Project-based Teaching Design of Embedded Courses Based on Flipping Classroom

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Abstract: The transformation and development of ordinary colleges and universities to application-oriented colleges and universities has put forward new requirements for the reform of teaching mode. Embedded course in our college is an important professional basic course. According to the needs of specialty and the current situation of Embedded Course teaching, the course takes "teaching according to talents" as the main line, carries out the reform and research of teaching mode of "flipping classroom" based on curriculum practice projects, puts forward specific implementation plans, clarifies the tasks of teachers and students in the process of teaching activities, and puts forward the flipping course, implementing measures of embedded system teaching mode based on combination of hall and project, to build a practice platform for students, to achieve students' autonomous learning as the main, supplemented by teachers' guidance, to cultivate students' learning initiative and enthusiasm, enhance practical ability, improve students' learning efficiency, thereby improving the teaching effect.

1. Introduction

Embedded technology is a practical course, involving many knowledge points, strong foundation, wide range, and fast update. For electronic students, learning this course is difficult to get started, knowledge understanding is difficult, learning interest is small, initiative is not high. In order to solve all kinds of problems, curriculum system reform, textbook reform and teaching method reform have been carried out. Especially in the teaching methods of practical projects, some teachers use software simulation, modularization, project and other methods to introduce practical teaching. In recent years, Flipped Classroom has been very popular at home and abroad. From basic education to higher education, many successful cases have emerged. Starting from the current situation of Embedded Course teaching, this paper explores how to effectively implement the project-based teaching mode reform in Embedded Course teaching, and puts forward specific implementation plans.

2. Project Design of Embedded System Course under Project-based Teaching Model

In the project-based embedded system teaching mode, we insist on taking the project as the carrier, guiding students to participate in the teaching process through the project, and promoting students to actively and actively integrate into the learning process. Emphasis should be placed on the project design of embedded system course to improve the cohesion between courses. Team cooperation among students should be emphasized in the process of project implementation. Team discussion should be strengthened with 4-5 students as a group to enhance the team spirit of students. Each group of students should complete the basic project according to the requirements of the teachers. The group can complete the task by its own division of labor. The comprehensive project can be completed by one group or drafted by itself, as long as the teacher has passed the examination and approval. The project design of Embedded System Course Based on Project-based Teaching Mode of flip classroom is shown in Figure 1.

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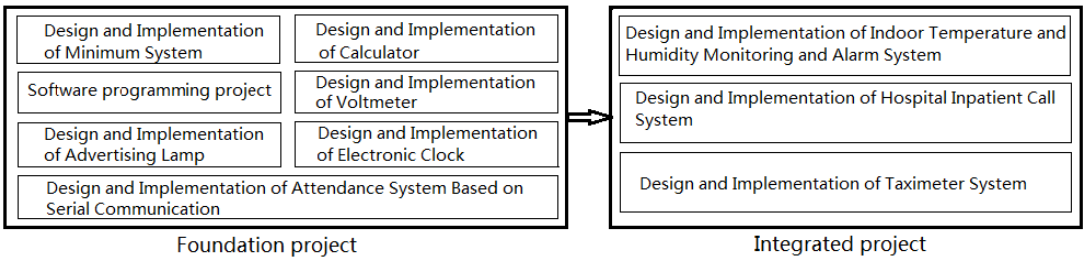

Fig.1. Project design of Embedded System Course under project-based teaching mode

3. Classroom Teaching Design of Embedded System Combining Flipping Classroom with Project-based Classroom

Flipping classroom is a new modern teaching method, which is a traditional classroom flipping mode. It enables students to complete knowledge learning before class and to master and absorb knowledge in class. It takes the form of students'pre-class preparation, self-study and pre-class practice through the relevant learning resources provided by teachers. Teachers only play the role of guiding, evaluating and dispelling puzzles in improving relevant practice activities or exercises in the classroom. Students'learning and practice projects before class, the process of sharing the results and understanding in class, achieve the internalization and consolidation of knowledge, the exercise of practical ability and the exertion of innovation.

3.1 Before class.

At the end of a project, the teacher gives the students the knowledge points and framework of the new practice project, and guides the students to list the core components of the new practice project. According to the content of the practical project, the students study independently through the relevant materials such as network course, PPT courseware, micro-video, record the function of relevant components, practical points, etc., carry out circuit virtual simulation, use existing training components to design the composition and practice to complete the relevant circuit, understand knowledge points, put forward and record relevant problems and phenomena, etc.

