Application of Mobile Learning Platform Based on Superstar Learning App in Fundamentals of Circuit Analysis Teaching

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Abstract: In view of the fact that the traditional teaching methods of Circuit course can not effectively mobilize students' desire to learn, it can not promote students to learn spontaneously after class, and at the same time can not improve students' practical application ability. This paper proposes blended teaching mode based on Superstar Learning Platform. Take the fundamentals of circuit analysis as an example, blended teaching is carried out based on the superstar learning platform, explore the application and effect of blended teaching mode. Through a semester teaching practice, the new teaching mode can fully enhance the students' passion and motivation to learn the course, greatly improve the students' achievements and quality, at the same time this research has certain reference value for college teaching reform and cultivating students' practical operation and engineering application ability. The combination of online teaching platform and traditional face-to-face teaching class increases the interaction between teachers and students, breaks the traditional single classroom mode, and makes the two complementary advantages, which is worthy of widespread promotion.

1. Introduction

Fundamentals of circuit analysis is an important technical foundation course for all majors in electronic information and electrical engineering.It is not only the follow-up course of Advanced Mathematics ,University Physics and other basic courses in the professional curriculum system, but also the foundation of the follow-up technical basic courses and professional basic courses of all electronic majors.It plays an important role in the training and curriculum system of the entire electronic majors.Through the study of this course, the students can master the basic theory of circuit, the basic method of analyzing and calculating circuit and the preliminary skills of experiment, and prepare the necessary circuit knowledge for the follow-up course.However, the course also maintains a traditional teacher-centered, book-centered and classroom-centered teaching model with the following problems:1)Less class hours. Taking our school as an example, this course has 56 class hours. In the limited class hours, it is difficult for students to master circuit theory and analysis methods comprehensively and systematically under the circumstance that students' cognitive level and acceptance ability are uneven.2)Theory is divorced from practice, and students lack enthusiasm in learning. The course involves more contents and knowledge points, and the teaching focuses on the explanation and analysis of circuit theory, with less practical application.Students feel that what they have learned will not be used and useful without learning, which affects their interest in learning to some extent. In addition, the course has a strong theoretical, logical and coherent nature, which requires a relatively high starting point for learning. It is easy to make students fatigue, thus affecting the enthusiasm of learning., thus affecting their learning enthusiasm.3)Lack of interaction between teachers and students. Due to the limitation of time, number of students and other factors in the teaching process, it is a common phenomenon that teachers spend more time on the teaching of knowledge points in face-to-face teaching, with less classroom discussion and interaction. It is difficult to get accurate information feedback from students, which easily leads to the phenomenon of cramming teaching.

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2. Realization of Teaching Mode Based on Superstar Learning App

Taking the general analysis method of resistance circuit as an example, on-line and off-line teaching based on superstar learning platform can be roughly divided into four stages:pre-class, in-class, after-class and evaluation.

1) Formulated the teaching content according to the syllabus. The course structure needs to be divided into several modules, and each module is divided into several small knowledge points to facilitate students to learn independently. The general analysis method of resistance circuit is the second chapter of the course. Take this module as an example to deconstruct and adjust the teaching content,the following Table 1 gives the teaching content.

Table 1 Teaching Contents of General Analysis Method of Resistance Circuits

Teaching modules	Knowledge points	Teaching contents
Independence of KCL and KVL equations	3	Topological constraints; Element constraints; The independence of KCL and KVL equations
Branch analysis	2	Branch current method; Branch voltage method
mesh analysis	3	Concept of mesh current; Mesh analysis
Reciprocity theorem	2	Content and application of reciprocity theorem
Node analysis	2	Concept of Node voltage; node analysis

Make courseware, video, question bank and other forms of teaching resources according to the teaching knowledge points, collect the network resources related to the teaching knowledge points, and publish the resources on the superstar learning platform for students to download and learn. The teaching video corresponds to the textbook, which is convenient for students to master the basic content of the course. Teaching courseware to highlight a point of knowledge, such as what is mesh current, can be briefly introduced through the circuit diagram, do not be too tedious content, affect the enthusiasm of students learning. The development of question bank is mainly to facilitate students' self-test and lay a solid foundation. Therefore, the setting of questions should be of appropriate characteristics and moderate difficulty. In general, the test of relevant knowledge points in each section is mainly based on objective questions such as multiple-choice questions and fill-in-the-blank questions, so that students can have an intuitive understanding of the preview effect through the self-test results. Before class, these developed teaching resources will be uploaded to the learning pass platform through the computer or mobile phone, and preview notice will be released on the platform. Students can preview and test at any time and anywhere by watching video and courseware on the learning pass, and have a preliminary understanding of solving ideas and steps of node analysis method.

2) Interactive teaching is adopted in the class. The platform provides a variety of check-in methods such as gesture, location, QR code, etc., which can grasp the attendance situation in real time. Teachers can grasp the completion of student knowledge points and case analysis through group reporting, so that students' language expression ability and thinking ability can be exercised. In the process of teaching, the platform can be used to interact with students by selecting students and answering questions, so as to enhance students' participation in class. Students' answers will be graded as one of the bases of process evaluation.

