Innovative Research on the Group-Teaching Mode based on the LabVIEW Virtual Environment

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ABSTRACT

This paper discusses the widely existing problems of increasing demand of professional engineer in electronic science major and the backward of the teaching mode at present. From one specialized course "Virtual Instrument technique and LABVIEW programming", we explore the new group-teaching mode based on the Virtual Instrument technique, and then the Specific measures and implementation procedures and effect of this teaching mode summarized in the end.

Keywords: LabVIEW Virtual environment, Group teaching mode, cooperative learning group, research-oriented teaching modules

1. INTRODUCTION

Into the 21st century, information, materials, devices and the development of large-scale integrated circuit chip and manufacturing has become the "heart" of information technology development and the pillar industry. During the "twelfth five-year" period, the country put the electronic components, large-scale integrated circuit design and manufacturing to the first to the nation's development outline. The strategic planning of information industry of our Country and in Zhejiang province brings a bright future of the development of electronic science and technology development, which make increased demand of the electronic science and technology talent. [1-3]

At present, the common problems of undergraduate courses teaching in colleges are: (1) In the basic course teaching discipline construction with undergraduate course education is divided, which lead to the lack of novelty and advanced for the teaching content; (2) college students' innovative practice ability training in professional education mainly through the second classroom, free from the classroom teaching system; (3) innovation activities associated with utilitarian competition, did not reflect the intrinsic value of the university teaching.[4] Practice of higher education in China, the vast majority are passive practice, students in the framework of teachers rules, following the teacher set route to complete the practice task, this not only stifle the students innovative thinking, but also hinders the cultivation of the students' ability. Initiative practice is the key to the innovation ability training, which need to strengthen the consciousness of teachers and students take the initiative to practice. [5, 6] And

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take the initiative to practice the concept of multiple links throughout the study, make students as the practice subject to participate in the activities of practice each link, in the process of active practice, and pay attention to students questioned force, observation, coordinated, leadership quality training. [7]

This project aimed at teaching reform needs have expand the scale of enrollment in colleges and universities, based on China metrology institute of electronic science and technology major. Our project also explore lager class oriented cooperative learning group innovation model, based on the dot, line, face combined with the research-oriented teaching mode. Combined with the joint laboratory based on VI (raised) LABVIEW virtual environment, from the construction of a geared to the needs of electronic science and technology department of the virtual instrument technology and LABVIEW programming courses of theory and practice teaching, based on the “large class into groups, groups into teams "for the group characteristics of innovation ideas. In addition, explore the interactive group, link through type, cooperation type project and the realization of the three-dimensional radiant group innovation personnel training practice model, eventually form for group cooperative learning and practice of innovation talents training practice area. Through undergraduate course design, internship, graduation design and extracurricular activities of science and technology concentration practice, improve the students' practical ability and research potential and innovation consciousness, the top model group innovation personnel-training mode of vitality. [1, 8]

2. GROUPED TEACHING MODEL BASED ON THE LABVIEW VIRTUAL ENVIRONMENT

The United States National Instruments (NI) is a leading international company of computerized instrument and graphical programming software supplier. Now electronic science and technology department cooperated with Shanghai poly star instrument company, to build "VI" joint laboratory of China and the United States, realize the interaction between institutions of higher learning with science and technology enterprises. In order to activate the big class teaching, electronic science and technology department opened the virtual instrument technology and LabVIEW programming courses, can make electric department students most closely the latest achievements of the industry of press close to, to lay a solid foundation for career.

The research-oriented teaching method and participatory teaching method are involved. The course project design, graduation design, professional practice, the second classroom are combined distinction performer training study during the two consecutive terms in electric department undergraduate. Construct the theory of the photoelectric circuit design of new curriculum teaching and practical teaching system, develop the hierarchical calculated optoelectronics and new components to design a new vision of theory teaching and the number of students in learning the course of nearly 150 people, which has realized the wide range of undergraduate cultivation and bright spots on the surface of the organic combination, namely "point - line -surface" the combination of innovative talent training.

Till now, we have set up four study interest groups include multimedia, database, virtual instrument and system integration. More activities include academic research, academic paper writing, academic research ability, et al was introduced to make the students obtain practical experience, enhance hands-on skills. Create innovative environment, encourage the student to carry on the invention. Give positive suggestion on students' innovative thinking and proposal to give timely guidance, and through a variety of software and hardware equipment is transformed into practical innovation, at the same time provide a closer relationship between teachers and students, the students a warm welcome and support, also has achieved initial success and experience. In addition, the main members of the project have been completed one talent cultivation photoelectric field teaching reform project, which has accumulated rich experience for the smooth implementation of this project.

3. THE STRATEGY OF THE TEACHING RESEARCH

3.1 LabVIEW Network virtual course building based on the NI virtue Lab.

[1]. Give full play to use the creativity and practical ability of the excellent students, implementation based on LAN set "virtual measurement" and "real measurement" teaching multifunctional test system, solve the problems of teaching resources lack in the background of new enrollment form higher education, especially the problem of experimental teaching resources resource shortage.

[2]. Implement 7 electronic science experiments.

[3]. Cooperation mode exploration: our institute, HUST and Shanghai star instrument company carry out cooperation and build joint VI laboratory.

