

The Teaching Reform of Network Engineering under the Thinking of "Internet +"

Haixia Sun¹, Houdi Xu²

¹Department of Computer Science and Technology, Anhui Sanlian University, Hefei, China
284407152@qq.com

²38 Military Representative Offices in China, Hefei, China

Abstract—In order to solve the problem of ineffective supervision of MOOC online education and the lack of student enthusiasm, this paper proposed a MOOC-based SPOC College mixed learning mode, which can not only promote internal teaching reform of college but also improve the external influence of college.

Keywords—Internet +; MOOC; SPOC; Teaching reform

I. INTRODUCTION

In the new era, the government attaches great importance to the development and application of "Internet+", encourages the application of "Internet+" technology in various scenarios such as work, life and learning. Internet + Mall becomes Taobao, Internet + Bank becomes Alipay, Internet + Map becomes Navigation, Internet + Taxi becomes a drop taxi, etc, "Internet +" achieved the effect of "1+1>2".

The current Internet has features such as low cost or free Wifi access, high penetration rate and fast connection speed, under the support of the rapid development of big data, cloud computing and mobile Internet, educational technology has produced a new innovation, most universities also have innovated their teaching methods, learning models and talent training methods.

In 2012, after the opening of the first year of MOOC, MOOC rapidly warmed up globally, and the construction of the platform was surging. In the era of rapid development of MOOC, how to integrate these new technologies into applied undergraduate colleges, how to apply it to the course of network engineering is a question worth considering.

II. CHARACTERISTICS OF APPLIED UNDERGRADUATE COLLEGES

A. Student

In Applied Undergraduate Colleges, students Have Lower Admission Scores, students' active learning ability is not strong, only a few people have the habit of preparing for the class, MOOC emphasizes that learners need to actively study, so people with active learning habits are more suitable for MOOC. MOOC teaching requires students to actively study video material under class, how to ensure that students can learn relevant knowledge according to the course schedule is a key issue.

Some of the students of applied-type colleges come from

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School level demonstration department of Network Engineering (16zlgc022); Large - scale online open courses in Anhui Province (MOOC) Demonstration project (2016mooc153).

liberal arts and some come from science, the student's

theoretical foundation is uneven, learning MOOC courses under class may encounter various problems, for example, lack of supervision, students are lazy, students do not understand problems, etc, it will lead to stagnation in student learning, eventually lead to high registration rate, low pass rate. How to strengthen the supervision of student learning and to solve the problems encountered by students in the learning process, so that students can adhere to learning the course is an important issue of the MOOC curriculum.

B. Institutions and Teachers

For applied colleges and universities, no matter whether teachers are applying for MOOC or provincial quality project, now all schools are self-funded, school only has the only source of tuition fees, so the school will not allocate too much for each project. In order to achieve MOOC teaching, we must invite special staff to help record courses and launch the platform, which requires a lot of money. How to produce high-quality online courses at a limited cost is also an urgent problem for teachers in schools.

C. Course Structure

After the 13th Five-Year Plan, major colleges and universities are reducing the number of hours, and applied universities are no exceptions, and many courses can't be covered at all for a limited time, basically, the teacher completes the basic knowledge of the course in the classroom, and the semester is over. However, the real practical application is hard to teach for the student. This urgently requires a teaching method to assist teachers' Teaching.

III. THE IDEA OF TEACHING REFORM OF NETWORK ENGINEERING UNDER THE THINKING OF "INTERNET +"

In order to solve the shortcomings of lack of supervision and insufficient funds in MOOC teaching of applied universities, a hybrid learning approach based on SPOC is proposed, as shown in Figure 1. The foundation of this learning method is abundant SPOC curriculum resources, using MOOC teaching platform to launch real-life teaching, Combines traditional online education with knowledge-based learning intelligence tracking for applied undergraduate colleges. The course teaching of network engineering is generally divided into theoretical class and experimental class. The following sections introduce the specific reform ideas from these two types of courses.

