

## Analysis on Course Resources and Its Online Platform based on SPOC

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**Abstract:** This paper takes network teaching as the research object, builds SPOC teaching platform and analyzes it. Firstly, it introduces the generation and the current situation of SPOC course. Secondly, it built online platform based on SPOC course resources on the technical level, and uses MVC thought to construct the design framework and divide the platform functions. Finally, it analyzes the characteristics of SPOC platform, expounds the interactive application of SPOC in classroom teaching, promotes the effective combination of online and offline teaching, and improves the construction of SPOC course resources.

### 1. Introduction

Supported by network technology, information technology and multimedia technology, the reform of education towards modernization has become a hot topic in today's educational circles. In recent years, development of MOOC course platform is very rapid, some schools and educational institutions try to introduce it into the auxiliary classroom teaching in traditional education. However, since MOOC adopt a generalized learning method, they cannot reach the depth of traditional education and are not easy for teachers to supervise and manage in an organized way. Therefore, SPOC model of online education with small group teaching and privatization has been widely concerned by the educational circles.

### 2. SPOC course overview

SPOC course introduction. With the continuous development of information technology and network technology, online education service has become an important way of education modernization. The diversified development of online education forms not only creates more channels for students to acquire more knowledge, but also changes the traditional education forms. In 2012, some American universities successively launched a short video education model based on knowledge points, providing students with Massive, Open and Online Courses, namely MOOC (Massive Open Online Courses). Subsequently, in May 2014, China's Ministry of Education led to the establishment of a MOOC platform for Chinese universities by Icourse and Netease. In just a few years, MOOC have been rapidly launched across the country as a platform and way for students to learn independently. However, although MOOC have enriched students' learning content and expanded their learning time, they still lack the close connection with traditional classes. There is also a lack of imitate interaction between teachers and students and scientific evaluation. Therefore, in 2013, the University of California proposed SPOC (Small Private Online Course), a small-scale restricted Online Course. SPOC reduces the number of participants, ranging from a few dozen to a few hundred students. It is an online learning platform with the characteristics of MOOC for students who need special learning and meet the demand of traditional education and teaching application.

### 3. Advantages of SPOC course

#### 3.1 Online platform based on SPOC course resources can provide group targeted teaching.

SPOC online platform is an organic integration of online learning and offline teaching. It

restricts the use of the platform, and designs the teaching content according to the curriculum outline, which is consistent and professional. Through SPOC platform, teachers can make online learning flexibility and offline classroom teaching complementary to each other, define teaching objectives and arrange learning plans in a unified way. So that students can just arrange the students' learning time, improve students' ability to learn independently.

### 3.2 The online platform based on SPOC course resources enriches the teaching method of classroom education and complements the traditional classroom.

Based on SPOC online platform of course resources, online course resources conforming to teaching requirements are constructed on the basis of short video learning of MOOC. Moreover, mixed with the classroom teaching content, to provide students with online and offline learning space. SPOC emphasizes the professionalism and rigor of the course, allowing students to focus on specific knowledge areas to gain knowledge.

### 3.3 The online platform of SPOC course resource expands the space for discussion and improves the teaching evaluation mechanism.

SPOC online course resource platform is similar to MOOC courses in that it provides students with visual network courseware in the form of short video. However, it is different from MOOC. SPOC course emphasizes the closure of users and is more suitable for the coupling of school education. SPOC platform can be used to build online and offline multi-form discussion space, so that teachers and students can no longer be limited to classroom communication. At the same time, teachers can evaluate the level of students' knowledge acquisition from multiple aspects and conduct independent teaching for a certain student with specific conditions.

## 4. Teaching design based on SPOC course resource online platform

### 4.1 Overall design.

SPOC course resources online platform construction should be based on the teaching needs of the platform operating environment. First of all, we must ensure that the platform can handle a large number of concurrent requests at the same time. Secondly, we must ensure the stability and scalability of the platform, and finally ensure the security of users. Operation environment construction of SPOC course resource online platform is shown in figure 1:

