

Reform and Research of "Student-centred" Hybrid Teaching of Optical Network Technology Course

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Abstract: With the development and change of the current society, the teaching at the university stage has been paid more and more attention by the society. In this article, high-quality classroom teaching activities have been carried out by adopting the mixed teaching mode in the optical network technology course, insisting on taking students as the centre. Through the combination of theoretical teaching and practical teaching, research and reform are carried out from the aspects of teaching methods, teaching models, teaching contents, curriculum assessment.

1. Introduction

Optical Network Technology is a compulsory major course for the majors of communication engineering, electronic information engineering and optoelectronic engineering. This course is intended to consolidate and deepen the basic knowledge acquired in the previous courses Communication Principles, Electromagnetic Fields and Waves, and Modern Exchange Technology, and the comprehensive application ability of innovation and practice would be improved. It enables students to research and design schemes for complex communication engineering problems through scientific principles and methods. Reasonable and effective conclusions will be obtained through information synthesis by analyzing the technical performance of different schemes through simulation and experiments. Students' basic ability can be cultivated to analyze and solve problems in optical communication engineering.^[1]

In the stage of teaching in colleges and universities, teachers must pay attention to the cultivation of students' comprehensive ability, taking students as the centre, and comprehensively improving students' learning ability and learning effect by adopting a mixed teaching mode. Through the development of student centred curriculum objectives before teaching, the teaching mode should be constantly change and the problem oriented teaching method should be adopted according to the characteristics of students in the process of teaching. Through increasing the practical projects of engineering practical ability training and adopting diversified assessment methods, teaching research and reform are constantly carried out to promote the overall improvement of students' learning and development ability.

2. Correct Understanding of the Educational Concept of "Student Centred"

The "student-centred" education concept is an overall transcendence of the "teacher centred" education concept. By creating a rich learning environment, students' curiosity and exploration will be stimulated. While cultivating students' good learning habits, students will have a good sense of gain.^[2]

The "student-centred learning" should give students full freedom, innovate teaching and learning methods and pay attention to the needs of students in curriculum design, establishing an effective learning support and guidance system. The "student-centred" education and teaching concept has a complete framework system, which is systematic, open and developable. Its constituent elements include learning initiative, learning process, learning effect and comprehensive ability.^[3]

3. Teaching Characteristics

When college teachers actually carry out the teaching of Optical Network Technology, the characteristics of classroom teaching in traditional teaching in order to achieve the best teaching effect. At present, the relevant education departments pay more and more attention to the training of college students. Teachers of optical network technology courses should fundamentally master the basic teaching principles and characteristics in the teaching process. At present, relevant professional courses have been set up by many colleges and universities, but, the teaching focus is not grasped in the actual teaching process, ignoring the application of teaching. This basic knowledge is difficult for students. Because students have different learning bases and different receptivity in the learning process, the final teaching results are uneven. When teachers explain the course later, they also need to spend a lot of time reviewing and explaining the basic knowledge they have learned before. Only in this way the derivation of relevant formulas can be completed. For students, they are not interested in the relevant knowledge of mathematics learning, and teachers also have some difficulties in classroom teaching. Teachers can not accurately grasp the teaching focus, resulting in the overall teaching content is more cumbersome. In addition, supporting experimental courses are lacked in the overall teaching, which makes it difficult for students to truly understand the differences in system work, leading to a more abstract understanding of the overall concept and the overall learning difficulty. Teachers can't accurately grasp the key points of teaching content when teaching, which leads to certain difficulties in teaching.

4. Problems in Teaching

4.1 Slow Content Update

There are some problems existing in the actual teaching process of the communication principle course for college teachers. The first obvious problem is that the adopted teaching content is relatively slow to update. According to the actual teaching situation and content of the current textbook, more teaching content is analyzed around the relevant principles of traditional optical fibre communication system. In terms of content, more attention is paid to the analysis of the working principle of traditional optical fibre communication. However, as far as communication technology is concerned, it is mainly about optical network technology. The new content of modern optical network technology lags behind the current reality by careful observing of the actual situation of the current industry development. Many contents in the textbook lack the latest optical fibre communication technology and knowledge, and in the actual teaching process, there are a lot of mathematical formulas in the textbook. The reasoning of formulas and the related content of theories are mostly explained by teachers, lacking the application of practice. Some teachers pay too much attention to theoretical teaching and neglect the relevant content of practical teaching in the actual teaching process, leading to a serious disconnect between the actual teaching results and the theoretical teaching objectives, which is not conducive to talent training but also affects the teaching quality of the entire curriculum.

