Application of SPOC mixed teaching mode in College Computer Foundation

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Abstract: with the emergence of the concept of "Internet plus", the mixed teaching mode based on "Internet plus curriculum" has gradually become the main learning mode of higher education. SPOC (small private online course) is a concept corresponding to MOOC. Its main purpose is to make up for the shortcomings of MOOC in school teaching, effectively strengthen the guiding role of teachers and improve passing rate, mastery and participation of student. This paper takes the 《College Computer Foundation》 as an example, by analyzing the advantages of SPOC mixed teaching and the current situation of course teaching, expounds the practical scheme of SPOC mixed teaching mode from three links: teaching preparation before class, implementation process of teaching activities and evaluation reflection.
Key words: SPOC; hybrid teaching mode; 《College Computer Foundation》

I. Introduction

With the development of Internet technology, the integration of curriculum teaching and information technology is deepening. Based on the Internet plus curriculum, the combination of online self-learning and offline classroom teaching has gradually become the main learning mode of higher education.

"Blended learning" is a combination of online and offline teaching. It is a hybrid teaching mode combining online self-learning and offline classroom teaching with the help of computer information network technology and network media. Its purpose is to combine the advantages of traditional teaching methods with the advantages of e-learning. We should not only give play to the leading role of teachers in guiding, enlightening and monitoring the teaching process, but also fully reflect the students' initiative, enthusiasm and creativity as the cognitive subject of the learning process [1]. In recent years, the mixed teaching mode in universities has gradually developed from the traditional MOOC teaching to the SPOC teaching form. Taking the 《College Computer Foundation》 as an example, this paper discusses the practical scheme of the mixed teaching mode based on SPOC.

II. Advantages of SPOC mixed teaching

SPOC (small private online course), first proposed by Professor Armando Fox of the University of California, Berkeley, is a concept corresponding to MOOC. Its main purpose is to make up for the shortcomings of MOOC in school teaching. The research shows that using SPOC to carry out hybrid teaching has the following advantages: (1) The course is based on a small-scale user group and is easy to serve college teaching. By reducing the course scale and selecting a small number of suitable students from many applicants, SPOC ensures that the teaching objects have a relatively similar knowledge base and academic level. The practice results show that limited access to applicants is conducive to realizing personalized teaching objectives, stimulating students' learning motivation and increasing learning participation so as to improve the teaching quality [2]. (2) SPOC redefines the role of teachers and provides personalized teaching. (3) complete curriculum model and platform design can effectively reduce the difficulty of mixed teaching.

III. Teaching practice based on SPOC mixed teaching mode

《College Computer Foundation》 is a general course of computer. It has strong practicality and operability. It plays a very important role in students' mastering the basic knowledge of computer science and cultivating students' information literacy and computational thinking ability. The traditional course of college