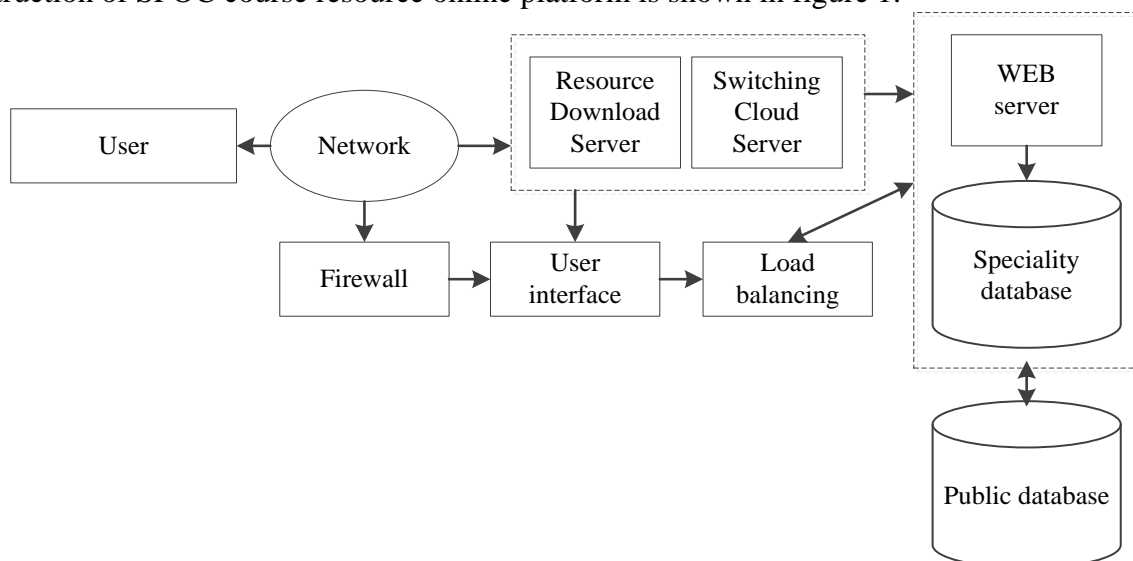


Figure 1. Online platform operational environment construction of SPOC course resources

Using Map/Reduce method to build the development framework can respond to the needs of a large number of concurrent requests. The database is divided into a professional database and public database to ensure the rational application of the database. Adopt the authentication mechanism to

manage the platform users and divide the users' right of use. The platform adopts MVC (Model View Controller) design pattern to ensure the extensibility and maintainability of the platform.

## 4.2 Function module design.

SPOC course resources online platform is to assist school classroom education for the purpose. It has built a miniature privatized online learning platform for teachers, students and platform managers. According to the use of users and purpose to build functional modules, divided into three types of clients. The teacher client provides course construction, course management, teaching management and student management applications, while the student client provides course learning, course discussion and learning material sharing. Platform administrator client audits users and maintains the platform. The functional structure of SPOC online platform for course resources is shown in figure 2:

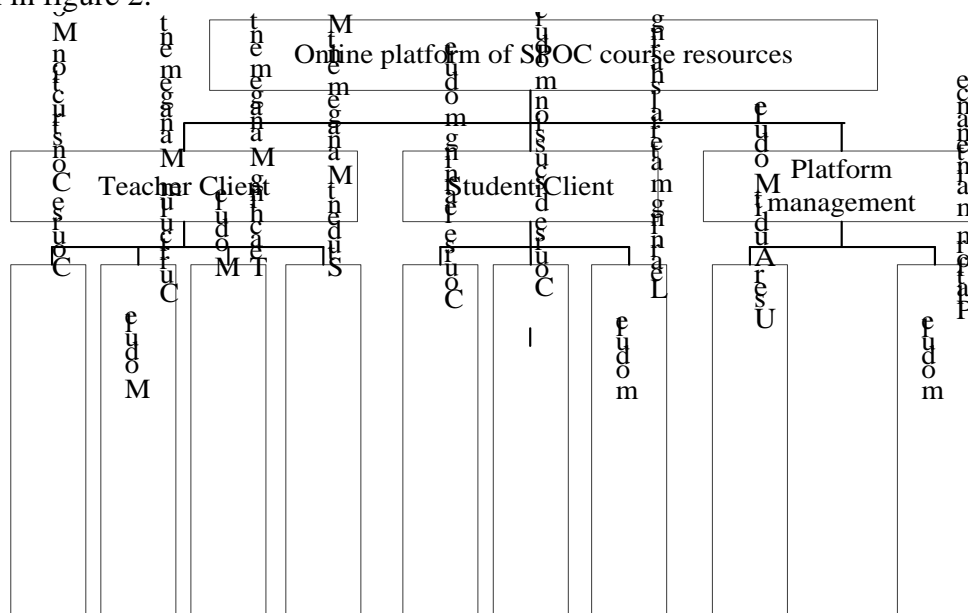


Figure 2. Online platform functional structure of SPOC course resources

The curriculum construction module provides the template of micro-course design. Teachers can add course resources according to the template, such as generating micro-video courseware. The course management module provides the function of course classification and editing management, and teachers can organize the online course with continuity orderly according to the process of teaching development. The teaching management module adds teaching assistants, assigns classes to students, and publishes exams. The student management module carries on the statistics to the student study situation, provides for the student to assign the study duty and carries on the appraisal to the student work.

