

Research on Online Teaching Model Based on Spoc Education Data Mining in Epidemic Environment

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Abstract: The new crown epidemic has had a huge impact on education. Based on the online teaching background in the epidemic environment, in response to the goal of “stopping classes without stopping teaching, and without stopping studying”, we guarantee the quality of online education and teaching. This article is based on the ChaoXing SPOC platform, taking the “Network Construction and Maintenance” course as an example, and conducts online teaching model design and education data mining research from the aspects of teaching methods, teaching strategies, process evaluation index system, and teaching quality feedback.

1. Introduction

In the context of the epidemic in early 2020, the Ministry of Education encourages colleges and universities to make full use of online MOOC, SPOC and other online course platforms to actively carry out online teaching activities to achieve “no suspension of classes”. How to use many online platforms to carry out course information teaching activities while ensuring the quality of teaching poses more challenges for teachers and students? This article takes the course of “Network Construction and Maintenance” as an example, designs and implements an online teaching model based on ChaoXing SPOC teaching platform, and adopts corresponding measures to ensure the quality of education and teaching[1].

SPOC is a small-scale restricted online course. It is reformed on the basis of MOOC. It uses some of the online resources, guidance, communication and other functions of MOOC to carry out teaching activities for a small group of people, so as to achieve a more standardized, effective and efficient teaching process. It also targeted management to improve teaching quality[2].

2. Currently Existing Problems

2.1 Lack of Corresponding Hardware Platform for Teaching

The course of network construction and maintenance is a professional course for students majoring in computer science, a follow-up course on the principles of computer network, and a deepening of the network course. Before the outbreak of the epidemic, our college mainly used cisco professional equipment for related theoretical and experimental teaching. Therefore, students are required to have professional knowledge in network theory, and be able to build experimental platforms and experimental environments by themselves in the classroom[3]. Students need to have certain abilities in solving and analyzing problems, checking and correcting errors. These abilities must be acquired in long-term practice. After the outbreak of the new crown pneumonia epidemic, the hardware platform was unavailable, and students and teachers were unable to go to school for normal teaching activities. Therefore, how to carry out network construction and maintenance courses has become a thorny issue that must be solved at present[4].

2.2 The Effectiveness and Quality of the Course Cannot Be Guaranteed

The network construction and maintenance course needs to cultivate the students' ability to deal

with problems, how to analyze and solve network problems through the knowledge of network theory[5]. Students have different levels of ability, and their conscious and initiative in learning are also different. Being divorced from the actual classroom means that students cannot be supervised. Teachers can't control the entire classroom. For conscious students, they may be able to learn some content through simple video mode, but for unconscious students, it is equivalent to "let them go". So the second key issue is how to ensure the quality of the courses[6].

3. Design of Online Teaching Model Based on Spoc

3.1 Choose Teaching Methods

<<Network Construction and Maintenance>> is the core course of computer science and technology, and it is a course that emphasizes the combination of hands-on and theory. The purpose of this course is to cultivate the core vocational skills and team spirit of cooperation and communication for students majoring in computer science and technology in the network direction, and to enhance their innovative ability[7].

Before the start of the course, first use the questionnaire function of ChaoXing platform to compile a questionnaire about academic conditions. Based on the results of the student questionnaire, the learning situation was summarized and analyzed. I learned that most students like to watch micro-classes via mobile phones or computers. Teachers live online live interaction, combined with hands-on practice and online self-test methods for online learning.

3.2 The Establishment of Teaching Resources in the Context of the Epidemic

During the epidemic, due to the large-scale development of online teaching, online teaching platforms are prone to stuttering. In addition to the normal live broadcast plan, it is also necessary to prepare teaching video resources in advance to ensure the effect of live teaching. This requires the recording of micro-class videos in advance. Taking into account the effect of video teaching, the recording of each micro-class video should be kept within 5 minutes under the premise of covering complete knowledge points to ensure the viewing effect and acceptance level of students. We also need to consider that students with limited network resources may have difficulty guaranteeing participation in real-time live teaching for various reasons. Therefore, it is important to consider students with these special circumstances, provide them with sufficient video resources for playback, complete learning tasks and homework in time, and ensure that every student can study well[8].

