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A Practical Study on Developing Blended Teaching in Principles of Electric Circuits Course Based on Applied Talent Cultivation Mode

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Abstract: With the progress of society and the development of science and technology, the cultivation of applied talents in higher education has become more and more important. To better cultivate application-oriented talents, it is necessary to combine traditional face-to-face teaching and modern technical means to carry out blended teaching as a new teaching mode. In the electronic information class majors, the Principles of Circuits course plays an important role in students' ability to master circuit design and analysis. In this regard, this paper will discuss the strategy of blended teaching in the Principles of Circuits course based on the application-oriented talent cultivation mode, which provides certain references and references for the teaching reform of higher education.

Keywords: application-oriented talent cultivation mode; principles of electric circuits; blended teaching; practice strategy

Introduction

The main goal of current higher education is to cultivate application-oriented talents, which requires students not only to have theoretical knowledge but also to have certain practical abilities. As a novel teaching mode, blended teaching combines traditional face-to-face teaching and online learning, which becomes an effective way to realize the cultivation of application-oriented talents. This paper takes the Principles of Electric Circuits course as an example to discuss the practical strategy of blended teaching, aiming at exploring a teaching method more suitable for the cultivation of application-oriented talents.

1. The Teaching Status of The Principles of Electric Circuits Course Based on The Application-oriented Talent Cultivation Model

There are some significant problems in the teaching of Principles of Electric Circuits based on the application-oriented talent cultivation mode: first, the lack of practical teaching resources limits the practical operation of the course. Because of the lack of equipment, laboratories, and other resources, students' opportunities for practical operation are quite limited. The lack of experimental environment and equipment for real circuits makes it difficult for students to obtain comprehensive practical experience (Zhu et al., 2019), which prevents them from effectively combining theoretical knowledge with practical applications. Second, the theoretical knowledge of the course is quite abstract and complex, which may pose a greater challenge to beginners. Students need to master a large number of circuit analysis methods and theorems, which may make them encounter difficulties in understanding and mastering them. Furthermore, the cultivation of practical ability and problem-solving ability is insufficient. Although the application-oriented talent cultivation model requires students to have practical

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ability and problem-solving abilities, the course teaching is often just a passive transmission of knowledge and lacks the opportunity to provide students with active participation and practice. Students seldom have the opportunity to think independently and solve practical circuit problems, which seriously restricts the cultivation of students' comprehensive quality and ability. In addition, the matching degree between teaching methods and teaching contents is also a problem. Some teachers still follow the traditional lecturing method, which emphasizes the inculcation of theoretical knowledge and neglects the cultivation of practical application links (Qu et al., 2021). Students are prone to lose their interest in learning in this single lecture and memorization, and it is difficult to truly understand the connotation and essence of circuit principles. Finally, the current assessment and evaluation methods are mainly based on written tests, favoring the examination of students' memorization and calculation ability, and lacking the evaluation of practical application ability and innovative thinking.

2. The Significance of Carrying Out Blended Teaching in the Principles of Electric Circuits Course under the Application-oriented Talent Cultivation Model

2.1 Favorable integration of theoretical knowledge and practical application

Traditional face-to-face teaching often focuses on the teaching of theoretical knowledge and conceptual understanding, but for the cultivation of applied talents, theoretical learning alone is not enough. Blended teaching makes students' learning more practical and applied by combining online learning resources, case studies, and practical projects (Sun et al., 2020). For example, in the process of learning circuit principles, students can build circuits and conduct simulation experiments through online simulation software to understand the characteristics and working principles of various circuit components. At the same time, to carry out practical projects, students can design their circuit scheme, debugging, and optimization. Such a practical process can not only cultivate students' sense of innovation and problem-solving ability but also deepen their understanding and knowledge of circuit principles. Through the practical activities of blended teaching, students can gradually develop the ability of independent thinking, active exploration, and innovation. It can be said that in blended teaching, students can gradually master the comprehensive qualities of professional knowledge, practical ability, innovative thinking, and teamwork in course learning. These qualities are the basic requirements of modern society for applied talents, and they are also an important guarantee for students' smooth employment and career development. Through the learning mode of blended teaching, students can better adapt to the needs of the working environment, solve practical problems and interdisciplinary cooperation, and improve their competitiveness.