3) Practice after class. After class, the teacher releases the homework through the platform, and can supervise and urge the students who fail to submit in time. Teachers can use mobile phones and computers for homework review. Subjective questions, such as multiple choice questions, filling in blank questions, and judgment questions, can be scored automatically by the system, and students with poor performance can also choose to automatically type back to do again. Through this function, students can grasp the learning situation in time, check their weak links in time, and teachers can better grasp the learning situation of students.

In order to deepen students' understanding of theoretical knowledge and improve their ability to analyze and solve practical problems, different teaching cases are introduced into the study of relevant chapters. Node analysis method is an important knowledge point in the general analysis method of resistance circuit. Combined with the case of D/A conversion circuit, students are guided

to learn theory with engineering problems, and some prospects are made for the following courses. Release the case analysis task through the platform, discuss and complete it in the form of random grouping. Each team leader assigns the task to the team members. According to the task requirements, the team members search for relevant materials, summarize and summarize the ideas and methods of solving the case, and report and display in the next class.

After class, you can also post relevant discussion topics through the discussion area. For example, after learning the node analysis method of resistance circuit with only resistance and independent source, organize the students to discuss the node equations with the controlled source circuit, guide the students to analyze with the previous solution ideas of the mesh equation with controlled source circuit, and help students to deepen the same understanding of the knowledge they have learned. At the same time, we should cultivate students' initiative and exploration spirit. In the process of learning, students can leave messages in the discussion area. Teachers can answer questions at a convenient time. Through communication and interaction, students can understand the problems in time and carry out targeted teaching.

4) Course assessment. Relying on the powerful data storage and analysis function of superstar learning, all classroom teaching data can be completely recorded and generated into a classroom report, which provides a strong basis for teaching evaluation, and realizes the data recording, analysis and application function of the whole process of learning and interaction. Teachers can view the detailed participation of any activity in real time, so as to make data statistics and do it in time Adjustment. The assessment of this course is based on the usual student check-in statistics, homework, course audio and video completion, online and classroom interaction activity, report presentation, etc. As the evaluation criteria, teachers can freely set weights, and can share the results with students in a timely manner to prompt students to learn. The course assessment has not only the assessment of professional knowledge points, but also the assessment of students' practical and innovative abilities. The evaluation of students is more comprehensive, objective and fair. It is more conducive to guiding students to clear the purpose and direction of learning. The course evaluation system is shown in Figure 1.

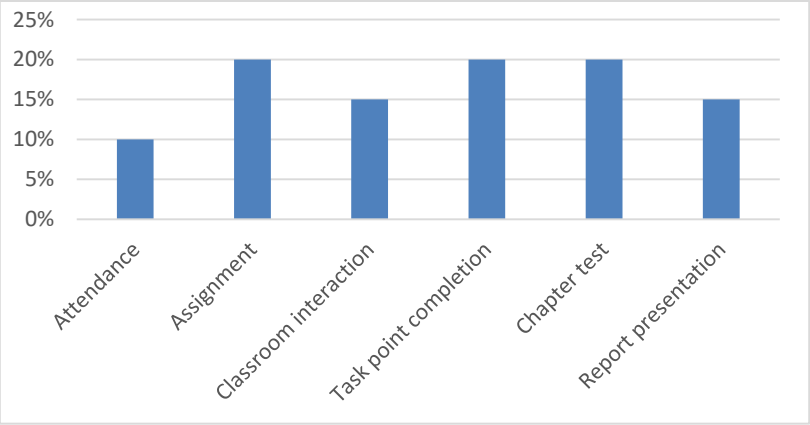

Fig.1 Course Evaluation System

3. Implementation Effect of Blended Teaching Mode

According to the teaching mode adopted in this course, a questionnaire survey was conducted among 59 students in two classes. The content of the questionnaire includes:satisfaction of teaching methods; improvement of self-learning ability; improvement of practical ability; improvement of communication and expression ability; improvement of team cooperation ability; satisfaction of communication and interaction. The evaluation is divided into three levels: satisfied, relatively satisfied and dissatisfied. the following Table 2 gives the results.

Table 2 Student Satisfaction Questionnaire

Evaluating indicator	Satisfied		Relatively satisfied		Dissatisfied	
	number	percentage	number	percentage	number	percentage
Satisfaction of teaching methods	56	95%	3	5%	0	0
Improvement of self-learning ability	48	81%	7	12%	2	7%
Improvement of practical ability	47	80%	9	15%	3	5%
Improvement of communication and expression ability	43	73%	10	17%	6	10%
Improvement of team cooperation ability	50	85%	5	8%	4	7%
Satisfaction of communication and interaction	47	80%	10	17%	2	3%

4. Conclusion

Through the use of the platform, the former teacher-centered teaching mode is changed, students' learning initiative is better aroused, the barriers of communication in online courses are overcome, the traditional single classroom mode is broken, the advantages of the two are complementary, and the teaching effect is improved. Of course, the new teaching mode also puts forward new requirements for teachers' teaching. It should not only focus on how to teach, but also pay attention to how to promote learning. Its effectiveness is affected by many factors such as the design of teaching links, the effective interaction between teachers and students, the supervision and management of learning process, etc.. How to ensure the full use of the platform in blended teaching, so that online learning resources and educational technology can better promote the progress of teaching, and more teaching practice is yet to be explored.

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