Application of task driven method to realize the teaching reform of MCU in Higher Vocational Colleges

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Abstract: the single chip microcomputer application course is a professional core course of electronic related majors in higher vocational colleges, which is highly comprehensive and practical. In the process of MCU application teaching, the task driven method is taken as the guidance to reform the traditional classroom teaching mode. Through this course, students can understand the application of MCU, master the design and development principle of MCU, cultivate students' practical ability and innovation ability, and improve students' professional quality of loving their jobs and keeping improving. Based on the actual task as the main line, this paper puts forward the reform scheme from the three aspects of curriculum design, practical operation and curriculum assessment, in order to cultivate the applied talents needed by enterprises.

Key words: MCU application course; Task driven approach; Curriculum reform

1 Introduction

SCM technology is widely used in aerospace, industrial control, electronic information and many other fields. The development of SCM technology promotes the progress of modern electronic industry. Therefore, the teaching quality of this course not only affects the learning quality of higher vocational students of related majors, but also affects the efficiency of China's industrial production and economic development.

The traditional single-chip microcomputer teaching generally adopts the theory teaching method, which is easy to make the teaching objectives and training objectives out of touch, which is not conducive to teachers' teaching and students' learning and mastering of skills.

Task driven method is a teaching method that can combine theory and practice, so this paper attempts to use task driven method to implement MCU Teaching. Through the ability test of students in our school and the satisfaction survey of employers, it has been proved that the teaching method based on task driven method has greatly improved students' interest in exploring knowledge, increased students' innovation ability, and improved students' practical ability.

2 The necessity of MCU Teaching Reform

2.1 Shortcomings of traditional teaching methods

The teaching design and arrangement of MCU Course in most higher vocational colleges generally adopt the teaching of basic knowledge first, and then the application practice, such as teaching the internal structure and instruction system first, then programming, and finally combining with relevant cases. In teaching, the proportion of theoretical class hours often exceeds that of practical class hours. The final result is that students still can not independently build a complete MCU system after half a day of learning, let alone understand the MCU and its surrounding electronic components, and can actively participate in MCU related design competitions.

2.2 Teaching advantages of task driven method

Task based teaching method is developed based on the theory of constructivism. Its core educational idea is to let students actively participate in the classroom, solve problems independently, and internalize knowledge. Specifically, the teaching content is divided into modules from easy to difficult; Then each module is divided into several projects; According to the project situation, it can be further divided into one or more specific subtasks. Through the completion process of task project module, students continue to increase the depth of curriculum exploration, and improve their comprehensive design ability, collaborative response ability and independent innovation ability.

Teaching through task driven method can deepen the teaching reform of MCU Course in Higher Vocational Colleges and enrich the content of teaching theory in Higher Vocational Colleges. Second, it is conducive to solving the docking problem of theory and practice in the teaching of MCU Course in higher vocational colleges. Based on the strong practicality of MCU Course in higher vocational colleges, the combination of its theory and practice can cultivate applied skilled talents who not only understand the principle but also can flexibly use technology, but also have strong hands-on and engineering practice ability.

2.3 Teaching design of task driven method

The key of task driven teaching lies in how to design tasks reasonably. First of all, teachers should determine a general task for the teaching content of the course, and then decompose it into specific sub tasks according to the general task. The following points shall be noted during design:

1. pay attention to the change of roles in the teaching process

In the task driven method of MCU Teaching, we should take the specific task as the main line, teachers play a leading role, and students are the main body to complete the task. Therefore, the key of the whole teaching is to mobilize students' learning enthusiasm, so that they are willing to actively participate in the project and actively complete the task. How should teachers change their roles?First of all, teachers should change the narrator as the organizer and the indoctrinator as the guide; From cramming teaching on the platform to walking off the platform, going deep into the students, communicating, discussing and jointly completing the task with the students.

When assigning specific tasks, teachers need to help students clarify the relevant ideas of project implementation, inform students of the relevant knowledge points they should master, and enable students to complete the task. At the same time, we also need to respect the dominant position of students. In the specific implementation process of the project, teachers can provide appropriate guidance and answer questions in groups. Through mutual discussion among group members, they can learn relevant knowledge and skills, acquire teamwork ability, and mobilize students' subjective initiative and innovation and creativity.

2. pay attention to the combination of theory and practice in the teaching process

Based on the need of higher vocational education to highlight the cultivation of practical ability, and to build a talent training mode based on the integration of production and education, the combination of work and learning, and order training, teachers can design tasks similar to the actual work scene in the teaching process. By completing these tasks, students can understand the work scene in advance, so as to have a clear target and avoid detours, Better adapt to the job. Here, it is suggested to cooperate with professional enterprises to jointly develop loose leaf textbooks and design tasks.

3. pay attention to the design of key and difficult points in the teaching process

The learning of MCU knowledge points is a gradual accumulation process. When designing specific tasks, remember to design too many important and difficult points on a small task, which will make students lose interest in learning because of the difficulty. Therefore, it is necessary to reasonably allocate the key and difficult points according to the actual level of students, contact the knowledge points learned before and after, and stimulate the confidence of students to constantly challenge in a step-by-step way, from easy to difficult.