2.2 Can Provide Personalized Learning and Feedback for Students

In blended teaching, teachers can use online learning platforms and other tools to provide students with personalized learning and feedback, which is of great significance to the cultivation of applied talents. On the one hand, personalized learning can better meet the needs and strengths of students. Compared with traditional face-to-face teaching, blended teaching enables teachers to offer online courses, exercises, and assignments with different levels of difficulty and content according to the learning situation and needs of students (Sun et al., 2019), so that students can learn and master knowledge points at their own pace. For example, in the study of circuit principles, students can choose different types of circuit design and experimental projects according to their interests and specialties to achieve better learning results. On the other hand, the blended teaching platform can track students' learning progress and performance in real-time and give corresponding feedback and evaluation. In this way, students can understand their strengths and weaknesses in learning and make timely and targeted additions and enhancements. At the same time,

obtaining timely and accurate feedback can also enhance students' sense of achievement and self-confidence in learning, and maintain a positive mindset and motivation in the learning process. Of course, personalized learning and feedback are also conducive to promoting interaction and cooperation between teachers and students. Blended teaching makes it possible for teachers to conduct more refined and personalized communication and feedback with students according to their learning situation and needs, further deepening the interaction and cooperation between teachers and students. Such interaction and cooperation can not only promote students' active learning and independent thinking, but also push teachers to continuously improve and optimize teaching methods and approaches, and improve teaching quality and effectiveness.

3. Practical Strategies for Blended Teaching in the Principles of Electric Circuits Course under the Application-oriented Talent Cultivation Mode

3.1 Establish an online learning platform

In the application-oriented personnel training mode, the Principles of Electric Circuits course adopts blended teaching, can establish an online learning platform, such as the use of "rain classroom" and other online learning platforms, can provide students with a wealth of learning resources (Zhang et al., 2021), such as electronic teaching materials, teaching videos, courseware, etc., so that students, according to their learning progress and needs, can learn relevant content anytime, anywhere. Anytime and anywhere independent learning-related content; can also provide online homework and practice questions for students to practice and consolidate knowledge points, which is conducive to students' understanding and mastery of the principle of electric circuits course. Meanwhile, through the forums and groups on the online learning platform, students can communicate with their classmates in real time to exchange learning experiences, solve problems, share resources, and so on. Students can learn from each other and learn from each other, forming a learning community and improving learning motivation and learning effect. In addition, students can also conduct group assignments or projects through the collaboration tools on the platform to cultivate the spirit of cooperation and teamwork skills. Through the features of live broadcast and online Q&A, teachers can interact with students in real-time, answer students' questions, and provide timely feedback. Students can interact in real-time in the classroom, participate in discussions, ask questions, and deepen their understanding of knowledge. At the same time, teachers can use the platform's learning analytics tools to understand students' learning and performance and adjust their teaching strategies in time to meet students' learning needs. Of course, teachers can also select suitable learning resources to be uploaded to the platform according to different teaching objectives and student needs. These resources can include circuit simulation software, experimental videos, case studies, etc., which enrich the students' learning content and methods, and increase the interest and practicability of learning.

3.2 Formulate face-to-face teaching plan

Developing a face-to-face teaching plan refers to the fact that under the blended teaching mode, teachers develop a face-to-face course plan suitable for students' learning characteristics and teaching objectives using students' demand analysis, survey research, and teaching evaluation, combined with their own teaching experience and quality. In the process of formulating the face-to-face teaching plan under the application-oriented talent cultivation mode, teachers need to make clear the overall teaching objectives of the course and the level of competence they need to achieve, to teach in a more targeted way in the subsequent teaching activities. In addition, teachers need to fully analyze and consider the teaching content and difficulty of the Principles of Electric Circuits course, and establish corresponding teaching activities and resources according to the learning needs and characteristics of different stages. For different teaching contents and difficulties, teachers need to design corresponding face-to-face course activities. For example, when introducing the basic theory of circuits, lectures,