In the course learning module, students can choose courses to study, take notes, and view evaluations and scores. The course discussion module allows students to communicate, post questions and answer questions about the course. Learning materials sharing module provides the download of learning materials for students. Students can download the learning materials on the platform to the local environment and study in a non-network environment.

The user audit module is a platform management personnel to manage the users of the platform and set the user rights to use the platform. The platform maintenance module can expand the platform functions, and can also view the platform logs and backup and restore data.

## 5. Online platform analysis of SPOC course resources

Comprehensive analysis of SPOC features, its focus on school-based. It has the advantages of small scale, small interactive breadth, high learning depth, online learning and offline teaching.

Compared with MOOC teaching, it focuses more on teaching professionalism and creativity. SPOC constructs its study group through various restrictions, and has the similarity of student characteristics. It is similar to online education under the small group teaching mode, which makes clear the purpose and pertinence of teaching, provides learning content and evaluates students' learning level in depth. It forms online and offline interactive teaching mode with traditional teaching, changes the teaching process of the school, and enables students to obtain more continuous knowledge. The LIGHT OF KNOWLEDGE ACADEMY launched by Tsinghua University in 2013 is a SPOC platform based on the existing knowledge architecture OF colleges and universities. It is unified and coordinated with the existing teaching materials, and rich multimedia courseware is used to assist college classroom teaching. From the SPOC course resources online platform built in this paper, it has the following characteristics.

### **5.1 Expand classroom education time and improve educational effect.**

The SPOC course resource online platform constructed in this paper integrates traditional classroom and online teaching into its construction idea. In SPOC mode, 45 minutes of learning time is extended for classroom education, with targeted auxiliary classroom education. The knowledge points in class are made into short video of 5-15 minutes to assist students in learning, and the problems encountered in class learning are solved online after class, so as to improve the efficiency and effect of classroom teaching.

### **5.2 Support special in-depth communication and interaction to consolidate students' knowledge base.**

On the SPOC platform, students participating in the course set up discussion groups so that the content of the discussion is more focused. Because students have similar knowledge systems, they can communicate and interact with each other in a deeper way based on what they have learned. Meanwhile, in the learning process, classroom learning and online learning after class can maintain the same constraint effect of knowledge scope. The knowledge points that cannot be fully mastered by students in classroom learning can be reviewed through the online platform after class, so that students can have a deeper understanding of the knowledge content and improve their academic performance.

### **5.3 Online and offline simultaneous testing, more perfect course evaluation mechanism.**

In traditional teaching evaluation, students can only pass mid-term and final examinations to test their academic performance. After the examination, the teacher only makes the evaluation and cannot carry on the intensive teaching of the weak link of knowledge for the individual students. In the application mode of POC platform, teachers can set the test content of multiple units for students through SPOC platform. Teachers can examine students' academic performance at all stages. For students with poor mastery of individual knowledge points, teachers can use the platform to make targeted learning plans for students, so that students with poor performance can have the opportunity to learn again

### **5.4 SPOC platform has the extensibility of functions and can be upgraded with the development of education.**

With the continuous upgrading and optimization of teaching contents and methods, SPOC platform's expanded functions cannot only meet the needs of education upgrading, but also reduce reconstruction costs. For this reason, the platform designed in this paper adopts the MVC pattern design idea to separate the model layer, view layer and control layer. Developers can continuously strengthen SPOC platform functions by adding new functional models, so as to make it in line with the development of modern education.

## **6. Summary**

SPOC course resources online course in China's educational application is still in the exploration

stage. In China's education reform, SPOC online courses and traditional courses are introduced in combination with the teaching method, which can transform the online course and traditional education disjointed, online course generalization and other issues. Limiting the teaching objects to a certain scale and complementing each other online and offline can improve the diversified level of education and teaching. With the help of SPOC online course, it is easier for teachers to master students' daily learning attitude and real level, so as to make an objective evaluation. Teachers can further design targeted teaching courseware and more specific design teaching content, so that students can further explore in the process of learning and improve the depth of students' knowledge.

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