

# Construction of Innovative Practice Teaching System Guided by Project + Competition

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**Abstract.** The single chip microcomputer principle and application of the professional courses as an example to discuss how the professional course teaching method is applied to implement, let the student's own potential can be brought into full play, and make full use of the hardware resources of the various channels as the supporting conditions, let students across space and cross regional, cross thinking the way to cultivate students into outstanding technical talents.

## Introduction

With a large number of national demand for technical personnel, in a single teaching mode has been unable to meet the employer's actual need, focus all over the world, all in an effort to promote cooperation, especially the governments of developed countries, adopt various measures to promote the development of the relationship between University and industry and Commerce, as the main training objectives of training applied engineering and technical personnel. China should learn the advantages of other countries, pay attention to the training of engineering talents, not rigid, should take the undergraduate education stand in its proper height, according to the technical development of the long-term plan to train qualified personnel, according to the "single chip microcomputer principle and application" course as an example, discusses how to teaching the application of professional courses into practice, let the students to play their own potential and application, and focuses on the concept and significance of Ladder Teaching[1-2].

## The Importance of Innovative Engineering Practice

A single-chip microcomputer, it can complete a variety of control functions and procedures through building the external circuit design, penetration and SCM has been widely used in all areas of our lives, to the military system of missile tracking system, intelligent control of various instruments on the aircraft, the system implementation data of various industrial automation industry system the control and processing, to a variety of smart appliances of our family life, children's toys, therefore, the development and application of single-chip learning, will create a number of electronic, computer and intelligent control of the scientists and engineers.

Higher education in the China, if engineering majors, "single chip microcomputer principle and application" this course is a professional course will be offered by universities, according to their own teaching syllabus to develop teaching programs, while supporting the national electronic design contest also emerged like bamboo shoots after a spring rain. Such as the National Undergraduate Electronic design contest, free scale smart car contest, Carle provides students with good learning and application platform. But from the three-dimensional perspective of teachers and students and others, for "Microcomputer Principle and application" this course, teaching methods will also exist, that is in the cognitive and subjective evaluation under different teaching ideal needs and the actual teaching effect is sometimes a game, understanding the extent of teaching ability, teaching methods teachers, teachers and students are needed to be studied and discussed, then how to dig up the students in this class of potential? To make students become applied, technical and excellent talents, it is necessary for colleges and universities teachers to pay a lot of effort and hard work[3-4].

The widespread attention of theory teaching and practice teaching to despise the phenomenon, in

this case, most students only test, and the practical ability will be very poor at the same time, the actual ability of college students and the social demand is not proportional to the cause of the vicious spiral if things go on like this. SCM is the mainstream of the current society, enterprise personnel need to have design ideas and design ability of sophisticated talents, rather than just talk about no practical ability of the people. Therefore, colleges and universities should re-examine the teaching methods of specialized courses.

"The combination of teaching and practice" principle and application of SCM theory, and not combined with experiment, the author visited several universities in the professional class, with 40 hours as the theoretical and experimental aspects, takes about 6 hours, this kind of teaching mode is just lectures instead of training, since SCM is the professional course is very important, it should focus on practical teaching as a practical application of the course, the practical ability of engineering excellence throughout the process of personnel training. For each student to do "practical skills to strengthen four years uninterrupted".

### **Implementation Plan of Ladder Culture**

In the practical project teaching mode drive first requires breaking the old teaching mode, most colleges and universities with focus on theory teaching instead of practice teaching, so a lot of college graduates, the only single chip cognition, unable to complete the design and application of SCM, this is the failure of education training program the drawback is, how to make students in excellent engineering and technical personnel need teaching of professional course in Colleges and universities is an important reform. Then the first "Microcomputer Principle and application" the teacher must should have practical experience of teachers, while the "through the case, teachers guide, simulation team" features in the teaching process, the student group, the team teaching mode, according to the specific project design requirements and standards, so that students can take the initiative to acquire knowledge, accumulate experience in learning, but also can improve teamwork and personal occupation accomplishment[5].

Teachers should be diversified, not only in accordance with the teaching materials should adopt diversified echo what the books say, teaching mode, such as assembly language should speak with examples, and teachers should take MCU development board, while teaching to the running effect of micro-controller demo program after downloading the students, this teaching mode can make students cultivate interest in learning, the establishment of "basic the cognitive principle and application of SCM for students". Teachers should have at least the occupation morals, the students as their own children, to have feelings to talk to the classroom, even if the control, the students even understand, this is the emotional education method.

