Research on application of online and offline mixed teaching mode for Mechatronics major in technical colleges

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Abstract: For the major of mechatronics, students generally reflect that the course is difficult and not easy to understand, and this major pays attention to the development of students' practical ability, requiring students to master a solid theoretical foundation and practical technology to solve practical problems in mechatronics production. Online and offline mixed teaching method through the integration of online and offline two kinds of teaching resources, the theoretical knowledge will be explained, build students independent learning platform, is a widely used and effective teaching method, more in line with the law of mechanical course teaching, teaching efficiency is high, teaching effect is obvious, students have a strong sense of achievement. This paper analyzes the effective strategies of implementing the online and offline hybrid teaching for Mechatronic integration majors in technical colleges, in order to provide references for cultivating students' innovative practical ability and improving course teaching quality.

Key words: Technical colleges; Mechatronics; Mixed teaching; Applied strategies

Online and offline mixed teaching method is a teaching mode that integrates online and offline teaching resources. Its most distinctive feature is that students have strong participation, and students raise, analyze and solve problems around specific cases. Mechatronics major is a major studying institutions and machines. The main content includes the structural analysis, motion analysis and dynamic analysis of institutions, etc., aiming at enabling students to master mechatronics operation skills, develop the ability to analyze, compare, judge and make decisions from the perspective of engineering, as well as the ability to research and improve or develop new institutions. In the Mechatronics major, the online and offline mixed teaching method is applied, teaching resources are integrated, and students' learning initiative is exerted, so that students can easily understand the theories explained in the relevant chapters of the course.

I. The concept and main characteristics of blended teaching

As the name suggests, online and offline hybrid teaching refers to the integration of online and offline teaching modes, the combination of traditional teaching and E-learning, to create online and offline teaching resources and teaching credentials. Compared with simply carrying out online or offline teaching, the blended teaching mode builds a freer learning platform for students. Teachers play the role of teaching guides and highlight students' main position in learning. It is a student-centered teaching mode. The work of blended teaching design requires teachers to design teaching according to the teaching objectives of the course, students' learning needs and teaching environment. Under the background of Internet + education, the application of E-learning platform and resources to subvert the traditional teaching mode and promote teaching reform with online classroom and information-based teaching resources is the main development trend of current education work. Hybrid teaching is a kind of system integration, not a simple superposition of online or offline teaching, the goal of this integration is to produce 1+1>2 effect. To carry out blended teaching, it is necessary to reconstruct teaching resources according to the course content and teaching objectives, give full play to the advantages of online and offline teaching modes, and ensure the teaching quality.

The major of mechatronics is to train skilled talents with mechatronics technology and professional knowledge of automation and mechanization for the society. In the future, these talents will mainly engage in high-tech industries dominated by microelectronics, CNC machine tools, robots, etc. It can be said that mechatronics professional education is an important work to support the development of China's manufacturing industry. Mechanical and electrical integration theory and practice are more prominent, the past teachers are often used to according to the order of teaching materials to explain the theoretical knowledge step by step, which leads to the lack of systematic teaching, the relevance of knowledge is not in place, affecting the students' learning quality, learning interest. The blended teaching mode breaks through the bottleneck of the traditional infusing teaching, and can effectively help students understand the knowledge points, avoid learning blindness, stimulate students' innovation potential, and improve students' learning interest and initiative.

II. The application of mixed teaching in mechatronics major teaching in technical colleges

Mixed teaching is mainly divided into three stages: pre-class guidance, in-class discussion and after-class expansion, and it applies online and offline resources and platforms.

1. Pre-class guidance learning

The pre-class learning stage is the most outstanding highlight of blended teaching. It brings students into an independent learning environment and lays the foundation for discussion in class. In the pre-class guided learning stage of blended teaching, students mainly rely on online learning resources to carry out independent learning. Therefore, teachers need to organize online video courses, online courseware, online test questions, etc. Organize online learning resources based on learning objectives, including micro-lesson resources, task lists, theme preview PPT, supplementary books and network resources, etc. Relying on the online teaching platform, teachers can sort out relatively rich learning resources and enhance the fun of online autonomous learning. With the application of the Internet and big data technology, students can conveniently access learning resources. In order to ensure the efficiency of students' independent learning, teachers can publish a test

question, and students can check the preview effect independently.

For example, in the principle lesson "CAM mechanism and its design", the following self-learning tasks can be set:

(1) Understand the structure and characteristics of CAM mechanism.

(2) What are the respective advantages and disadvantages of the pointed follower CAM, the roller follower CAM and the bottom follower CAM? What kind of scenarios are they used in?

(3) How to design the CAM mechanism with given motion law? Design the CAM contour curve according to the given motion law.

(4) How does cam-driven control guide robot dog achieve coordinated movement?

(5) What are the advanced parts processing methods?

Task 1 and 2 are the basic content, students can form a basic understanding and grasp of these two tasks by watching the video course; The discussion of tasks 3, 4 and 5 is the extended content, which explores these three tasks by combining the course resources and independent thinking.

In order to effectively ensure the initiative and enthusiasm of students in learning, teachers can supervise students online, guide them to keep up with the progress of independent learning, and actively communicate and discuss in the discussion area. In the pre-class guidance stage, teachers can conduct timely and personalized evaluation and feedback on students according to their pre-class preview, so as to fully mobilize students' learning participation, effectively improve students' learning progress in class, and achieve the goal of quality education.