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computer foundation adopts "teach+operation demonstration" as the main line. There are many problems, such as tight number of class hours, slow renewal of teaching content, fixed assessment methods, shortage of practical exercises, insufficient interaction between teachers and students, imperfect teacher evaluation system, etc. This series of questions cannot effectively reflect teachers' teaching quality and students' learning. The application of SPOC in the course of College Computer Foundation provides a new way to solve the above problems.
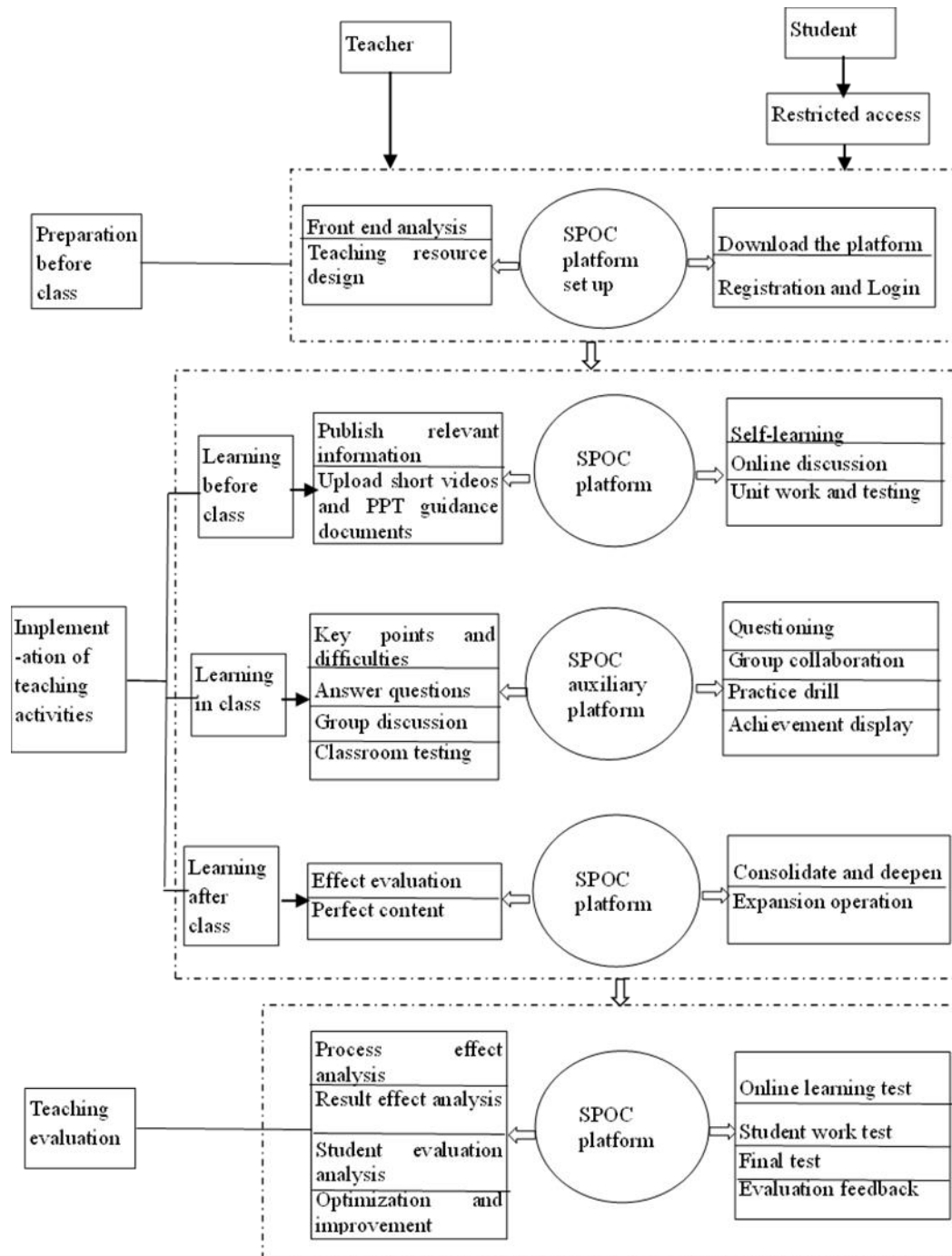

Figure1. Construction of mixed teaching mode based on SPOC

According to the characteristics of the course, the SPOC mixed teaching process in Colleges and Universities includes three basic links: teaching preparation, teaching implementation and evaluation reflection.

The three-teaching links are a unified whole, and any error in any step can affect the teaching effect of the course. The teaching model of this paper is also constructed around these three links, which is mainly divided into the following parts: The first part is the teaching preparation before the class, including front-end analysis and teaching resource design. The analysis of learners, learning objectives, learning content and learning environment plays a strong guiding role in the design of follow-up teaching resources. The second part is the implementation process of teaching activities, which is divided into three stages: learning before class, learning in class and learning after class. The third part is teaching evaluation, which combines the online and offline teaching process, combines the process evaluation and summary evaluation, and evaluates the teaching effect from many aspects [3]. The architecture of SPOC based hybrid teaching mode is shown in Figure 1.

3.1 Teaching preparation before class
3.1.1 Front end analysis
　　《College Computer Foundation》 is a compulsory course for college students after admission. It mainly teaches the basic knowledge of computer and the use of common software. Through learning, students can master the basic theoretical knowledge and basic operation skills of computer, so as to lay a solid foundation for cultivating computing thinking and learning of subsequent courses.

　　First, analyze students' personality characteristics, learning ability and learning attitude to ensure that SPOC hybrid teaching model can meet the overall requirements of students.