Because the students' comprehension ability, cognitive ability, individual learning ability are different, not a professional training to all students in a training program, most of the students in training should grasp the basic engineering skills and comprehensive engineering skills at the same time, to highlight the cultivation of excellent engineering skills, so in teaching should establish a training program of ladder personnel. Therefore, the training program should be divided into 3 stages, which are basic engineering skills training, comprehensive engineering skills training and excellent engineering skills training. Specific as follows:

- (1) Basic engineering skills training series: mainly cultivate the basic ability of students.
- (2) Comprehensive engineering skills training series: mainly cultivate students can flexibly exercise knowledge, systematic comprehensive development ability of the project.
- (3) Excellent engineering skills training series: mainly train students through team cooperation system engineering project research and development ability. The cultivation of this ladder, the first layer is every student must master, after second layers of learning, have some understanding and ability outstanding students will be selected out of third talent shows itself, into the layer of learning, so you can show the training step raising model. At the same time, the performance evaluation can also be fair, fair, open and consistent with the results of normal distribution.

## Implementation Measures

**Through the O2O teaching mode, cultivate students' innovative consciousness and innovation ability.** The teaching reform should first update the concept, completely discard the idea that practice teaching is the subordinate position of theoretical teaching, establish an independent and innovative practice teaching system, and cultivate students' innovative consciousness and innovative ability.

The teaching method of O2O based on SPOC, that is, combining theory teaching with practice teaching, forming a blended classroom.

**Through the "modular, multi-level, progressive" practice teaching model, to carry out innovative training in class.** From the unit to the system, embodies the "modular", to cultivate students' ability of engineering practice and innovation as the starting point of the practice teaching system is divided according to the function, reflect the talent cultivation stage and objective regularity; integrated by the foundation to reflect, "hierarchical", from "entry Guide - based comprehensive training the design of independent innovation through the class, step by step, according to different levels and ability of students. In practice, the verification experiment, design of hardware circuit to design the hierarchical progressive innovation, in the process of teaching, and gradually improve the content of the breadth and depth of comprehensive research and exploration, gradually promoting practice requires skill and innovation; in teaching, the students through the "competition + project" the practice experience of requirement analysis, knowledge supplement, theory calculation and realization method selection, circuit design and simulation, experimental steps design, test scheme, experimental parameters analysis "process, use of theory to guide practice, find and solve problems in practice, leak filled, broaden their horizons, independent innovation.

Hierarchical and progressive content of curriculum practice:

A. Basic type: knowledge application ability, practical application, practical ability. (primary stage).

B. Comprehensive type: knowledge mastery, establishing system, overall design, comprehensive analysis ability. (intermediate stage).

C. Inquiry type: find problems, solve problems, explore thinking, research ability. (advanced stage).

**Strengthen the innovative and entrepreneurial ability of college students through the open and independent curriculum project.** A. Teachers recommend topics (such as taxi pricing system design, automatic tracing car, basketball game scoring machine, etc.). B. Independent innovation of students.

**Improve the quality evaluation system of practical teaching, and evaluate the teaching effect scientifically and fairly.** For many years, practical teaching assessment has been using the simple "real + report" assessment method as the standard of evaluation of experimental results. Under certain circumstances and specific circumstances, this assessment method can objectively reflect the degree of students' mastery of knowledge to some extent. But along with the practice of teaching reform, the cultivation of innovative talents of the environment, the traditional practice teaching system and teaching methods have undergone tremendous changes, practice teaching evaluation methods have seriously restricted the quality of the cultivation of innovative talents. Practice teaching should adopt "diversified" assessment method, qualitative assessment and quantitative assessment.

Focus on the introduction of eugenics exemption, implemented in accordance the following two kinds of assessment scheme: A. Traditional (homework, online learning, classroom discussion 20%); usual test, class self summary, final exam 50%; practice 30%; reward 6 points. B. Students (exemption homework, online learning, classroom discussion 20%; quizzes, class of students self summary, the final exam 10%; project team, product design, exhibition 70%, 6 bonus points)

**Perfect the various management methods of innovative practice teaching, establish the system guarantee mechanism.** The organization of professional practice guidance team, to support the development of laboratory, use and management, guidance and assessment, team work of students' innovative credit calculation and assessment of the new fund management approach, to

establish the corresponding incentive mechanism, provide a guarantee for the teaching reform.

### **Government Oriented Advantages**

(1) For undergraduate education, the government should increase the management and investment efforts, so that colleges and universities in the province share high-quality resources, joint construction. At the same time, the establishment of schools, enterprises of production, learning, research integration, comprehensive and professional base.

(2) The establishment of "double teacher" team, the same project, engineers from the enterprise perspective and school teacher's angle is different, the students through the "double" of the study will get a different perspective, to stimulate innovation and inspiration.

### **Conclusion**

"Single chip microcomputer principle and application" is a very important engineering college courses, learn the professional courses for students of their own and the future of the students have a deep meaning, and speak well of the course for educators is a challenge, let all the educators in education values and thought do have occupation morality, learning, and constantly improve. In order to enhance the undergraduate's innovation ability, practical ability, application ability, employment strength contribution force.

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