

Application of SPOC-based Hybrid Teaching in Automotive Theory

Yanshan Zhang , Yanan Wu, Shoucheng Yan, Lizhen Zhang

School of Energy Engineering, Huanghuai University, Zhumadian, Henan 463000, China

Abstract: SPOC teaching as a new teaching model, is developed on the basis of moocs. This paper analyzes the importance and necessity of SPOC teaching in automobile theory course, through SPOC teaching content construction, on-line resources release, off-line teaching, teaching evaluation to complete the online-off hybrid teaching. In view of the low efficiency of online study in the mixed teaching of automobile theory, this paper puts forward some solving methods, at the same time to enhance the students' learning interest, self-learning ability and the ability to solve practical problems.

Keywords: Spoc; Hybrid teaching; Automobile theory; Application practice

Fund Project:

This research was funded by the construction project of huang-huai university online open course ([2021] No. 242)

1. Introduction

“SPOC (Small Private Oline Course) , the concept of SPOC was first proposed and used by Professor Armando Fox^[1-2]. Small is the Small size of a student. Private is the setting of restrictive entry conditions for students. Because this kind of teaching mode can make use of targeted and high-quality online resources (such as MOOC MOOC videos, on-campus online courses) to deeply integrate online learning and offline classroom teaching, the classroom interaction effect is good, and better inspire students to learn independently, and so on, it has become a hot research topic of online teaching in colleges and universities at home and abroad.

2. The necessity of SPOC teaching in the course of automobile theory

Automobile theory is a required course in the training program of automobile service engineering major for undergraduates. The course of automobile theory involves a lot of mechanical theory and mathematical knowledge and is difficult, for example, vehicle handling and ride comfort require more knowledge of control theory and mechanical vibration, and the building of complex power differential equation. If the pre-class do not carry out the relevant knowledge reserves and course preview, close to the classroom to explain the theory, it is difficult for students to understand and master. And without the relevant expansion and rich case resources, without effective and flexible measures, students can not always maintain a high level of attention, and do not have a deep understanding of knowledge, will have a sense of difficulty, as time went by, I lost interest in the course of automobile theory. This kind of traditional teaching method can not let the student to the knowledge firm grasp and the flexible application, can not apply in the actual question. Therefore, SPOC teaching method, the use of high-quality resources, a large number of cases can keep students interested. In the case discussion, the learning task and goal of this course are made clear, so that the theoretical knowledge of the course can be better connected with practical problems to meet the requirements of the training goal of applied talents.

All knowledge points are taught offline, can not be timely attention to students self-study and preview of the situation, teaching online and offline hybrid teaching mode, the content includes vehicle performance, evaluation index and influencing factors, and transforms relevant automobile theory knowledge and relevant evaluation methods into scattered knowledge points and uploads them to relevant network platforms. Online resources include ppts on automotive performance, in-school online course videos, online classroom assessment tests, and Outreach Learning Resources (quality MOOC resources and other course-related video resources) . The offline automobile theory course is mainly used to deal with the difficult problems in online learning, and solve the problems

through group discussion and interaction between teachers and students. Provide personalized guidance to students. Explain the key points and difficult points of the automobile theory course, such as the adhesion condition of the automobile and the sideslip characteristic of the automobile.

The course of automobile theory is to study and analyze the main performance, Evaluation Index, evaluation method and influencing factors of automobile dynamics, such as the evaluation method of automobile fuel economy in different working environment. Several aspects of vehicle braking evaluation indicators and electronic control devices on the impact of vehicle braking, and so on^[3]. These performances of automobile involve many complicated calculation formulas related to theoretical mechanics and higher mathematics, and the relevant dynamic equations need to be established. For example, air resistance and engine power formulas are used to evaluate fuel economy in automobiles, and vehicle handling stability is related to linear degrees of freedom vehicle vibration differential equation. It is difficult to study the automobile theory course, and the traditional teaching mode is not enough. SPOC teaching mode is an effective supplement to the traditional teaching mode. More high-quality online resources can be used by students. It also brings more effective and flexible learning incentives. Adopting Spoc teaching mode in automobile theory course is beneficial to arouse students' enthusiasm for the course.

According to the teaching objectives, teachers should select all kinds of high-quality resources which are beneficial to students' learning and can meet students' learning needs. The application of SPOC teaching mode in the teaching of automobile theory, the teacher becomes the manager, guides and helps the students to internalize the book knowledge into their own knowledge and ability [4]. The use of online discussion interaction, different forms of evaluation and other measures to stimulate students' interest in learning, students will give full play to the subjective initiative. In the classroom teaching to explain the theoretical knowledge before the assignment of tasks, the corresponding questions, teachers according to students online learning and discussion, can analyze students online learning situation, thus in the process of explanation to find common problems focus on the explanation and discussion. Let the students feel able to use the theoretical knowledge to solve practical problems, thinking with the knowledge and practical problems linked, so as to fully feel the importance of these theoretical knowledge in the analysis of practical problems.

