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# Application of Mosoteach in Power Electronics Technology Course of Secondary Vocational School

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***Abstract*—In recent years, with the rapid development of mobile communication technology and mobile terminal equipment, mobile learning has shown an extremely spacious application prospects in the field of education. Based on the analysis of the current situation of power electronics technology course in secondary vocational schools, this paper applies Mosoteach application to the course, aiming at improving teaching methods, boosting teaching effect, encouraging students to study independently and enhancing their ability to analyze and solve problems by using information technology.**

***Keywords—secondary vocational school; Mosoteach; power electronics technology***

## I. INTRODUCTION

With the development of mobile Internet and intelligent terminals, education information has become a trend of development. Vocational education is an important part of the development of national education. The Outline of Educational Planning puts forward new requirements for deepening the teaching reform of secondary vocational education: establishing and improving the curriculum cohesion system of vocational education to meet the learning requirements of skilled talents at different stages and in different forms.

## II. CURRENT SITUATION OF POWER ELECTRONICS TECHNOLOGY COURSE IN SECONDARY VOCATIONAL SCHOOLS

### *A. Analysis of the Nature and Objectives of the Course*

The course of power electronics technology is a major course of electrical operation and control specialty in secondary vocational schools. This course is mainly divided into four parts. The first part is power electronic devices. The second part is basic power electronic circuits. The third part introduces pulse width modulation (PWM) technology and soft switching technology respectively. The fourth part introduces the application of power electronic devices.

The teaching goal of power electronics technology course includes two parts: knowledge teaching goal and ability training goal.

First, objectives of knowledge teaching: To master the working principle, specific parameters, usage methods and scope of power electronic devices such as thyristors and insulated gate transistors, and to understand the basic principles, structures and uses of power electronic circuits.

Second, ability training objectives: Through theoretical and practical learning training, the ability to solve practical problems is initially formed, which lays a good foundation for the follow-up professional courses, improves students' overall quality and strengthens their professional ethics.

### *B. Analysis of Current Teaching Situation*

At present, there are some problems in the teaching practice of power electronics technology course in secondary vocational schools, such as paying attention to the cultivation of certain skills, neglecting basic theory learning, or focusing on imparting knowledge, neglecting practical skills. The graduates trained are not strong in adapting to the changes of occupational posts and weak in continuing learning ability. Due to the large expansion of higher education, the overall quality and level of students in secondary vocational schools have declined, students lack interest in learning and lack of autonomous learning ability. Many vocational schools lack teaching equipment, so teachers can only "talk on paper", which makes students' theoretical knowledge disconnected from the actual situation.

## III. THE CHARACTERISTICS AND ADVANTAGES OF MOSOTEACH APPLICATION

Mosoteach is a cloud service platform for real-time feedback and interactive teaching in and out of class based on mobile intelligent devices under the mobile network environment [1]. It can better connect teachers and students. Students can download cloud classes through mobile application. Teachers can create their own classes according to the courses they teach. Each class has an invitation code, and students can join in through the invitation code, so that teachers can manage every student through the cloud class [2].

Mosoteach application has the following advantages:

First, the mobility of learning forms. The external form of Mosoteach is to achieve learning anytime and anywhere. Learners can use mobile terminals (including wireless

connected laptops, mobile phones, PAD, etc.) and mobile communication technology to achieve information acquisition, learning and communication.

Second, it can meet the individuality of learning behavior. Mosoteach has really realized the learner-centered learning concept. In mobile environment, learners are mainly dependent on individual learners to achieve the learning process, and the autonomy of the learning process is given to learners.

Third, it serves as a learning interactive multimedia. Interaction is an indispensable process in learning. Outside the classroom using blue clouds classes, teachers and students are in a state of separation. Interaction mainly depends on mobile learning platform for resource presentation, and multimedia resources in the form of text, pictures, audio and video to achieve interaction.

Fourth, it can evaluate the learning process. Through the use of Mosoteach, students and teachers, students and students, students and learning content can carry out more interactive exchange, learners in the learning process can get help in time, is conducive to training learners in the learning process to find and solve problems in time, and is conducive to improving their performance and confidence.

In view of the analysis of the current situation of the power electronics technology course in secondary vocational schools and the advantages of Mosoteach application, the author tries to apply Mosoteach to the power electronics technology course in secondary vocational schools.

## IV. Application of Power Electronics Technology Course Based on Mosoteach

The course of power electronics technology based on Mosoteach is divided into three stages: pre-class, in-class and after-class.

### *A. Pre-class Preparation*

Teachers create classes in the blue clouds class application program, and let students use class invitation code to join the class. Teachers search the video of thyristor in practical application before teaching, and upload video pictures, courseware, and other resources to the Mosoteach, resource bank for students to download and learn. Then, according to the goal of the class, the teacher creates a question-answering discussion area in the blue clouds class to answer the difficult problems encountered in the students' preview online.

### *B. Classroom Teaching*

In class, the teacher first explains the relevant knowledge points, then demonstrates the operation, and then randomly selects a student to identify the quality of the thyristor with a multi-meter to verify the thyristor on and off; the teacher comments on its operation and focuses on the common questions raised by the students before class, one-to-one answers to individual questions.

### *C. Consolidation After Class*

Teachers will expand their learning tasks and set up "brainstorming" activities in blue clouds classes. Students summarize their learning tasks and complete the thinking and expanding questions set up by the activities.

Taking the simple test of task-thyristor and the on-off and off conditions as an example, the course design is carried out, as shown in "Table I".

