# Elementary Introduction to the Teaching Reform and Practice of the Singlechip Computer Course

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**Abstract:** The application technology course of singlechip microcomputer is characterized by strong comprehensiveness, strong practicability and strong engineering. The traditional teaching can not adapt to SCM training objectives of occupation education under the new situation, this paper discusses the necessity of teaching reform of SCM, from the aspects of teaching content, teaching methods and means, practice teaching system and so on and try to improve students' ability to analyze and solve problems, and enhance the innovation ability of students the comprehensive quality, and puts forward the improvement of the existing mode of classroom teaching, improve the teaching quality of thinking.

## 1. Introduction

The traditional SCM teaching is based on the structure of singlechip microcomputer. First, we talk about the hardware structure of microchip, followed by instructions and software programming. Then we extend the singlechip microcomputer system and the application of various peripheral devices. Finally, let's talk about some examples. According to this kind of teaching structure, students generally feel difficult to learn. Especially the occupation school students, there is no contact with the computer structure, even digital circuit is just contact, want him to understand the internal structure of the microcontroller, it is not easy, as many books start the bus address, etc., it is difficult for students to understand, no matter what clever analogy is not easy to understand. The singlechip computer has a large amount of information. The traditional textbook is usually written with the structure of singlechip and the use of each module as the core.

Such teaching materials detailedly analyze the structure and various functions of the singlechip computer, which is helpful for students to master the theoretical knowledge of singlechip computer in an all-round way. But such teaching materials are not suitable for secondary vocational students. Teaching materials in secondary vocational schools should adopt modularization teaching materials instead of teaching items and modules. The whole theoretical system will be decomposed into organic and decomposed projects and integrated into projects and modules. At the same time, we should put forward basic requirements and requirements for students, so that students can have independent learning and independent innovation space when they complete basic teaching tasks, and facilitate students with learning ability to further improve themselves. The third part is the SCM software programming, if the front things can not understand, but also rely on memory to obtain knowledge, this part is purely to understand and master, if not previously learned programming, a short time is difficult to grasp the relevant knowledge of programming, not to mention the programming skills. However, it is clearly stipulated in textbooks that such a program should not be compiled, nor can it be learned by others. Of course, it will only be considered that the requirements of textbooks are reasonable and should be done.

## 2. The Necessity of Teaching Reform of Singlechip Microcomputer

Now the MCU teaching materials, are fundamental to the microcontroller based learning computer principle, and the impure for learning microcontroller technology in teaching materials,

teaching process arrangement has not considered the ability to accept students, make students learn to process is a continuous process of frustration, so many students think that SCM entry difficult. In the teaching of the application technology course of the singlechip microcomputer in Career Technical College, the theory teaching and the practice teaching have been separated for a long time. In classroom teaching, students are passively accepted, unable to take part in the whole teaching activity actively, and fail to achieve the purpose of vocational education based on students and cultivating students' operative skills.

Although the arrangement of experimental training, but the experimental training and classroom teaching can not achieve mutual coherence, mutual reflection, experiment and training project and the content of classroom teaching associate degree is not enough, the classroom teaching and students' practice can't achieve the organic combination of exercises and classroom content could not be closely buckled, the examination form and content in theory mainly, with only a piece of paper made the ability of students, students can not reflect the practical application of knowledge practical ability. In a word, the traditional single teaching materials and too much emphasis on deductive reasoning and knowledge system, there are many problems in SCM course inherent in the abstract, traditional teaching is, make the most of the students have a fear of course, so as to affect their learning enthusiasm, to become a "course" not only the follow-up courses for students studying the formation of a certain difficulty, also has a negative impact on the teaching quality of engineering. Therefore, it is necessary to carry out the teaching reform of the singlechip computer course.

## 3. Analysis on the Teaching Reform of Singlechip Microcomputer

Reform the curriculum content system structure. The teaching content of the singlechip computer has high abstractness, which is the inheritance of history. Therefore, the course of speculative ability and flexibility of thinking of students' requirements are relatively high; the relevant materials of current knowledge relatively old, teaching content rarely reflect the actual application of SCM in the relevant professional knowledge of the out of touch with the school - not only failed to reflect "the quality of teaching of modern education concept of education", did not reflect the SCM for professional the basic professional should be "". In addition, in practical teaching, different students have not paid enough attention to the different learning needs of the singlechip computer course. Therefore, it is very necessary to choose and update the teaching content of the singlechip computer. SCM curriculum reform after the module, task, task structure, the whole course is divided into several modules, each module is composed of a number of topics, each topic consists of one or more tasks, each task consists of four interrelated parts mission, task analysis, correlation knowledge and task implementation.

## 4. Reform of Teaching Content Organization

Influenced by the traditional educational concept, the current classroom teaching methods and means of singlechip computer are obviously backward. Especially in the new situation of higher vocational education, how to abstract the traditional classroom teaching in the concept of specific and visualization, the dull theory of diversification, vivid, lifelike image will be heavy and difficult knowledge content to show in front of students, inspired by the picture and intelligence of the combination of dynamic and static induction function, should be urgently strengthen the key content of the research in teaching reform.

