Exploration in Principle and Interface Technology of Microprocessor Course Teaching

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Abstract: "The principle of microcomputer and interface technology" curriculum has the characteristic of strong practicality and wide application field. Discussion on the implementation of the research teaching process, how to design teaching, the teaching process control and comprehensive evaluation. Adopt a "problem" as the center, student "subject", around "theory with practice, foster innovation," the thrust of the research teaching model theory and practical teaching combining discussed to improve the teaching curriculum effect.

Introduction
"Microcomputer Principle and interface technology" course is a professional basic course of our school of electric and information specialty, in the specialized construction and the curriculum system occupies an important position, has an important role to student's knowledge development and innovation practice. How will the classroom knowledge effectively in practice, improve the students' ability of innovation and practice, is the central task of teaching reform in the course of “Microcomputer Principle and interface technology".

"Microcomputer Principle and interface technology" curriculum present situation
Our school curriculum is divided into the theoretical course "Microcomputer Principle and Interface Technology", 40 hours, 2.5 credits; experimental course "Microcomputer Principle and Interface Technology Experiment", 24 hours, 1.5 credits. Students are required to master assembly language, 8086/8088 microprocessor and an interface circuit, the purpose is to train students with an initial hardware and software design and development capabilities. We found some problems in the traditional teaching process.

Content abstract, memory capacity, students learning interest is low
"Microcomputer Principle and interface technology" course of terminology, talked about the interface chip in large quantities, lack of association between before and after the content, students need to a lot of boring working memory, so it is easy to lose interest in learning.

Course covers a wide range of difficulty
"Microcomputer Principle and interface technology" course includes knowledge of computer hardware, software, digital logic assembly language, etc. disciplines, students do not really grasp the internal structure of the computer hardware; it is difficult to understand assembly language programming.

Ignoring the students' cognitive
The traditional teacher centered teaching mode neglects the students' cognitive main role, is not conducive to the cultivation of students' creative thinking ability.
Basic ideas of research teaching

The meaning of research teaching

Research on teaching model, also known as seminar-style teaching model, is a teacher with course content and students' accumulation of knowledge-based, creative use of knowledge to guide students to autonomously identify problems, study and solve problems, student-centered, to master the knowledge-based, ability as a main line, in order to improve the quality of a new model for the purpose. Therefore, it is very important to construct a new teaching mode in the classroom teaching.

The main characteristics of the research teaching

Promote participatory and practical unity

Because the ultimate goal of the research teaching is to cultivate students find problems, study and creative problem solving skills, the whole teaching process by traditional didactic to autonomous, inquiry, from beginning student participation and active exploration activities. Let the students have the sense of "hero", the research of teaching is in optimizing the curriculum, based on modular teaching and project teaching, fully mobilize students' enthusiasm. At the same time, in accordance with the physical and psychological characteristics of students in exploring activities, let student threw himself into the to knowledge acquisition and application of practice, in specific problem contexts with scientific methods of objective things. Improve students' professional ability.

Promoting equality between teachers and students

Research Teaching mode requires in the classroom teaching, let the students happy, no pressure, so that students get a world found in the learning process, to explore the world relaxed environment, teacher-student relationship is equal, so that they can be in the teaching process mutual each other's way of thinking, and promote student information input, output, feedback and flow rate, and enhance the consciousness of students, so that students become the subject of self-development creativity.

The unity of creativity and potential

The biggest difference between research teaching and traditional teaching is to cultivate students' creativity and their sense of innovation. It is a dynamic, creative teaching process in the design of teaching content, arrangement, implementation process reflects the rediscovery of knowledge, re-integration, students are not the results obtained from the book, but after thinking, explore, apply knowledge , the organic combination of theory and practice, in order to develop the students' divergent thinking, can greatly inspire teachers and students to create enthusiasm and initiative.

The implementation of research teaching in the course of Microcomputer Principle and interface technology

Design of research teaching

According to the nature of the curriculum and student characteristics and needs, consider the effectiveness of the implementation process, controllability, and the cultivation of students' teamwork, practical ability and creative ability, the teaching design research in the following four steps.

(1) First semester students to freely combined into several groups, each group of 5-6 people, free theme within 2-3 weeks, to complete the design and implementation of a 8086 CPU core of the intelligent system.

(2) In the classroom learning process, the key to understand and master the theoretical knowledge needed for the completion of the nominal group, including the basic structure of the 8086 CPU, pin, program structure; select memory chip design; peripheral hardware circuit design; Component Option type and software programming.
(3) Class members of the class division of collaboration, the completion of the hardware design, programming and debugging, laboratory tasks set up, software and hardware debugging, testing and other work.