3.3 Design Teaching Strategies

Based on the analysis of online teaching model(figure1) and the division of course modules, combined with SPOC's online course resources. Starting from the two main elements of teaching, teachers and students, the teaching activities are optimized into four stages: before class, during class, after class, and after class. Based on ChaoXing SPOC platform, including notification module, test module, homework module, discussion module, and publish learning tasks. Each online teaching uses a task-driven approach to stimulate students' interest and enthusiasm for active learning[9].

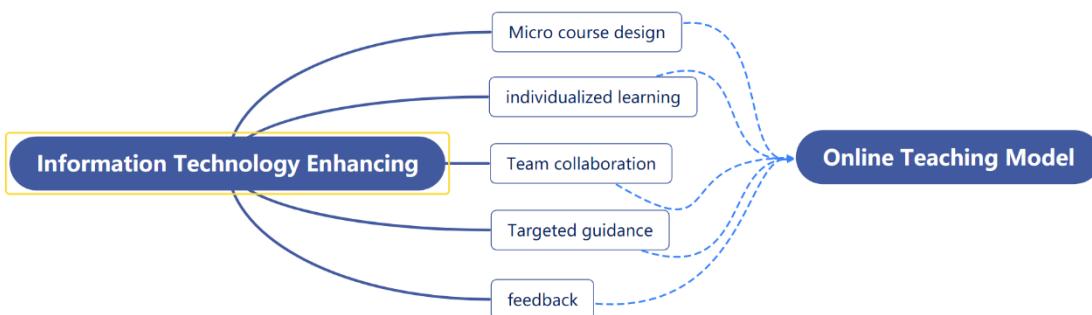


Fig.1 Online Teaching Model

Before class: The teacher publishes the course task list through the ChaoXing platform, which includes the teaching objectives, teaching content, teaching difficulties and pre-class tasks of this online course, so that students can understand the content of this course in advance. Before the class, students watch the micro-class and understand the relevant knowledge points, complete the knowledge quiz on the platform, self-test their mastery, complete the relevant information review and collection in advance, and lay a good foundation for the classroom discussion. Teachers can view the students' self-assessment status through the platform, and timely grasp the students' preview status, so as to adjust the teaching arrangement plan.

In class: When the teacher is teaching on the live broadcast platform, the teacher summarizes the preview situation through the introduction of questions, and introduces the new learning content through the review of the previous course content, so that students can learn from the past and learn the new. By watching the video of the micro-class, students can repeatedly learn the knowledge points in class as needed, and complete the quizzes set up to test their mastery of the knowledge points in the video. Through the platform, teachers can monitor the completion of video viewing and the accuracy of the test, understand the students' mastery of knowledge points and existing learning loopholes, provide precise assistance, and implement targeted personalized teaching to achieve better teaching results. In classroom teaching, teachers can also enhance the interaction between teachers and students and students and the fun of online classrooms through functional modules such as selection of candidates on the platform. In the practice link, tasks are released through the platform. With the help of the Cisco simulation software Packet tracer (Figure 2) and virtual machine and other simulation experimental environments, students can combine theoretical knowledge points to complete the hands-on practice, improve the online course lack of practical links, and create hands-on for students Space. Students submit the simulation results through the platform, and teachers can immediately check the reviews and comments, guide students in time, and achieve the purpose of real-time practical teaching.

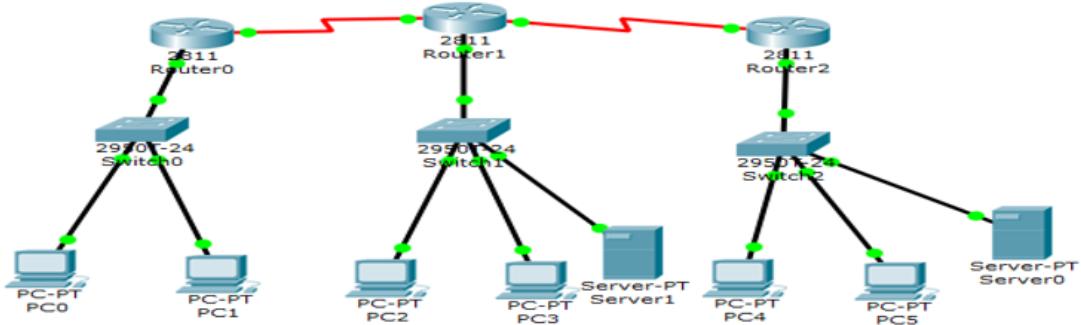


Fig.2 Packet Tracer

End of class: Summarize the tasks, let the students review and consolidate the key points in this course, by arranging the expansion tasks after class, let the students extend their thinking after class, and further solve difficult teaching problems.