TABLE I. Simple Test of Thyristor and Course Design of Conditions of Turn-on And Turn-off

| | |
|---|---|
| **Before class** | Teacher:<br>a)Send tasks in blue ink cloud class (identifying thyristors with multimeter; verifying thyristor on and off conditions)<br>b)Send resources (including pictures, videos, PPT, etc. related to thyristor content)<br>c)Set up corresponding experience values for tasks and resources, and evaluate the process according to students' learning situation.<br>Student:<br>a)According to the receiving task and pushing resources of APPLICATION, the knowledge points (the structure and working principle of thyristors; the basic characteristics of thyristors; the main parameters of thyristors) are sorted out.<br>b)Use Mosoteach to discuss the questionable parts, upload the preview information and get the corresponding experience value. |
| **In class** | Teacher:<br>a)Provide the required equipment for the task (multi-meter, thyristor), thyristor on, turn off the test board, 1.5V * 3 dry battery, 30V DC regulated power supply).<br>b)Explain knowledge points and demonstration operation (distinguish thyristor's quality; thyristor's on condition; thyristor's off condition).<br>c)Point-dial instruction (When the multimeter tests the forward and reverse resistance between thyristor gate and cathode, if its resistance value is close, it does not mean that the thyristor has been damaged, as long as the forward resistance is smaller than the reverse resistance, the thyristor is good; when measuring the resistance between thyristor gate and cathode, the multimeter generally uses R *100K_gear, not R *10K_gear).<br>d)Organize students to conduct self-evaluation, and evaluate each other among team members and groups.<br>Student:<br>a)Practical operation (use multimeter resistance gauge to measure the positive and negative resistance between the anode and cathode, anode and gate and cathode of thyristor, to identify the quality of thyristor under test).<br>b)Use the Mosoteach to show the results of the task in the form of photo transmission. |
| **After class** | Teacher:<br>Use Mosoteach to set up thinking questions (tell us the function of capacitance, think about what will happen if the capacitance is too small, why?).<br>Student:<br>Summarize the simple method of judging the quality of thyristor, the method of turning off thyristor, and complete the thinking topic. |

## V. THE EFFECT OF POWER ELECTRONICS TECHNOLOGY COURSE BASED ON MOSOTEACH

Since the Cloud Class was launched, nearly 90% of the students have completed the pre-class resource preparation through the release of pre-class resources. The students' self-study ability has been improved. The teachers have stimulated the students' interest in learning by using different activities in class. Nearly 80% of the students are willing to participate in interactive activities, which have improved the students' participation in varying degrees. After class, through answering questions and discussing activities, the students have solved various problems encountered in the process of self-study. It is obvious that there are many students who like to ask questions, and the students' practical skills have been improved in varying degrees.

After class, the teacher used the blue clouds class APPLICATION to issue questionnaires to understand the students' experience and evaluation of the blue clouds class assisted power electronics technology course teaching. There were 42 students in the class. The results of the survey are shown in "Table II".

TABLE II. QUESTIONNAIRE RESULTS

| Project | Endorse | Proportion (%) |
|---|---|---|
| Willing to use Mosoteach in class | 38 | 90.4 |
| Promoting Learning Autonomy | 30 | 71.4 |
| Guiding Operational Tasks | 35 | 83.3 |
| Increase teacher/student interaction | 29 | 69.0 |
| Improving Teaching Effect | 39 | 92.9 |

## VI. CONCLUSION

Mosoteach is conducive to promoting teaching resources and promoting and guiding students' autonomous learning. Teachers use teaching resources such as videos, pictures and courseware uploaded from the Mosoteach to provide more reference materials for students' preview. At the same time, they create a question-answering discussion area to answer the difficult problems encountered in students' preview at any time, so as to guide students to better preview. Teachers can also see the experience value of students' online learning in the blue clouds class, understand the progress of students' learning and include the learning experience value in their ordinary grades, so that students can learn more motivation and promote learning initiative.

Mosoteach is conducive to mobilizing students' learning enthusiasm and increasing teacher-student interaction. Traditional power electronics technology classes do not allow students to play with mobile phones, but the course of power electronics technology based on blue clouds classes uses mobile phones as a learning tool, which makes students full of novelty, touches curiosity, and satisfies their desire to use mobile phones. [3] Students can watch multi-media courseware, operate videos and pictures at any time in and out of the classroom by using Mosoteach to study independently.

Especially in the open laboratory after class, teachers cannot be present to guide, students can understand the operation points through video and pictures, guide and standardize their own operation.

This arouses the students' enthusiasm for learning, and also reduces the pressure on teachers to teach. Students can also ask questions to teachers at any time through the question-and-answer discussion area. Teachers can give timely answers and feedback, which increases the interaction between teachers and students.

Mosoteach is conducive to teachers' management of the classroom, assessment and evaluation of the operation of training materials is limited, cannot have a hand, so there will be individual students in the training class desertion, chat or secretly surfing the Internet. In order to help students make better use of classroom time, teachers can use Mosoteach to manage students' learning behavior in real time. Classroom test questions can be published in class, requiring students to complete in a limited time, so that students have a sense of urgency to learn, no time to do other things. After the students hand in their papers, the test scores and the time taken to do the questions can be quickly counted out, which greatly shorten the time and reduce the workload of teachers than traditional examination model. [4] Teachers understand students' mastery of knowledge by checking the test results, and then explain the important and difficult knowledge according to the students' answers, which improves the teaching effect.

To sum up, the teaching of power electronics technology assisted by Mosoteach can improve students' learning enthusiasm and autonomy, help students control learning, promote interaction between teachers and students, and help teachers manage the classroom. Of course, the assistant teaching of Mosoteach is still in the stage of discussion, and we need to continue to explore and improve its functions. Questionnaire shows that students need a lot of traffic to download pictures and videos and occupy the memory of mobile phones. They can compress pictures and videos and upload them for students' convenience. At the same time, students are more willing to use video to guide operation training. They can also upload demonstration videos with explanations to blue clouds classes to meet students' needs.

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