(4) Tissue analysis and comment at the end of semester, each group with its own presentation PPT principle works, design drawings, manufacturing process, and features a live demonstration of works by teachers and the presence of all the students in each group works bearer score.

Research Teaching Process Control

In the process of implementation of the "Computer Architecture and Technology connection II" course of study in teaching, research questions grasp, learning resources, research methods, forms of organization and teaching evaluation of five key elements, focusing on teaching objectives, teaching design research process, to ensure that research teaching orderly and smooth manner.

Teaching objectives

The goals of research include teaching autonomy build a flexible knowledge base, develop research, judgment, reflection and other higher-order thinking skills as well as practical and realistic, enterprising spirit of science. In "The Principle and Interface Technology" research teaching practice course, the first teachers to introduce students to the teaching objectives and to discuss specific tasks to achieve this goal needs to be done. For example or show some real-life application, previous student outcomes, so as to achieve the learning objectives of visualization. Students feel the previous results, stimulate their enthusiasm for learning, and motivation for learning beyond the previous generation.

Study of Problems

The problem is the starting point and the end result of the research teaching. In "Microcomputer Principle and Interface Technology" course of study in the teaching process, the teacher guides the student independent study, focus occurs in natural scene and in the social scene of real problems, training students identify problems, ask questions, analyze and solve problems of consciousness and ability. And solve the problem essentially is a continuity of thinking activity, in the process of solution and produce new problems, teachers guide students through solving key problems, promote the in-depth research and problem solving methods of effective migration. Students put forward a practical value or a project with the entertainment nature, and then the teacher to guide, so that the workload control in a reasonable range.

Learning resources

Research Teaching information age, the need to focus on the use of information resources. In practice, "Microcomputer Principle and Interface Technology" research teaching, teachers provide students with pre-core resources, related resources and expand the resource categories of information resources to guide students to use the Internet effectively explored.

Research Methods

Research Teaching used research literature research, observation, investigation, experimentation, design research and case study method. According to the characteristics of "Microcomputer Principles and Interface Technology" course and different research questions, selecting and applying appropriate research methods. In the actual study of the teaching process, many students used two or literature research, experiment, design methodology and so the above method.

Organizational forms

German educationalist Humboldt pointed out: "In the University, lectures only minor things, important is enable students to be consistent with the taste, of the same age and with awareness of the close cooperation. In Colleges and universities, rich in the form of teaching organization, "Microcomputer Principle and interface technology course based on its characteristics and nature, let the students organized into study group collaborative learning, inquiry and cooperation, while
strengthening group management and evaluation, collaboration to promote the rational division of labor, and pay attention to the communication atmosphere to create a group member between different groups, and between, forming good relationships.

**Teaching Evaluation**

The evaluation index of research teaching is changed from the original knowledge and skills to the evaluation of the comprehensive quality of students' attitude and ability in the course of research teaching. To adopt the diversified evaluation methods, such as teachers, students themselves and students to evaluate the diversity of evaluation subjects and students self evaluation, group evaluation, teacher evaluation, teacher evaluation, etc., and pay attention to the process of evaluation.

"**Microcomputer Principles and Interface Technology**" course student outcomes

**The number of classroom real-time automatic monitoring device**

In 8086 CPU core, selected latch decoder to build a self-study to complete the interior and out the number of real-time monitoring, can be valid for the number of public places in the city and out of control. The number of conference rooms, auditoriums, stadiums and other public places can also be used to inventory.

**Vehicle mileage statistics**

In 8086 CPU core, selected latch decoder to build a complete measuring tire rotation, calculate mileage cars with 7-segment display of the mileage and other features.

**Crossroads traffic light system**

In 8086 CPU core, the choice of latch decoder to build a complete 33 seconds, the red light, green light for 30 seconds, 3 seconds of yellow lights at the crossroads of system to build; completion of the emergency control switch, control switch to cross all the lights turned red; completed a two digit seven segment digital tube countdown function control.

**Conclusion**

In the "Microcomputer Principle and Interface Technology" research teaching practice, teachers in the rational design of teaching programs, the initiative by teaching goals, learning to grasp the research teaching process resources, research methods, forms of organization and teaching evaluation, and through the evaluation discussion the form of teaching achievements inspection. Students through the integration of professional knowledge and applied to the design of the project, analysis, systematic engineering practice training research and practice, in analyzing solve practical engineering problems in obtaining new knowledge, to complete a variety of intelligent system software and hardware works. In the task of the design, development process, fully mobilize the initiative of students to explore, in the training of students' comprehensive ability and innovative spirit has received a good effect.

**References**


