

Teaching Reform of the Course of Single Chip Microcomputer

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Abstract

The content of the course of microcomputer principle and interface technology is abstract and complex, which is difficult for students to understand and accept. So, the course needs teaching reform and the reform method is put forward. By improving the teaching methods, strengthening the practice and reforming examination methods, this reform can not only cultivate the learning interest but also strengthen the theoretical knowledge of the students. In addition, this reform can establish self-confidence of the students and improve their practical ability and self-learning ability. Accordingly, the teaching effect can be greatly improved.

Keywords: Teaching reform; Teaching method; Assessment method.

1. Introduction

As the microcomputer (MCU) has a very excellent performance, such as compact size, low cost, easy production, good reliability, adapt to wide temperature range, easy to expand, strong control function, it is playing a very important role in the field of household appliances, intelligent instrumentation, industrial control and the rocket navigation [1]. With MCS-51 Series MCU as an example, the course mainly includes the basic knowledge of MCU, the hardware structure, instruction system, program

design, timer/counter and its application, various interface system, serial and parallel communication and system expansion and other parts. The traditional teaching method is that teachers teaching these theoretical knowledge in the classroom and do some demonstrations in some partial link [2]. The lectures usually take 50hours or so and then let the students do some confirmatory experiments associated with the content. The experimental teaching of the course generally requires 10hours or so. Since the course is very abstract, the traditional teaching method not only makes it difficult for students to understand the course content, but also makes it difficult for the teacher to teach well. The consequences of traditional cramming teaching method often leads to low learning enthusiasm of students and studying very hard and losing learning confidence. Further more, it makes the students' practice ability is poor. This deviates from the goal to cultivate technology talents of the college.

2. Present teaching situation of the course of single chip microcomputer

The teaching method still takes the teacher as the center and pays more attention to teach the theory knowledge in the classroom, while ignoring the main role of the students in the process of teaching. Teachers teach simply the theory knowledge what the books say and

it is difficult for students to understand the abstract theory. What they need to do is noting in the class and reciting notes out of class. While in practical application, they often forget everything. Using the timer of the knowledge points as an example, although teachers at the podium spent a lot of time to explain the timer structure, work principle and control register, the teaching effect is not ideal. Because the students remember just the boring knowledge points without practical examples in order to write the knowledge point on the volume surface. So, it is difficult to achieve the ideal teaching effect [3].

The examination of the students' learning effect is often laid at the end of the course by ways of close assessing examination. As this course is more difficult and abstract, it tends to cause a lot of students failing the final exam. The exam results of several years show that the failure rate of this course is the highest among all learning subjects. On the other hand, this kind of evaluation method pays only attention to the theory of evaluation while neglecting the comprehensive application ability evaluation of the students [4].

Therefore, the reform of the teaching content, mode, method, means and methods of examination of the single chip microcomputer principle and application should inevitably be done.

3. Teaching reform of the curriculum of single chip microcomputer

In order to realize the target of cultivating the students to become training talents, the traditional teaching methods should be reformed immediately to establish a kind of new teaching mode so as to meet the needs of modern higher education. As the class teacher, I think that it should reform this curriculum teaching from the following aspects [5].

3.1. Improve the teaching method

As it has several malpractices, the traditional teaching method has been unable to adapt to the teaching of this course and it must be reformed. The specific reform measures are tentatively identified as follows.

1) Multimedia teaching

In order to make the students have some intuitive understanding of the pins of the chip, you can put some chip pictures in multimedia. Through rich dynamic demonstration and vivid descriptions, the teacher can make the abstract concept be specific and have students receive information through their auditory and visual senses. In this way, the teaching method can enhance their interest in learning and improve their memory. For example, we can use the multimedia teaching in illustrating the space allocation of the memory on-chip or off-chip. Since this part of the textbook is very abstract and complex in logical sequence, it is very difficult for students to understand and remember. It is difficult to show up its internal structure and storage space even if we have practical chips in the lab. But we can use multimedia courseware to display what the internal structure and storage space is. The teaching results of several years show that the three instruction symbol MOVC, MOVX and MOV are the most likely to confuse and the most difficult part to understand and master to students. However, it can be displayed vividly on the multimedia courseware. Thus, this method can enhance the understanding and memory ability of students.