　　Second, learning goal analysis. The learning objectives of this course: (1)Expand students' basic computer knowledge: introduce basic computer knowledge, information technology, operating system, information security, database and program design. (2) Master basic computer skills: the use of common operating systems and application software. (3) Cultivate innovative consciousness and practical ability through practice, so as to lay a solid foundation for students' follow-up courses. (4) The ultimate goal is to cultivate students' information literacy, computational thinking ability and practical innovation ability.

　　Third, learning content analysis. The learning contents of this course are divided into two categories: the first type of basic includes: basic knowledge of computer, basic information technology, basic operating system, basic information security, basic database and basic program design. The second type of operation includes: Windows 7 operation, word processing WORD, spreadsheet excel, presentation PowerPoint, computer network application, common tools and software application.

　　Fourth, analysis of learning environment. Generally, it can be divided into online learning environment and offline learning environment. Online learning environment is the main learning platform of MOOC and SPOC. China University MOOC platform is an online education platform jointly launched by NetEase and higher education press. Its school cloud module provides colleges and universities with a supporting environment for SPOC teaching in the way of cloud computing. The reason why China University MOOC school cloud is selected as the platform for curriculum opening and implementation is that there are a large number of excellent MOOC courses on the platform.

3.1.2 Design of teaching resources
　　On the MOOC platform of China University, there are many basic courses of university computer. According to the requirements of the internal structure of the course, we finally selected the basic course of university computer taught by Associate Professor Chen Lei of China Agricultural University as the source of SPOC course.

　　On the school cloud service platform, online resources mainly include short videos, PPT courseware, guidance documents, unit assignments and tests, discussion topics and exams. Offline resources are mainly extended resources provided by teachers to students as a supplement to online resources, including discussion questions on key and difficult points of the course, high-quality cases to be shared, reference materials and relevant teaching tools that may be used in experimental classes.

　　According to the front-end analysis and the design of learning resources, we need to design specific teaching activities, determine the total class hours of the course this semester according to the course content, and then make an overall plan for the class hours and teaching content. For example, how many class hours are allocated online, what learning resources need to be uploaded for each class hour, and what learning tasks students should complete; How many class hours are allocated offline, what offline resources need to be prepared, and the teaching links and teaching tasks of each class. It can be said that reasonable teaching design is the premise and important guarantee for the orderly implementation of teaching activities.

3.2 Implementation of teaching activities
　　The implementation process of teaching activities is divided into three stages: pre class learning, learning in class and review after class. Students study independently on SPOC platform before class, actively participate in discussion, read reference materials and other relevant learning materials. In class, teachers

analyze and explain the key contents of the course to solve the problems existing in students' learning. Students participate in group discussions, display group or personal experimental works, and complete the internalization of knowledge. Review after class, Students complete the homework and unit test assigned by the teacher, and consolidate the knowledge.

3.2.1 Self-learning before class

Self-learning before class, teachers publish course related information on the course homepage of SPOC platform, including course overview, class hours, lecturers, course start and end time, unit test deadline, course assessment methods and scoring standards, teaching unit content and knowledge points of each chapter.

First, students register on the MOOC platform of China University. After meeting the admission conditions, set the user's name according to the format uniformly required by the University. In this way, the learning behavior data and scores recorded on the platform can be well connected with the school educational administration management system, and then students can enter the course by selecting the course offered by the school on the SPOC platform and entering the course selection password.

Secondly, students browse the course announcement, course outline, performance requirements and assessment standards to have an overall understanding and grasp of the course.

Finally, students are free to choose the time and place according to their daily course and time arrangement, and study in their own habits and learning methods. Take the first chapter "basic computer knowledge" as an example. Before class, teachers upload the learning resources of this chapter on the SPOC platform, including the learning contents of computer development and application, computer hardware system and computer software system. The topic of the discussion area is: do you think computational thinking is valuable to your subject and major? What is the value? Please discuss with everyone and share your opinions and views. In addition to participating in the theme of the discussion area, students can also ask teachers and peers for help at any time when they encounter problems in learning through the discussion area. In this process, students not only get answers to questions, but also enhance their thinking ability. Through sharing and communication with peers, students' learning enthusiasm are improved. Similarly, Teachers can also gain knowledge from it.