2. Study in class

The task of the class is to consolidate the content of the pre-class preview and strengthen the knowledge of the major and difficult points of the course. The class is mainly based on the group cooperative learning mode, and the problems encountered in the preview are exchanged and discussed. The teacher further analyzes the key and difficult knowledge of the course for the students through guidance, prompting and explanation. The teaching design in the course is based on students' online autonomous learning, and the learning effect of the course is tested by in-class quizzes.

For Mechatronics majors, because the course knowledge is relatively difficult, the in-class research is an effective means for students to solve the knowledge difficulties. The students exert their collective wisdom to complete the task. The whole case discussion task is presided over by the teacher. Each group independently discusses the ideas and design schemes, and finally forms a group discussion result. This is the process of sharing the design experience of the whole class, and it also makes the students truly realize that they are the main body of the case teaching. The effective combination of classroom discussion and extracurricular research can achieve the goal of case teaching and achieve the best group discussion results.

In the offline class, the teacher should answer the learning problems encountered by the students in the process of independent preview, so that the students can further consolidate the important and difficult knowledge of the course. Research in class mainly relies on group discussion teaching, allowing students to analyze and think about the important and difficult knowledge of the course through group communication and discussion. In the course research, teachers play the role of teaching guide and students' cooperator, giving timely guidance and solutions to students' problems and doubts, guiding students to discuss and understand the problems left over from the independent learning process and the important and difficult knowledge of the course, understand the core content of the course, develop key abilities, and absorb and internalize the knowledge taught by teachers. To ensure that they fully grasp the learning content of this lesson. Teachers can also use the Internet platform to design diversified and interesting teaching models. For example, the application system can be used to enliven the classroom atmosphere by scanning faces and randomly drawing student numbers.

3. Extend learning after class

The blended teaching mode extends the teaching time and space. Based on the online learning platform and online learning resources, students can easily carry out independent learning after class. Teachers can arrange some extracurricular learning tasks, guide students to complete learning tasks independently in their spare time, and let students use mobile electronic devices to complete relevant after-school learning tasks in their spare time, so that students can give full play to their learning initiative. The advantages of network teaching platform have achieved the goal of cultivating students' independent learning habit.

For example, teachers can assign some life-oriented learning tasks, shorten the gap between mechatronics knowledge and actual life situations, concretify abstract principles and concepts, and promote the transformation from theory to practice, so it is of great significance to improve students' learning interest and develop students' learning potential. After-school extended learning is effective in the cultivation of students' ability to analyze, solve problems and innovate, as well as the acceptance of knowledge and the persistence of retention. The pre-class and in-class teaching of Mechatronics major is mainly focused on textbook content, while after-class extension is mainly related to mechatronics production and students' life, so as to cultivate students' ability to apply and create with professional knowledge. The full integration of pre-class, in-class and after-class teaching enables students to master the basic concepts and core abilities of the course, and improves the ability of mechanical innovation design.

4. Implement diversified teaching evaluation

On this basis, teachers can design a variety of evaluation methods, combining qualitative and quantitative, process and outcome evaluation, design a set of scientific and reasonable evaluation index system, introduce a variety of evaluation subjects, and let students participate in it.

Teachers should effectively supervise and evaluate students' online learning and classroom learning. For example, they should score students according to their comprehensive performance by preparing for class, consolidating review after class, watching learning videos

and collecting learning materials, and take these materials as an important basis for process evaluation. In the outcome evaluation, teachers should combine students' PPT topic statements, flow charts and written test scores, and take these as an important basis for the final evaluation.

Since the online learning platform can record all kinds of online learning data, it can effectively support the process assessment, organically combine the process assessment and the final assessment, evaluate students' learning level more truly, give full play to students' learning initiative, enhance students' ability of knowledge construction, and enable students to get a better learning experience. The process assessment also needs to record the performance of students in offline classes, record the specific performance of each group member, make periodic comments and summaries of the content answered by students and the knowledge points in Cohen, and integrate the classroom teaching content from the perspective of students as the first, effectively master the teaching points, and let students truly master the professional knowledge and tools of mechatronics. To provide more possibilities for their future development.

On the network platform, teachers can collect students' feedback information through various ways. For example, students are allowed to express their opinions or suggestions online through real names or anonymity; It is also possible to learn about teachers' teaching concepts, teaching models and teaching methods through online questionnaires. In this way, more learning information can be obtained to help teachers optimize the classroom teaching mode, adjust the teaching content and teaching plan, establish a good teacher and student evaluation system, build a democratic classroom, and improve the teaching quality and efficiency.

Concluding Remarks

Information technology plays an important role in the educational reform of technical colleges, promoting the deepening and development of the educational reform of technical colleges. As a key major in technical colleges, mechanical and electrical integration has cultivated a large number of skilled talents for the manufacturing industry, and plays a pivotal role in the transformation and upgrading of China's manufacturing industry. The teachers of this major should actively change the teaching concept, actively introduce the "mixed" teaching mode, make full use of modern educational technology, constantly innovate the teaching mode, enrich the teaching content, build the "mixed teaching of mechanical and electrical integration" mode with the characteristics of the college, constantly stimulate students' learning interest and enthusiasm, and promote the improvement of the quality of mechanical and electrical teaching.

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