4.2 Single Teaching Mode

In the actual process of teaching, teachers will inevitably be affected by traditional education ideas and teaching methods. When teaching optical network technology courses, many teachers still adopt a simple teaching mode. The teacher explains a certain knowledge and theory in the textbook in class, and the students are only responsible for listening in class. In the process of teaching, teachers only pay attention to whether they can pass on all knowledge points to students, while ignoring students' receptivity and receptivity in the learning process. Lectures are given very fast in class by teachers. Students have problems in the process of learning, and they do not give timely feedback to teachers. In the process of teaching, teachers did not realize the importance of the teaching model for the overall teaching results. In the actual teaching, they still attached importance to the theoretical teaching and ignored the practical teaching, which caused serious differences

between the overall knowledge structure and the basic level of students. Teachers did not change the teaching mode according to the actual learning situation of students, which led to many problems in the teaching process. If teachers use this method to carry out teaching for a long time, it is bound to cause students' resistance to professional learning, thus reducing students' enthusiasm for learning, and also reducing the overall teaching quality.

4.3 No Cultivation of Outstanding Ability

The systematic design of cultivating students' ability cannot be highlighted when setting course objectives, and the development of professional disciplines and students' needs for courses cannot be reflected, which is not conducive to the improvement of students' learning and development ability. For example, although in some colleges and universities relevant experimental courses within the school have been set up, the confirmatory experiments on the simulation of Matlab are more likely to be carried out. For students in application-oriented colleges and universities, they have not received systematic education before professional learning, and students have not really touched the learning of programming. Therefore, there are certain difficulties in learning, leading to very low overall learning efficiency. Teachers should correctly understand the relationship between practical teaching and theoretical teaching, and separate practical teaching and theoretical teaching according to students' learning characteristics. After carefully observing the students' learning effect and determining whether they have really mastered the basic theoretical knowledge, teachers can apply the basic theoretical knowledge to experimental teaching. Teachers also need to integrate theoretical knowledge when conducting experimental teaching. They should learn to draw inferences from one instance to enable students to understand. Teachers should ensure that the experiment can be carried out smoothly. When conducting experimental teaching, students' enthusiasm for the experiment should be fundamentally improved, so that students can operate the simulation software skilfully. Helping students establish correct learning consciousness and learning emotion, their understanding of theoretical knowledge and ability training through practical teaching can be improved.

5. Mixed teaching Reform Measures of "student-centred"

5.1 Teaching Method of "Problem oriented"

In the actual teaching process, college teachers should be fundamentally aware of the importance of the optical network technology course teaching, and should constantly analyze the specific teaching content and reasonably formulate the course objectives. At the same time, the teaching methods will be continued to reform and optimize on the basis of the existing teaching conditions. First of all, teachers should carefully analyze the problems existing in the current teaching content and teaching methods, constantly integrating the existing teaching content. By designing and adding project scenarios in the classroom, students can be guided to find and analyze problems by adopting the "problem oriented" teaching method and taking students as the centre. Through the joint efforts of teachers and students or the students themselves, problems can be solved and knowledge and skills can be gained, so as to enhance the sense of gain experience of students' independent learning, their enthusiasm for learning, their self-confidence in learning, and the learning effect of students. In order to better enhance the impression and understanding of students, teachers can also provide some dynamic pictures to show the specific derivation process. Teachers should add the hot content and hot cases of the current popular optical communication technology to the teaching content, and combine the actual teaching situation to stimulate students' interest in learning. In addition, if teachers encounter some knowledge points related to the communication system in the course of explanation, they can also ask questions and guide students' learning through the "question oriented method" to encourage students to independently summarize such knowledge points. The students can also compare the digital information such as signals and systems by assigning questions and tasks, and make detailed conversion between the relevant course contents and specific teaching forms involved in the optical communication system. Finally, the students can really connect the

professional curriculum knowledge with the relevant curriculum teaching content, and students learn to integrate and deepen the understanding of relevant knowledge points.