3.2.2 Learning in class

In the class stage, feedback and strategy induction are more important. In class, teachers can focus on the problems encountered by students in autonomous learning and answer them through the following links.

The first step is for teachers to speak carefully. Teachers explain the key and difficult problems in each chapter of the course in depth, help students internalize the knowledge of autonomous learning, and then find their own learning strategies through reasoning and induction. During teaching, teachers conduct demonstration teaching, teaching interaction and video recording at the same time. In order to improve students' interest in demonstration teaching, in case design, try to carry out case teaching according to the principle of from easy to difficult and connecting with practice. For example, when teaching the application of EXCEL, students can complete the following operations by designing a student performance statistics table: the calculation and statistics of various performance data, and calculate the scholarship according to the student scholarship selection and reward methods of the University on the basis of the previous table. Start with easy table establishment and simple calculation, and then transition to slightly difficult ranking calculation and classification statistics. Finally, everyone can calculate their own scholarship level, so that students can complete and master various difficult applications driven by interest and achieve good teaching results [4].

The second step is to answer questions. Teachers focus on answering the questions that students reflect more about online learning. For some students who put forward questions but failed to be solved in the discussion, they will explain them in detail in class.

The third step is to discuss and deepen in groups. Teachers design course requirements and assign task lists. After receiving the tasks, the learning group will discuss and divide the work, cooperate with each other to complete the tasks, and carry out classroom display activities such as work demonstration, on-site questions and group mutual evaluation.

The fourth step is classroom testing. Teachers use SPOC platform to release classroom test questions, and students submit them on the spot and get real-time score feedback. According to the data analysis of the platform, teachers feedback the evaluation results, give a detailed explanation of the mistakes and weaknesses, and clarify the key and difficult points [5].

3.2.3 Review after class

The after-school stage is mainly to conduct self-test on knowledge and start the learning of new knowledge in the next stage. Teachers will assign some expanded self-test exercises to students after class in order to make students know more about mastering knowledge. Students review in time according to the explanation and

discussion in class, check and fill in the gaps of knowledge, and complete the homework tasks assigned by teachers online. When encountering problems in the test process, students can complete them alone, or ask teachers and students for help through SPOC platform, discuss and solve problems online, or ask teachers for advice in the next class, so as to consolidate their learning achievements. In addition, after the homework task is completed, the teacher will release the task of the next stage on the SPOC platform and upload learning materials for students to carry out autonomous learning in the next stage.

3.3 Teaching evaluation

Teaching evaluation includes students' self-evaluation, group mutual evaluation and teachers' comments. The evaluation form adopts the combination of process evaluation and summary evaluation. The two evaluations form the final evaluation score according to a certain proportion. Among them, process evaluation includes the evaluation of students' online learning performance and the evaluation of students' works. The evaluation of students' online learning performance is mainly realized through SPOC platform system, which is composed of students' watching videos, completion of homework and chapter tests, activity of online discussion area, offline classroom attendance, group discussion and speech, etc. The evaluation subjects of students' works are teachers and students. Generally, it is realized by using students' learning evaluation scale after the course. In the scale, there are students' self-evaluation, group mutual evaluation and teachers' comments. By integrating the results of the three evaluations, we can determine the performance of students in the process of completing the experimental works. The summative evaluation is mainly reflected in the final test results. SPOC allows students to take exams offline, effectively reducing the possibility of cheating. As a part of multiple evaluation, test scores are the basis for teachers' summary evaluation. It can reflect students' mastery of knowledge and skills in curriculum learning.

IV.   Conclusions

In order to verify the teaching effect based on SPOC mixed teaching mode, we conducted a questionnaire on 200 students. The questionnaire is mainly conducted from three aspects: platform use, learning process and learning effect. Through students' feedback, the teaching mode has made innovations in the following three aspects: (1) Student status subjectivity: Based on SPOC online and offline mixed teaching mode, students carry out autonomous learning, improve students' self-learning ability and highlight students' dominant position. (2) Diversified teaching forms: teachers use the platform to provide rich information-based teaching resources, and various classroom teaching forms to enhance students' interest in learning. (3) Teaching management informatization: use SPOC teaching platform to monitor and manage students' learning before, during and after class, which is more conducive to optimizing the teaching process and teaching reflection after class [6].

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