The Analysis on the Application and Method of the Fine Progressive Teaching in the Single Chip Microcomputer Courses

Xiaoxu Qi

Chengde Petroleum Institute, 067000, China.

Abstract: The course - "SCM" is very applicable and professional. In the process of teaching, teachers should follow the principle of paying attention to the basic knowledge, improving experimental ability and application development ability to guide students to apply what they have learned to practical problems on the basis of comprehensive understanding and mastery of theoretical knowledge and cultivate students' ability of system design and debugging. Under the new curriculum standard, the fine progressive teaching, as an efficient teaching method, plays a great role in the single chip microcomputer course teaching. This paper focuses on the application of fine progressive teaching in the course of the single chip microcomputer.

Keywords: The Single Chip Microcomputer; The Fine Progressive Teaching; Application Methods

A lot of teaching practices have proved that the progressive teaching method is consistent with students' cognitive law. Theoretical teaching helps students understand and master theoretical knowledge and practical teaching can prove theoretical knowledge through experiments to a large extent and expand and extend theoretical knowledge, which is the core of the progressive teaching. Next, talk about some thoughts of the application of the fine progressive teaching in the single chip microcomputer course teaching.

1. The course teaching thinking of the single chip microcomputer

A large number of teaching practices of the single chip microcomputer course show that the course is complex, systematic and difficult, and closely related to "C language", "electronic technology" and other courses. For students, it is very difficult. Moreover, most of the students are new to the content of this course and have a weak theoretical foundation, but most of them have a strong hands-on ability. Based on this, the educational workers try to divide the content of the course into multiple modules through the teaching reflection. In the teaching process, it is necessary to carry out the modular teaching, implement practice for the knowledge in each module for many times. It should pay attention to blending in a little new knowledge at a time during practice in a gradual way, as a result, not only students' learning interest and enthusiasm can be effectively stimulated, but also to create a true learning situation for students, which lets the students have immersive experience and gain the fun of hands-on practice and have a sense of achievement. It can make the students be willing to accept at the same time and also can constantly make students focus on, so as to improve the teaching quality and level.

Copyright © 2019 Xiaoxu Qi
doi: 10.18686/ahe.v3i4.1583
This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.
2. The single chip microcomputer curriculum utilizes the teaching design of the fine progressive teaching mode

Teachers can base on students' learning ability, learning foundation, teaching contents of the curriculum and other practical conditions, using modular, progressive, driven teaching methods. The specific teaching design: the curriculum is divided into four modules: Micro-controller minimum system, timer, I/O interface and serial communication interface. The teacher can deeply analyzes the content involved in each module, based on the actual situation of the module to design some common tasks and common phenomenon and then divide them into many sub-tasks, ensuring that two sub-tasks can have effective cohesion, but also ensuring that the knowledge of the module is able to show a gradual change law, ensuring to implement the fine teaching for every sub-task to arouse students' learning interest and enthusiasm and be able to truly gain knowledge by learning. Then, taking the "I/O module" teaching in the course of the Single Chip Microcomputer as an example, the teaching design of the fine progressive teaching mode is fully expounded.

2.1 The circuit design idea of the external hardware equipment

Teachers utilize 8051 single chip microcomputer STC89S51 in the process of teaching design. This equipment mainly uses 40 pins dual-in-line package form, including PO, P1, P2, P3, the four I/O ports that has 32 pins and different pins can be input by time-sharing and has the characteristics of low level and high output. In the process of the hardware circuit design, all four I/O ports of STC89S51 can lead out terminal blocks, so that can be based on the actual situation of the teaching task and can be effectively connected to the peripheral circuit through flexible flat cable or the single wire. In the process of teaching design, P0 and P2 are selected this time to realize effective control of the field code and the word code, P3 is used to read the key and P1 is used to effectively control the small light. In the peripheral circuit of this module, there are 8 digital tubes of dynamic display circuit, 8 keys of input circuit, 8 small lights of driven circuit, which ensures that this hardware connection can be effectively throughout the I/O module in the whole teaching process.

2.2 Specific teaching arrangements

Still taking the I/O module teaching as an example, the three most typical tasks are selected, namely, the key inputs, the digital tube display and small lights up. Education workers base on the three tasks to design 8 sub-tasks and each sub-task is able to see the concrete display under the function of small lights or digital tubes. From the initial "light eight little lamps" to later "eight keys successfully control any number of display of the eight digital tubes ", consequently, the interpretation of knowledge points is from shallow to deep, which realizes the progressive teaching, greatly improving the effectiveness of the class teaching.

3. The extension of the single chip microcomputer course teaching

Through the class learning, after most students understand and grasp the hardware structure of the four ports, the typical circuit working principle of the periphery and the key module, the little lamp driver, the dynamic display of digital tube module and other chapters, teachers can combine with teaching contents, teaching practice to extend teaching. The specific manifestation: firstly, four ports can be connected at random aiming at the existing peripheral circuit, using the relevant procedure to effectively control the small lights, the display of digital tubes and the read of the keys and so on, so that is conducive to enhancing students' understanding and mastery of the four ports, and can put it into daily practice and operate it skillfully. Secondly, based on the actual situation, it should fully extend other circuits of the periphery, such as the buzzer driving circuit, control relay circuit and so on. The control principle of these circuits is the same, letting the students themselves operate. Practice makes perfect and then students will be able to absorb all these knowledge in the class teaching and can fully understand it. In the follow-up study, work or life, students can use it, flexibly and constantly enhance the ability to transform the reality problem into a single chip microcomputer control problem, cultivating students' creative thinking abilities and achieve all-round development through the study of the course of "SCM".
4. The summary of the curriculum

To sum up, in this paper, although we only designed the teaching of I/O module in the course of the single chip microcomputer, we achieved remarkable results. For the remaining three modules, the teaching staff also carried out similar teaching designs. In the normal teaching, relevant professional skills training and coaching skills contests and in the process of many other activities, we found that the fine progressive teaching mode is more suitable for students who have not contacted with SCM. They can start from scratch and realize the progressive teaching of knowledge, which not only can lay a firm foundation for students to learn the subject knowledge, but also can effectively extend in the later study. It is a very perfect innovative teaching mode. It is worth mentioning that the above materials applied in the teaching design, such as the SCM application board, curriculum textbooks and so on, which are developed by educators themselves. In the check of professional skills in higher vocational colleges of the local province, the pass rate of our college's SCM about the module teaching sampling inspection is as high as 100%. On the other hand, the educators who are engaged in the teaching of "single chip microcomputer" in our school have been instructing our students to participate in various electronic design competitions. In recent 10 years, they have guided students to win many awards in many national and provincial electronic design competitions. The brilliant achievements of our school cannot be separated from the mutual efforts of the educators.

5. Conclusion

To sum up, through the persistent efforts of our education workers for so many years, the application of the fine progressive teaching mode in the single chip microcomputer course teaching is very successful and achieve a good teaching effect. The progressive teaching lets the students of different levels and different learning abilities have been significantly increased, which vividly embodies the strategy of teaching students in accordance of their aptitude and has an great influence on the development of students and the school. Next, all educators will continue to work hard and explore, find out timely the problems existing in the application of the fine progressive teaching mode in teaching and formulate effective countermeasures to solve them, so as to truly play its role in improving teaching effectiveness and guiding students to develop in an all-round way.

References