After class: feedback the results of this task or homework through the platform. Issue a questionnaire survey to collect students' feedback on this teaching to further improve the quality of teaching. At the same time, it is also a stage of knowledge transfer and ability improvement after class, which can realize hierarchical and personalized teaching.

Online teaching tends to be no interaction because of the lack of face-to-face emotional communication, and students' attention is also easily distracted. To attract students' attention and stimulate their interest in learning, the design of online interactive strategies is particularly important. Strategies to enhance the interaction of online teaching are: 1. Try to design micro-classes with interactive functions, such as using the feature of Superstar video to add small questions, allowing students to answer the small questions in the video by clicking on the options during the video learning process, and strengthen and consolidate knowledge in time; 2. The design

and selection of candidates and the rush to answer arouse heated discussions among students, and the initiative of the live broadcast class can be given to the students, so that they can play the main role; 3. Use private messaging functions such as small notes to narrow the distance between teachers and students and enhance emotional communication with students; 4. Using ChaoXing PBL module to design problem-based open tasks, and students will complete the tasks in teams to increase the students' emotional communication. Although they are isolated at home during the special period, they can still communicate and learn with classmates, participate in teamwork, and improve their ability to solve problems independently[10].

3.4 Data Mining to Determine Evaluation Indicators

During online teaching, the biggest problem is that it is difficult for teachers to monitor and understand the learning situation of students, but the student data provided by the ChaoXing platform can realize all-round monitoring of students' online learning situation, including the number of students' check-ins, video viewing time, and response interaction, test results, etc. According to the characteristics of the course and the learning demands of students, the learning evaluation indicators of this course are decomposed according to the teaching stages to realize the process evaluation of students' learning and achieve the purpose of teaching quality evaluation. The teaching indicator proportion can be adjusted on the ChaoXing platform according to the center of the course.

With the help of Superstar PBL module, multi-dimensional and multi-subject evaluation methods such as online self-evaluation, group mutual evaluation, and intra-group mutual evaluation can also be realized. By setting the focus of teaching evaluation, the focus of teaching evaluation can be flexibly controlled. The diversification of evaluation subjects refers to teacher evaluation, self-evaluation, mutual evaluation within the group, and mutual evaluation of the group. Multi-dimensional evaluation indicators: professional quality, work attitude, communication skills, task completion results.

In order to ensure the effect of online teaching, it is necessary to analyze current teaching deficiencies through a teaching quality feedback mechanism, and to continuously improve teaching for a long time. After the course is over, a questionnaire is made based on the course goals, and students are required to fill out the teaching evaluation questionnaire on the SPOC platform to score the teaching goals and other evaluation indicators. Using data analysis to help teachers diagnose teaching and continuously improve teaching quality.

4. Spoc Educational Data Mining Online Learning Effect Analysis

Through the questionnaire survey module, a survey was carried out using the online learning students of this course as samples, and a total of 50 valid questionnaires were collected. According to the questionnaire setting, on the question of "Do you like using the SPOC teaching model", 50% of those who chose "Like it a lot", 30% of "Preferred" and 0% of "Very disliked". Compared with the previous traditional offline teaching mode, 25% chose "very good", 50% chose "fair", 15% "general", 10% "not so good", and only 1 person "no effect at all". It can be seen that students' acceptance of this teaching model is relatively high in a special period. On the one hand, it is related to the isolation background of the students, and on the other hand, it is also related to the students' acceptance of informatization.

Students expressed that they particularly welcome the simple and easy-to-learn micro-class videos in the SPOC mode, and they can selectively watch and learn repeatedly, and they can continuously deepen their knowledge points. The interactive quizzes in the video are also very helpful for learning. They can be used on the spot to consolidate and deepen the impression of knowledge points in time[11].

5. Concluding Remarks

The special period provides a new opportunity for the new development of online teaching forms

and teaching models, and the online teaching platform plays an important role in this vigorous teaching reform. The online teaching model based on ChaoXing SPOC expands the breadth and depth of traditional classrooms in time and space, improves students' learning enthusiasm, builds a new system for teaching evaluation, realizes process monitoring, and guarantees teaching quality.

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