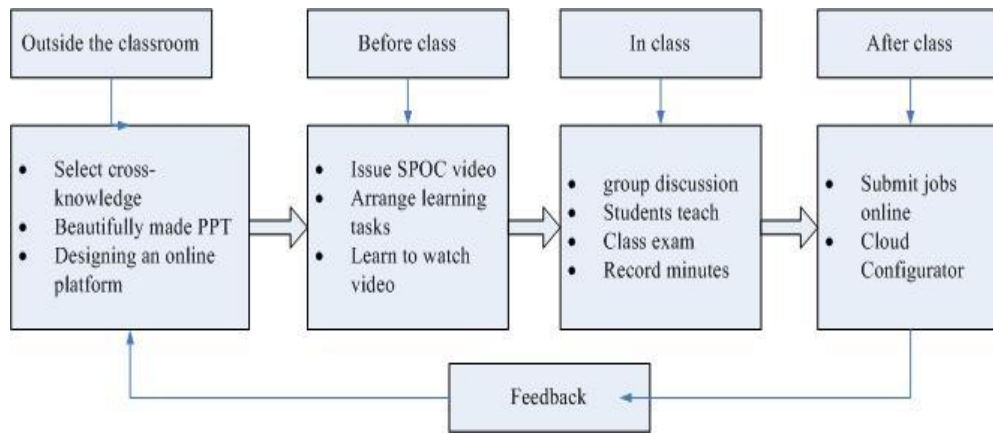


Fig. 1 SPOC Teaching Mode

A. Theoretical Teaching Reform

Step one:

The network engineering major has established courses such as computer networks, network communication infrastructure, network protocol analysis, routing switching technology and network application services, the OSI seven-layer model, TCP/IP model, IP address, subnet mask, subnet division, principle of the switch, router principle, routing protocol and other knowledge have been duplicated in many courses, If each course teacher repeats the knowledge in class, it is undoubtedly a waste of valuable class hours. If you do not speak directly, you are afraid that the previous knowledge of the students is not solid enough to affect later learning. Therefore, the network engineering courses can be analyzed in detail to find out the overlapping knowledge points between courses and courses. Each knowledge point is produced into a beautifully PPT, and explained by excellent teachers, recorded as a 5-15 minute micro course, the video is required to have a small memory capacity and can be played on mobile phones. In this way, teachers can guide students to learn SPOC courses when they teach cross-knowledge points, without repeating explanations, and putting saved teaching hours on project-based learning to enhance students' practical ability.

Step two:

Teachers send SPOC video material to students at one time, guide students to prepare for previews under class, In a weekly entity class, according to the teaching schedule, you can specify which chapters this week must be completed under the class, let a student summarize the knowledge of self-study last week, and ask students to list questions that they have encountered in self-study for discussion; Students should be assessed on some simple topics based on their knowledge in each entity class, give each student different questions and set a time to answer questions as a student's usual time; Entity classes can also answer students' questions in class to understand the learning quality of the students' learning.

Step three:

According to the students' mastery of knowledge, group teaching is carried out, each group is made up of outstanding students as teaching assistants. In the teaching process, an argument, knowledge point or project example is arranged, and each group provides solutions and technical solutions and implements it. The teacher gives evaluation scores for each group of solutions or technical solutions, and records the scores in the normal time. The scores of the members in each group are scored by the team members or the average scores. At the end of each semester, students participate in the theoretical examinations, and the test scores are combined from time to time in peacetime. Those who pass the comprehensive score will receive credits for the course.

Step four:

Build or use a mature online answering system that requires the system to automatically evaluate students' answers in real time, integrate various knowledge points, select classic test questions or design new test questions, improve the test question bank. For network programming jobs, students submit a complete programming job online or configure a complete web application through the cloud. The answer system automatically analyzes the result of the correspondence between the functions of the job and the requirements and gives the job score as the test score.

B. Experimental Teaching Reform

The SPOC teaching in the experimental class is divided into three parts: knowledge preparation, demonstration and reproduction. Before class, teachers design learning task sheets, arrange pre-lab tasks, and then students watch teaching videos, learn and design experiments [2]; during the class, teachers and students discuss knowledge points with each other, and students explain the experimental design ideas, and demonstrate the experiment on the spot, and obtain experimental results. Other students analyze and discuss the experimental results [3]. After class, the teacher arrange the task list, according to the experimental report written by the students, improve the post-experimental evaluation work.