2) Laboratory teaching

Sometimes, the platform can be moved to the laboratory. For example, the teacher may teach in the laboratory when illustrating the four kind of working

modes and applications of timer / counter, when illustrating how to realize the timing/counting function of the timer/counter. In this way the teacher can make the students understand all the content through a vivid experiment. In this experiment, the pin P1.0 can output a sync pulse for 500us when the positive electric level of pin P3.4 jumps to the negative level. In the first, we should select the working mode, calculate the initial value and program. Since this part of contents is of more abstract, the students usually feel it difficult to understand by simply listening to the teacher. While teaching in the laboratory, the running results of the program can be visually displayed on the screen. The same running results of different programs can be achieved allowing the students to set different working mode. It can put the very abstract theory into the visual results in laboratory teaching, allowing students change from indirect study into direct study. So, it will deepen the understanding of this part of contents as well as arouse the learning enthusiasm and interest of students.

3.2. Strengthen the reform of practice teaching.

The course of microcomputer principle and application is one course that is based on very strong practice. Previously, it has only 10hours of experimental class and has only 5 verified experiments, which is not enough. Therefore, we must strengthen the practice teaching reform.

Practice teaching reform focuses mainly on the provided experiment content. The previous single confirmatory experiment is divided into three levels: confirmatory experiments, designing experiments and comprehensive experiments. Experiment hours are highlighted from the previous 10hours to 30hours. This 30hours period is divided into 5hours of experiment design

experiment, 15hours of designing experiments and 10hours of comprehensive experiment.

Verification experiments are the application experiments of basic knowledge which include clearing procedure experiment and spelling experimental procedure. These experiments make the students be familiar with the programming method assembly language and the programming steps of single chip microcomputer, which are the most basic experiments. Designing experiments are those allowing students to design their own experiments such as lighting experiments of P1 port, simple I/O port expansion experiment and using PA port of chip 8255 to control its PB port. Through these experiments, students can design some their own interface circuits. After completing the design of these experiments of application circuit system, they can master the methods of hardware control, interface designing and chip extension. Through these designing experiments, students can understand the design process of products. This does advantage to improve the comprehensive application ability of students. Comprehensive experiments are those designed according to the practical engineering applications such as automatic data acquisition system of bridge health monitoring. Such design topics are relatively difficult for students in that they need collecting data from both aspects of hardware and software.

3.3. Evaluating mode of the curriculum reform.

As the last link of curriculum teaching, which dominates the learning of most students, examination can inspect both effects of teaching and learning directly. At present, what more commonly used is still closed book examination whose aim is to compel the students to learn and master the knowledge points. But for the

curriculum of single chip microcomputer principle and interface technology which is a kind of practical application course, close examination will often result in high grades with low talents phenomenon. Reforming the curriculum evaluation methods may start from two aspects. The first one is that making the score of closed book exam account for 30% of the total score and score of practical application problems accounted for 70%. As for practical application problem, the students should make their own times to write procedures to achieve a certain function. The final score should be the both weighted summation score of the closed book exam and the practical application problems.

4. Conclusion

Nowadays, the higher education is being reformed greatly. Both the nation and the schools have thrown many financial resources and material resources to carry out teaching reform. And the theory guiding ideology of learning by doing is put forward. Under the guidance of this advanced theory, it is very meaningful to carry out larger teaching reform of the curriculum of single chip microcomputer. This reform of the traditional teaching methods can make up for the deficit of traditional teaching method and can greatly improve the learning enthusiasm of the students. As well, it will enhance the practical operation ability of the students and lay a solid foundation for the students to obtain employment successfully.

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6. References

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