process of each student, analyze the characteristics of studying by means of big data mining technology, make massive data be the basis of platform construction and implementation of the a curriculum. Basing on the analysis of historical data, including such data as the learning path, the rule as well as the tendency of studying, a platform should provide some suggestion for the learning path and the problem that needs to be discussed. Personalized designs basing on the characteristics of students can stimulate students' interest in learning, thus improve the efficiency of teaching.

##### C. *Improve the user experience by reasonable design of the interface and operations*

The platform should try to improve the user experience through user centered design and try to increase the attractiveness of the curriculum. For example, it should refer to the current mainstream of user habits, such as the interface style, color schemes, and application mode. By providing support based on such technology as cloud computing, big data storage, etc. it can guarantee smooth concurrent access to the curriculum even with large scale users. It should provide personalized recommendation, either about curriculum or about learning communities, and thus increase learning incentives. In the aspect of curriculum building, the platform should provide teachers with a more rich and convenient means to design a curriculum, so that teachers can design the video, problems and research topics according to the characteristics of network learning.

#### *D. Strengthen the support of social learning*

Social learning can improve students' learning experience. The platform can use the existing social tools to build social learning atmosphere. For example, establish a mutual assistance mechanism to promote the communications of students. In addition to MOOC's own discussions and communication platform, other social tools such as Email, Forums, QQ, WeChat and so on can all be used as a tool for communication between teachers and students, or between students and students to discuss about the curriculum. Diving into such group learning atmosphere, students can collaborate and share learning process in a friendly atmosphere.

#### *E. Strengthen the management and control of learning process*

The platform should provide some mechanism to trace and control the learning process of each student in a variety of ways. This kind of mechanism may be a pressure to student, or an incentive. It can not only attract the attention of students, but also improve the learning effect. The effective control method include such mechanism as prohibit learners from dragging the progress of video for the first time learning, giving some rewards if a learner learns a lesson for a second time, questions asked during the interactive actions must be answered within a specified time, otherwise the lesson must be learned again from the beginning, students must learn the content and complete the specified exercises of a chapter before he can enter the next chapter's learning. The platform can also refer to students' historical learning behavior and adjust the learning process accordingly. For example, the platform can suggest a learner skipping over a chapter basing on the evaluation before class. The platform can also set the time limit that the students must participate in the discussion during the interactive actions, etc.

#### *F. Combination of the process evaluation and final evaluation*

Similar to the assessment of the students in the traditional teaching method, the evaluation of students in MOOC should include the process evaluation as well as the final evaluation.

As for the process evaluation, the methods used in MOOC largely depend on the technology the platform providing. In the process evaluation, the platform should not only assess a learner by his operation but also consider other aspects of his learning process. For example, consider such aspects as whether the learner is listening and seeing the lesson in the process of video playing, whether the assignment and the test are completed by the student himself. As for these questions of authenticity, the platform should adopt some intelligent evaluation method so that the process of evaluation is more objective.

As for the final evaluation, there are mainly two kinds of methods, i.e. the evaluation by machine and the evaluation by person. The former is more efficient, but it can only deal with the objective problems and can only judge by pre-given standard answers. It cannot judge those problems which have multiple answers. For example, in the test of programing, every programmer may give a different program to solve a same problem. There are many forms of evaluation by person, such as student self-evaluation, classmate mutual evaluation, teacher evaluation, etc. It can not only deal with the questions which have multiple answers but also can give a comprehensive evaluation result.

The MOOC platform should provide multiple evaluation methods while it depends on the teachers to choose the appropriate. The teachers may choose the combination of several methods and assign different proportions according to the nature of the course. At the same time the platform should use some technical means to prohibit possible cheating in the evaluation process, thus make the evaluation result true and effective.

## VI. CONCLUSION

On the basis of analyzing the characteristics of continuing education, this paper studies the problems existing in the current MOOC platforms oriented to continuing education, puts forward some suggestions for improvement. MOOC provides a new method for continuing education, which is a powerful means to build a continuous learning society. Organizations and experts in education field should dive into modifying the shortcomings of existing MOOC platforms, provide more convenient and effective mechanism of studying, so that this kind of studying system can continue to evolve and become a lifelong school for people to learn new technology and new knowledge.

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