IV. THE WAYS TO PROMOTE SPOC MIXED TEACHING

In order to effectively promote SPOC mixed teaching, schools should take the following actions: Set up online teaching implementation and incentives, such as recording course bonuses, teaching assistants and teaching aids, etc; The first production should be loosely recognized as the number of hours, and the total workload of the teachers as the semester should not be increased, Determine the number of hours taught by teaching content instead of video hours, For example, if a course of 32 hours is produced as a MOOC video, it may only be 16 hours. At this time, the teaching hours is 32 hours instead of 16 hours; Give priority to selecting one class from common subjects in multiple classes, First implemented in small classes and then extended to large classes; Encourage teachers who have good teaching responses first; Encourage long-term preservation courses such as general education or basic subjects first; Regularly track student assessment and teaching effectiveness.

In order to effectively improve the teaching effect, the teacher should clearly formulate the teaching progress and the scoring standards, and do not increase the total student learning burden; At least once a week you should meet with the entire class to track and assess student progress; Don't let students have the feeling or illusion of being grazing grass, keep in touch with the students on the Internet, and pay attention to the quality of the video.

V. THE ADVANTAGES OF THE SPOC MIXED TEACHING MODEL

Flexible and effective is an important feature of the SPOC mixed teaching mode. It solves the traditional simple online teaching of a simple copy of the classroom teaching scene, the lack of interactivity, the lack of real-time feedback questions, poor teaching and other shortcomings. The following three aspects to talk about the benefits of SPOC.

A. For teachers

For teachers, the preparation time is greatly reduced. According to the statistical results of applied colleges and universities, teachers' preparation time reduced from 7 hours to 2 hours per week. The shortened time is mainly due to the fact that the SPOC teaching video liberates the implementation of teachers' repetitive teaching activities, the answer system automatic scoring function saves the repetitive time of the correction task. The repetitive time saved per week can be better invested in higher academic research, expand the horizon of teaching, especially the new technology and new applications of the rapid development of network engineering, introduce new technologies and new applications into teaching, and more closely follow the project application, For example, to strengthen the digital content of the curriculum so as to establish a teaching website; Prepare new courses; Invest in academic research work, publish high-quality papers, and obtain research funding supported by national and provincial authorities.

B. For students

Students conducted a questionnaire survey, students think that learning courses after class has the following benefits : You can choose your own study time, you can watch before going to bed, see when you can do a bus, use the debris to study effectively and rationally; You can save videos forever, pause videos, and think about time; You can be previewed in advance; Contents that are not or unfamiliar will be gathered together and will be watched again and again. Familiar contents will be more relaxed. You can increase the playing speed and learn quickly; If you really do not understand the content, you can have time to listen to other teachers to class; You have more time, and you can do more. Questionnaire survey results for students are shown in Figure 2.

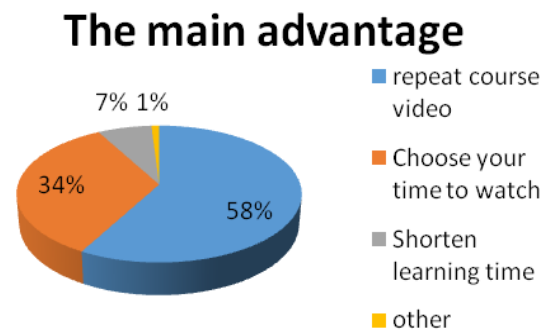


Fig. 2 Questionnaire survey result

C. For colleges

For colleges, SPOC's greatest teaching features are high teaching efficiency, significant teaching results, and low teaching costs, which greatly reduce the funding requirements of applied schools, schools can better promote teaching, Invite students or engineering technicians who need technical training to register as members and authorize universities or companies to obtain some benefits.

VI. CONCLUSION

In an age when MOOC are extremely prevalent, it is necessary to excavate the advantages of MOOC, but also pay attention to the lack and deficiency of MOOC. The article combined typical characteristics of applied undergraduate colleges, proposed a teaching method which suitable for practical colleges and universities----SPOC-based hybrid approach, the organic combination of SPOC online classroom and entity classroom has increased the supervision and control of students, and has also saved school expenses and received good teaching results.

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