5.2 Online and Offline Hybrid Teaching

In the course of professional course teaching, teachers should fundamentally realize the role of mixed teaching mode in professional teaching and give full play to the role of mixed teaching to improve the teaching effect. With the rapid development of Internet technology, the hybrid teaching mode is more and more widely used in the field of education. The mixed teaching mode is different from the traditional teaching mode. Teachers combine online teaching and offline teaching, and use the online offline mixed mode to educate students. In the process of mixed teaching, students are the main body of the whole learning. Teachers should guide students and enable them to achieve online autonomous learning. Through autonomous learning, the accurate learning effect can be improved, including students' online autonomous learning ability and autonomous learning awareness, so that students can have greater enthusiasm in the study of this major, which is conducive to students' subsequent progress and development. When using the hybrid teaching mode to carry out teaching, teachers should first accurately grasp the characteristics of the optical network technology course, giving full play to the role of the network teaching platform. When teachers actually carry out teaching design, they should first make clear the key points and difficulties of each lesson. Secondly, the key points and difficulties can be summarized and made into a video, so that students can master the key to learning through watching the video. Finally, relevant teaching discussion activities should be organized through the network teaching platform, and students' learning communication and learning effectiveness can be controlled through interaction.

5.3 Practical Projects for Engineering Ability Training

When teaching the theory course of optical network technology, teachers should accurately grasp the content of classroom teaching because the overall teaching content of optical network technology teaching is relatively abstract. Students cannot accurately understand the specific content knowledge in the process of learning, so they will inevitably lose interest in learning in the process of learning. Teachers should be aware of this problem and clear about the nature of experimental classroom. The purpose of teachers' increasing the teaching strength in the experimental classroom is to enable students to have a deeper understanding and impression of some key and difficult knowledge points through the simulation experiment operation. However, teachers did not take students as the centre when designing the class teaching, ignoring the cultivation of students' ability. It finally leads to the disconnection between theory and practice. When designing courses, teachers should first ensure the simultaneous integration of theoretical teaching and practical teaching, and ensure that theoretical teaching and experimental teaching are conducted simultaneously in combination with students' learning effectiveness. In addition, during theoretical teaching, students will have more opportunities to practice, integrating experimental courses with theoretical courses and verifying relevant knowledge points through experiments to improve their engineering practice ability.

5.4 Assessment Method of Multiple Evaluations

In traditional teaching, teachers regard the final examination as the only standard for students' assessment. Teachers attach importance to students' academic performance partially, which leads to certain psychological problems in the process of students' development. In the current education, teachers should reasonably optimize the assessment scheme and content and adopt diversified assessment methods. a combination of dynamic and static methods to assess and evaluate students should be applied. In addition to paying attention to students' academic achievements, students' consciousness of thinking should be also fundamentally cultivated. Students should formulate detailed learning plans according to their actual learning conditions. Teachers should constantly supervise students and urge them to complete teaching tasks according to the goals and plans formulated during the learning process. Teachers should pay attention to the investigation of students' learning ability in the process of teaching, and a diversified assessment system can be

established according to the actual learning situation of students. In addition, teachers should carefully analyze the characteristics of the curriculum and establish exercise banks according to the characteristics of the curriculum, helping students find appropriate learning methods.

6. Conclusions

In a word when college teachers carry out the teaching of optical network technology courses, they should pay close attention to the characteristics of the courses, and choose a mixed teaching mode based on the actual learning needs of students and the actual characteristics of the courses. The current role of information technology in professional teaching should be given full play, and information technology should be used to conduct online teaching for students., students can be promoted and improved at any time by breaking the time and space limitation in traditional teaching. In a word, in the process of professional teaching, teachers should also attach importance to the combination of theory and practice. They should combine theoretical knowledge with practical knowledge according to the actual learning needs of students to comprehensively improve the overall teaching effect and teaching ability.

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References

- [1] Xinrong Mao,Rong Li."Optical Fibre Communication Technology and Optical Network(C)". China University of Mining and Technology Press,2021.
- [2] Zhao Jin-kun, Li Hui-nan."Thoughts on the Construction of Internal Teaching Quality Assurance System in Colleges and Universities under the Concept of"Student-centred(c)".Journal OF Harbin University,2022.4:124-127.
- [3] Hui Xia."Student-centred"education and teaching concept:theoretical origin,framework system and teacher's role".Journal of Hotan Normal College,2022.1:51-55.