3.2 In class.

Students are the masters of the whole classroom, leading the curriculum. Teachers are just organizers and guides in the classroom. Students show project works in class, share the process of learning, conception, design and function of the works, analyze the works, and evaluate the works and give feasible help to each other. Teachers in the classroom, break the usual teaching, to achieve "teaching according to their aptitude". As the organizer of classroom teaching, guide students to explore and analyze works, stimulate students'enthusiasm and interest, give students the pointed answers to doubtful questions, and put forward suggestions for improvement of works. The whole on-the-spot teaching takes pre-class works as the entity, uses multimedia and Internet as the medium, and carries on the exchange of theoretical knowledge and practice between teachers and students.

3.3 After class.

Students learn conceptual works before class, share works in class, solve difficult problems and technical problems, then use comprehensive theoretical knowledge and practical exploration after class, boldly exert their creativity to improve and improve project works, write experimental reports of practical projects, and completely realize the whole "flip classroom" teaching mode. So as to achieve the consolidation and expansion of knowledge points, the improvement of practical ability, as well as the joy of obtaining results, improve their interest in learning.

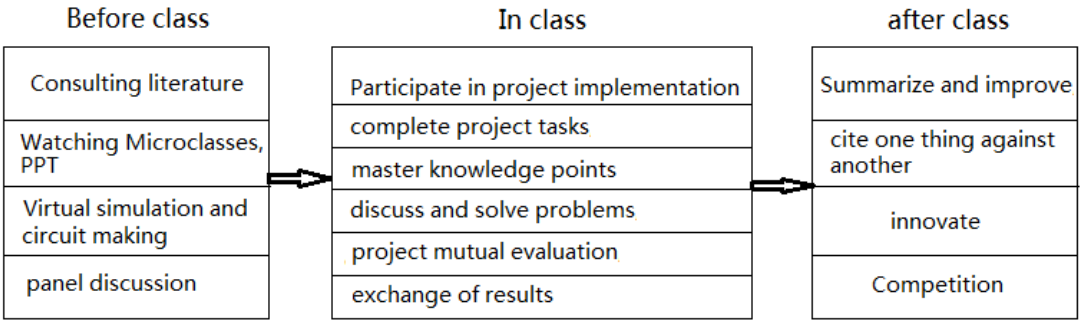

Fig.2. The structure of the teaching mode of "flip subject"

4. Examples of Flipping Classroom Practice Items

In the specific curriculum, how teachers organize the "flip classroom" is a problem that needs to be studied in depth. In this study, the project in Figure 1 uses "flip classroom" teaching as an example, according to the learning situation, using the "teaching according to aptitude" teaching ideas, students are grouped into groups for cooperative learning, and grouped around the principle of learning practical ability ladder. Firstly, the teacher gives the introduction of general knowledge points and the framework of practical projects, provides relevant components of students'practice, and gives PPT, proteus simulation of students' relevant knowledge points as well as website address and video of similar projects. Students study independently, discuss in groups, cooperate in division of labor, design work circuits, equip project welding tools and debugging tools, read and test components, install and weld circuits, and finally debug them.

The purpose of this training is strong, and the form of the project presentation is observable, which can improve students'initiative and interest. In the process of production and debugging, students will encounter different problems. They discuss and help each other among groups, groups and groups. At the same time, they ask me for help online. They can't wait to solve various problems. These are the manifestations of students'initiative and interest in learning.

Class 4 hours, student-led course time is 2 hours. In the classroom, the students show each group's pre-class works one by one. During the course of the presentation, the group representatives explain the functions of the works, and the puzzles and technical problems encountered in the production process. I made a good record, summarized the problems and difficulties the students had encountered, and prepared for the next comment. Then each group evaluated the works of other groups, and there was also communication between groups. In the next two classes, I will give professional answers and practical technical guidance to the problems they encounter, and form an interactive discussion and research with them. Here, we give students the evaluation and acceptance results of practical projects, affirm their practical results, and further stimulate their interest in learning. The students get the teacher's answer information from the classroom, and the difficult questions are open-minded. At the end of the class, the student group makes corresponding improvement and improvement according to the work, and forms the experimental training report of the project.

5. Conclusion

In a word, the reform of embedded curriculum needs to conform to the latest educational and teaching reform concepts, combine with the talent training program, explore the project-based teaching reform mode of embedded system based on the flipped classroom, change the relationship between teachers and students in the traditional classroom, improve the interaction between teachers and students, enhance students'ability to build knowledge, constantly improve the effectiveness of the curriculum, and enhance students' learning initiative. It can enhance innovative consciousness and achieve good teaching effect. Therefore, it is of great practical significance to carry out the teaching reform of this mode, and further reform is needed in the future.

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