demonstrations, and demonstrations can be used; while when explaining signal analysis and amplifier design, case studies and group discussions can be conducted. Of course, teachers also need to clarify the time and place of face-to-face teaching to combine face-to-face teaching with online learning and realize the advantages of blended teaching mode. At the same time, teachers also need to design corresponding teaching assessment programs, including course assessment methods, assessment standards, and feedback mechanisms (Yang et al., 2023), to comprehensively assess students' learning outcomes and teaching effectiveness. In the implementation process, teachers need to pay close attention to students' learning and feedback information, and constantly optimize and adjust the face-to-face teaching plan. This can make the teaching plan more adaptable to the needs of students and teaching objectives, to improve the teaching effect and meet the needs of students.

3.3 Organize students' cooperative learning

Under the application-oriented talent cultivation mode, the implementation of blended teaching in the Principles of Electric Circuits course and the organization of students' cooperative learning is one of the effective practical strategies. The traditional lecture mode easily leads to passive learning, while cooperative learning can make students more actively participate in the learning process. By discussing and solving problems with their classmates, students are more likely to develop an interest in knowledge and increase their initiative and motivation in learning. Teachers can organize students' cooperative learning through group discussion, project-based learning, and role-playing (Yang, 2021). For example, teachers can divide students into groups and set some open problems, requiring students to discuss and think within the team and propose solutions; students can be divided into teams, allowing each team to choose a circuit principle design project with practical significance, to complete the work of independent design, implementation, testing, and evaluation, etc.; words can be divided into different roles nature of the group, in a certain situation Role-playing, to promote students' thinking and innovation. At the same time, some group competitions or cooperative competitions can be set up to stimulate students' enthusiasm and competitiveness. Of course, in the process of cooperative learning, teachers should give timely guidance and feedback, guiding students to division of labor, clear goals, and reasonable allocation of time; they can also use tracking and assessment methods to assess and summarize students' cooperation, identify problems and make timely adjustments and improvements. At the same time, teachers also need to pay attention to cultivating the spirit of cooperation and competition among students and guide students to learn to respect others, and humbly accept the opinions and suggestions of others. Through cooperative learning, students' comprehensive quality and teamwork ability can be improved, and their competitiveness in future work can be enhanced.

3.4 Introducing practical projects and cases

Under the application-oriented talent cultivation mode, the introduction of practical projects and cases can effectively improve students' understanding and mastery of the knowledge of the Principles of Electric Circuits course, promote end-to-end learning, and enhance students' motivation and practical ability. In carrying out the Principles of Electric Circuits course under the blended teaching mode, teachers can introduce practical projects and cases in the following ways: project-based learning. Teachers organize or guide students to select a circuit principle design project with practical significance, and require students to work independently in designing, implementing, testing, and evaluating (Wang et al., 2019) so that they can apply the circuit principles they have learned in practice; case study. Teachers can provide students with some practical cases, such as circuit principles applied in electronic products, so that students in the process of analyzing the case, to deepen their understanding and mastery of the knowledge of the course; engineering practice. Teachers can arrange for students to go to the laboratory or other places to carry out engineering practice, to improve the students' practical ability and

skills, and will learn the circuit principles in the real world to be applied and tested. It is worth noting that when teachers introduce practical projects and cases, they should make sure that the practical projects and cases are closely related to the course knowledge and meet the student's learning level, and at the same time, they should regularly check and guide the students' practical projects, and provide timely assessment and feedback to optimize and improve the teaching strategies continuously.

Summary

In summary, this paper proposes four practical strategies for carrying out blended teaching for the Principles of Electric Circuits course based on the application-oriented talent cultivation model, including the establishment of an online learning platform, the development of a face-to-face teaching plan, the organization of students' cooperative learning, and the introduction of practical projects and cases. These strategies help to meet the needs of application-oriented talent cultivation and can promote the cultivation of students' independent learning, interactive cooperation, practical ability, and problem-solving ability.

Conflict of Interest

The author declares that she has no conflicts of interest to this work.

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