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 platform, 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.

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 been 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 performance requirements 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 online learning.

4) Stability

It is necessary for a platform to ensure that the system can be used by teachers and students at any time.
5) Openness
A MOOC platform should be accessed by any uses at any
platform 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 user 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 orient 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 shared 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 speed 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. Confinied 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 an 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 programming, 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.

REFERENCES