Constructivism holds that the process of learning is the process that students construct the meaning of knowledge in their own minds. In the construction process, students of cognitive knowledge cannot rely on knowledge, nor on the contents of the book on memory and thinking of teachers repeat practice but accomplish specific tasks in the students' because of the pressure of the external environment to understand and solve the problem, the resulting power demand of cognition and learning. That is to say, meaning construction is to process and reorganize and reorganize information gradually in the mind of the students' own needs in a certain learning situation.

Therefore, in the process of organizing teaching, teachers should follow the law of knowledge construction and create a learning situation for students.

According to the theory of constructivism, students should be guided actively in the course of teaching to maximize the main role of students in the experiment. The questions raised by the students, not the positive answer, but the key to guide the students to find the problem around the problem, and solve the problem by themselves. The teacher led, student-centered learning, speak, learn while training. In the course of teacher's explanation, students are required to use relevant software on the computer to verify it, and some students are asked to carry out analysis and operation on the platform. The innovation experiment is a variety of students mainly in the form of students from "want me to learn" to "I want to learn". Students are encouraged to work independently and independently to complete the project.

## 5. Reform Practical Teaching Design Method

The student experiment takes the classroom teaching task as the object, draws the circuit schematic diagram with the protel software, draws the simulation circuit diagram with the Proteus software, inputs the program and compiles the program with the WAVE software or Keil software, then carries on the simulation debugging movement to the procedure and the electric circuit. The teacher reviews the key, difficult points and key points in the process of the students' experiment and the problems in the process of the students' operation. And students are required to make proper modifications on the basis of experiment tasks, circuits and programs. Only by combining theory with practice and strengthening experimental teaching and curriculum design, can two real links be mastered. In order to improve the students' design ability and innovation ability, the course design link is introduced.

## 6. Reform the Form of Examination and Realize the Separation of Teaching and Examination

This course has a relatively simple form in the past. The examination focuses on memory, such as a few instructions, a few parts, a simple program, and some students have high achievement in singlechip test, but they will not use it practically. Therefore, it is a very important task of teaching reform to reform the assessment form of single-chip microcomputer and restore the vitality and function of SCM course to meet the needs of social development. In order to change the students' examination psychology, it is necessary to reform the method of examination.

A transparent examination method is adopted for the theoretical knowledge of memory, and the examination questions with complete coverage of theoretical knowledge are formulated for each subject. In order to strengthen the student's theoretical knowledge reserve, take the theoretical knowledge to tell the students ahead of time, and carry on the random test 10 minutes before the practice class. The assessment of practical projects is based on "learning by doing", providing students with more choice opportunities, more practical tools, more room to play and imagine, and strive to enable students to "live" in the process of hands-on practice. Reforming the assessment method is the key to teaching reform. Because the course of SCM application technology is aimed at training students' practical ability and application ability, examination should also check for several aspects of ability. The methods of assessment and the content of the assessment will directly affect the implementation of the teaching process, which is not only related to how teachers teach and how students learn. Therefore, the reform of the teaching process should be promoted through the reform of the methods of assessment.

## 7. Conclusion

The assessment of the application technology of singlechip microcomputer is mainly for the ability of programming, software and hardware analysis, debugging ability of hardware and software, and the ability of comprehensive application. In the teaching process, we first on the evaluation methods of the reform, the assessment includes three aspects, comprehensive capacity

assessment, a total score of 50%; the training process of the assessment, the total score of 30%; usually questions, assignments, performance assessment, a total score of 20%. The examination of comprehensive ability completely adopts the form of "test bank" and implements the separation of teaching and testing. Professional knowledge examination take the written and oral combination of engineering practice ability assessment using the recording work and study combination, the data reliability assessment methods, can effectively promote the practical ability, practical ability of engineering students to improve contact theory.

The examination paper includes two aspects that should be known and should be met. The so-called "know" refers to the examination of all knowledge points, including basic concepts, basic principles and basic devices. For the results of the on-site commissioning, the teachers are graded on the basis of the accuracy and proficiency of the students. The assessment of training process is to record and score the results of each student during the training process of each module. The evaluation basis can be completed according to the sequence, quality and student's expressive ability of the training project. The result is signed by students. The purpose is to make students take seriously every training project. Practice proves that this method can achieve good results. If we carry out practical training in group, we should also ask each student to ask questions or operate independently, which can play a good role in promoting poor students.

Through the above teaching reform, we aim at improving students' interest in learning MCU, mobilizing the subjective initiative of students, activating learning atmosphere and improving teaching effect. In the process of learning progress management, students' practice task progress publicity method is adopted to help students who finish the situation slower than expected, and display excellent projects by practice projects, and encourage students with strong hands-on ability to take the lead role. The experimental device used in this course is handed over to students for safekeeping and maintenance, so that each student can have enough time to carry out practical operation after class, which lightens the teaching burden of teachers. It also gives students plenty of freedom so that they can practice all the time and anywhere. Reform is not the purpose. It brings students enthusiasm through reform, and enables students to have more contact with knowledge and enrich their learning career. That is the role of reform.

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