3. On-line and off-line hybrid teaching in the implementation of automotive theory teaching

The implementation of SPOC teaching is to run the network resources through the whole course, and to mix teaching as the main line to link up the key and difficult knowledge in the course. In the teaching process, the online into which, through online topic discussion to train students to use automotive theory to solve practical engineering problems.

3.1 Construction of course teaching content

This paper summarizes the teaching contents of automobile theory course into three aspects: first, how to evaluate the usage performance of automobile; second, how to influence factors of each usage performance of automobile; third, how to improve various usage performance of automobile, that is, what measures can be taken to improve the performance of the car. It is called evaluation to know the relevant parameters of a car, and it is the design process to get the relevant parameters of a car. The previous traditional chapter content, according to the use of automotive features into three modules.

3.2 SPOC teaching organization and implementation

Online teaching: the teacher plays a leading role in guiding students through some of the content of the course, for example, the evaluation index of vehicle dynamic performance, the content and evaluation of handling and stability research, the adhesion condition and adhesion rate of vehicle driving, the evaluation of vehicle braking performance, etc., these contents use on-line self-study and on-line discussion, face-to-face combination. Assign students online learning tasks, in the resource platform to view the relevant knowledge of the material learning. These contents are more difficult to understand the knowledge points, targeted questions for students to discuss, according to student access to information and discussion participation record peacetime results, in order to encourage students to complete online learning tasks.

In SPOC mode teaching, on the one hand, teachers should prepare well before online teaching and integrate course resources, provide students with a variety of quality learning resources (such as course courseware, course videos, MOOC videos, topic discussion topics, learning requirements, etc.), and set up interactive answer, assessment and evaluation links. On the other hand, it is necessary to design and organize the offline teaching activities, which focus on guiding students to analyze, apply, evaluate and innovate the higher-order cognitive training to achieve the higher-order teaching objectives. According to the students' online study, interaction and examination before class, through a series of activities, such as teaching the key points, discussing in groups, answering questions and discussing between teachers and students, the teacher makes the students think deeply and study deeply^[5-6].

Offline entity classroom can also be based on the content of the course into the timely ideological and political courses. By analyzing the development of self-brand automobile performance, we can inspire students' national pride and patriotic enthusiasm, combine ideological and political contents with professional knowledge, and realize the educational goal of Lideshu people. SPOC hybrid teaching combines the online and offline learning advantages of students, can meet students' inquiry and personalized learning needs. Not only can be a good integration of teaching resources, but also to achieve the overall quality of students to improve literacy. In the concrete implementation process, the hybrid teaching mode based on SPOC consists of the following links.

4. On-line and off-mix teaching thinking

4.1 Strengthen the management of online learning

On-line and off-line hybrid teaching needs teachers to do solid on-line teaching design, through the network resources and related resources platform on-line to show teaching ideas and ideas to students. Although this model has many advantages, but because it needs to be carried out online, with the help of some network resources platform, so there are still some problems. For example, in the implementation of online teaching, students' learning dynamics can not always be observed and monitored; students with different levels of learning, learning content of the feedback is not timely enough. In addition, in the use of teaching resources platform for teaching activities, some students in the study data on the problem of early leave, although there are data, but there is no real phenomenon. For example, the length of time spent watching videos, online discussions, and online questions and answers are the same. Therefore, the existence of these problems is a major obstacle to online-offline hybrid teaching. To solve these problems, teachers should take effective measures in the course of curriculum design, design the lowest line of the same answer rate, set the corresponding questions in video learning, and so on. To realize the effective and timely supplement and supervision of online classroom teaching.

4.2 Strengthen the study of teaching models

Most of the courses using the online-offline hybrid teaching model have a short implementation time, and many courses are in the initial stage of implementation. This kind of teaching mode still has not formed the very perfect and the mature system. Although it has some problems, but we carry out effective supervision, its advantages can be fully utilized. When teaching automobile theory, teachers insert periodic knowledge questions into the online teaching video. When the online learning time reaches a certain amount of time, they will jump out of the questions involved in the video content, you must answer the questions correctly before you can continue to watch the video or move on to the next phase of your study. Teachers can also enter answers to some common questions in advance. Students who do not understand the question when they study online can click on the link to show the answer to the question. Students can also feedback the difficult questions they encounter online to the teacher, in this way, teachers can discuss and answer pertinently in online and offline classroom teaching, and improve the effect of online and offline mixed teaching.

5. Conclusion

Through the application of SPOC's hybrid teaching method in the course of automobile theory, the students have greatly increased their interest in the course of automobile theory. The teaching effect and classroom atmosphere are greatly improved, which broadens students' vision and improves their ability to analyze and solve practical problems with theoretical knowledge. As an application-oriented university, the online and offline teaching method also well meets the requirements of application-oriented personnel training, and lays a good foundation for students' future employment and work.

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