4. increase exploration space in the teaching process

In the process of implementing the task driven method, we need to leave enough space for students to explore and think, and cultivate students' independent exploratory learning. It can be realized here in the form of arranging after-school thinking assignments and carrying out the second classroom. By increasing the exploration space, students can break the fixed mode of thinking, make bold guesses and attempts, and innovate on the basis of the second, and finally obtain the required skills.

5. summary is the key

After the completion of the task, first of all, students can summarize themselves in the form of writing a report to build a knowledge system in line with their own cognition; Then they can summarize and discuss in groups and share their experiences and lessons in the learning process; Finally, the teacher should guide the students in each group to make a corresponding summary and comment on the completion of the task. Through summary and reflection, students can deepen their understanding of the knowledge they have learned and consolidate the knowledge they have learned.

3 Implementation of task driven method in MCU Teaching

3.1 Teaching application process

Taking the UAV application technology major in Higher Vocational Colleges as an example, the total class hours of the talent training program of "principle and application of single chip microcomputer" is 56 class hours. When designing the teaching process, teachers can combine theoretical teaching with task driven method, and divide the teaching content of single chip microcomputer into three modules from simple to deep, corresponding to the cognitive part, the basic part and the comprehensive application part. Each module is task driven and divided into sub projects and sub tasks.

Module 1: "hardware structure and development tools of single chip microcomputer" has 6 class hours, which is divided into 2 projects and 3 sub tasks. Through simple small tasks such as 1-bit LED lamp design and 2-bit signal lamp control design, students can understand the hardware system and software development system of single chip microcomputer and stimulate their interest in learning.

Module 2: "MCU system design and simulation" has 34 class hours. Based on the basic design project of MCU, the module subdivides the corresponding knowledge points into 6 projects and 18 sub tasks, which also cover all the important and difficult points of MCU Course. In the design, because the task is decomposed carefully and the class hours are allocated reasonably, the accumulation of important and difficult points is also avoided.

Module 3: "single chip microcomputer course design example" is an innovative addition, which is related to the major and has 16 class hours of comprehensive single chip microcomputer project design. This module not only has the relevant knowledge of MCU, but also relates to the actual industry, which is a link of joint development with enterprises. This part is completed in combination with the second classroom and under the guidance of enterprise tutors. Through this link, we can achieve continuity after class and let students learn

independently.

3.2 Specific application examples

Taking "UAV design based on STM32 microcontroller" as an example, the application of task driven method is specifically taught. The implementation of the project is a process of comprehensive application sublimation. In the whole process of task implementation, in strict accordance with the working environment of the enterprise, the double qualified teachers in the school and the enterprise tutors outside the school jointly guide and complete the task.

Prepare for task 1 before design, and introduce relevant tasks through 2 class hours of teaching. This task is to design the software and hardware system of UAV Based on STM32 MCU. The software system uses STM32 MCU to complete the program design and Simulation of UAV flight control module; The hardware system needs to complete the PCB welding of UAV fuselage flight control module and remote control flight control module.

The second task is the design part, which is also the specific implementation part of the task driven method. At this time, the students are very clear about the task, and the teacher can arrange the students to carry out cooperative learning in groups. Team members can discuss with each other, use online materials or consult teachers to give a reasonable design scheme, and then design the software and hardware according to the scheme. At this stage, teachers should give appropriate guidance and help, including providing necessary materials, to assist students to successfully complete the corresponding tasks.

The third task is to carry out the UAV installation and test flight in the second classroom. Only in the use of limited classroom time for single-chip microcomputer learning, students can not be very impressed with the learning content, nor can they arouse their awareness of innovation. Let students install and test the designed UAV in the second class, so that they can really see the application of single chip, and are willing to design more single chip products. In this link, the enterprise tutor will guide them, so that students can understand the real production link.

After the completion of the task, the teacher needs to summarize the knowledge points, the necessary operation process and the corresponding key points of the task, so that the students can finally obtain the ability from theoretical knowledge to practical application.

3.3 Assessment and evaluation methods

The application of task driven method in teaching, the traditional stage result evaluation can not fully reflect the situation of students' learning. Therefore, the assessment method is suggested to adopt the combination of process evaluation and phased result evaluation. The students' mastery of a certain knowledge point or key and difficult points is investigated through the process evaluation, and the students' mastery of a project or task is investigated through the stage result evaluation. The evaluation subject also suggests diversification, with teachers, business mentors and members of the group participating in the evaluation.

The specific evaluation can be as follows: before class, during class and after class account for 30%, which is completed jointly by teachers and members of the group; The interim assessment includes project progress assessment and knowledge point assessment, accounting for 30%, which is also completed by teachers and members of the group; The final examination accounts for 40%, and the assessment of project completion and technical report writing accounts for 20%, which can fully simulate the real work situation of the enterprise.

4 Concluding remarks

In this paper, 18 and 19 levels in our school are the research objects of task driven method in MCU Teaching. In teaching, the traditional teaching method is adopted in level 18, and the task driven method is adopted in level 19. In terms of the final assessment results, the level 19 students' mastery of theory is significantly better than that of the level 18 students. In terms of practical ability, according to the satisfaction survey of internship employers, the practical ability of grade 19 students is better than that of grade 18 students. At the same time, grade 19 students are more daring to challenge and try, and their enthusiasm to participate in the competition is significantly higher than that of grade 18 students.

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