3.2 Exploration and practice of group cooperative learning mode

[1]. Using the research-oriented teaching method of the participatory teaching method, we study the course project design research in "photoelectric circuit design", the course of undergraduate of electronic science and technology department. Explore the combination of large class teaching with interactive curriculum design team, the combination of theory teaching and practice of design patterns.

[2]. For the whole grade of all students in electric department, with the method of big class teaching, we focus on imparting professional curriculum of basic concept, basic methods, the basic idea of classroom knowledge.

[3]. According to the group innovation-training mode, the students of different backgrounds can be divided into several groups, such as the project team, programming team, team, panel report, speech, etc.

[4]. According to the course, requirements and electronic professional characteristics set different research projects, carries on the curriculum design.

[5]. Each team from scratch in the face of project, the literature, to determine the design, programming, simulation, optimization, the research summary, the results show, performed by different students.

3.3 Practice education with all part joined up

[1]. Through the second classroom, teaching practice link such as professional practice and graduation design project of participatory research, explore the implementation more linear mechanism of talent training.

[2]. Relying on the preparation of the "VI" joint laboratory of China and the United States, from the excellent student course design team actively recruit a group of strong interest and strong practice ability of undergraduate students, to participate in the activities of the second class, professional practice and graduation design, and implement the teaching practice of many different aspects.

[3]. The classroom, professor of theoretical knowledge, inspire the creative thinking, to develop innovative potential, cultivating innovation ability, lets the student to grasp the method of innovative design, interest in trains the student to engage in scientific research and to develop good habits of scientific research; Outside the classroom, the introduction of information project management operation mode, teachers and students together to carry out a series of research practice, for the cultivation of students' innovative spirit and practice ability to provide a broader space.

[4]. Graduate student entrance to each link, including the extracurricular activities of science and technology, professional experiment, curriculum design, the production practice and graduation design (paper) as an organic whole, pay more attention to the long-term cultivation of the undergraduates, On the basis of the research institute to issue as the carrier, continuously strengthen the cultivation of undergraduate practical innovation ability.

3.4 “Train outstanding students, make them leaders” in during the research project

[1]. Through scientific research project involve distinction performer and expertise in the laboratory, explore team guidance as the core of elite talent training mode, cultivate a large number of outstanding students.

[2]. Established by the graduate students to participate in academic exchanges team, undergraduate student academic exchange is blended in among them, regular inspection and Seminar activities of project, give play to the role of the graduate student's demonstration, radiation effect.

[3]. In line with the principle of their aptitude, to absorb a number of learning distinction performer and expertise, into the tutor system training phase ahead of time. According to the characteristics of each distinction performer and expertise, appoint full-time personnel responsible for, and with the requirements of the team leader to develop, implement a highlight of the top students.

[4]. Using the professional direction of teaching resources, to attract students to extracurricular academic practice. Make full use of the research institute, laboratory, scientific research and teaching resources, encourage students to participate in interest groups, use after school time for science and technology creation, exchange of experience, not organize regular seminars and professional knowledge propaganda and the results show, the specialized experiment and production practice, graduation design and the students daily study organic union, form a mentor to drive students, senior student drive the team and team training mode of junior student.

3.5 Development with Stereoscopic radiation style

[1]. Exploration of large oriented cooperative learning mode and the radiation effect of innovation talents group innovation, to carry on the vertical cultivation, in improving the students' quality and promote the innovation in groups of talents cultivation at the same time, exercise and training to participate in teacher team leading ability, forming a high academic level, reasonable structure, young, teaching and scientific research team with international vision.

[2]. Through the second classroom, distinction performer training, science and technology innovation activities, professional practice and graduation design practice, strengthen the practice teaching.

[3]. In accordance with the "dominant leading, application, teaching, academic training interaction and harmonious development" to manage all students, emphasize the cultivation of the student team spirit, highlight team of elite students' abilities to exercise at the same time.

[4]. Encourage more young teachers to actively participate in teaching reform and the training of invasive, and promote the students and teachers grow up together.

4. RESEARCH METHODOLOGY

Research activities in the subject basic courses, specialized courses and extracurricular activities of science and technology level of synchronization, specific measures and practices are as follows. [3, 5-7]

4.1 The preparation procedure for the research orientated teaching model

[1]. Electronic discipline basic course of research-based teaching, cooperative learning group innovation model for large.

[2]. Shift from mainly teachers teach to the students' autonomous learning under the guidance of teachers, gradually began to independent study, students study most of the problems are real issues; In true longitudinal subject for traction, the discipline construction achievements into undergraduate teaching quality resources, actively update teaching content, stimulate students' active inquiry consciousness.

[3]. Comprehensive introduction of modern education technology, especially the digital technology and network technology, the virtual reality of electronic scientific theory. The model will be a

combination of teaching and research is now on the students' "learning", students are encouraged to explore unknown areas, rather than inherent knowledge and in conclusion first. In student teams as the basic unit, form " large class into groups, groups into team" way of cooperative learning.

[4]. In practice, and communities in the curriculum design, graduation design and the combination of undergraduate academic activities, improving the students' innovation ability. Adhere to the discipline construction of this model combined with undergraduate course education, teacher convert the problem of academic frontiers to share with students in teaching.

4.2 The research-oriented teaching of academic disciplines, based on professional education

[1]. In professional education stage (grade three) reform of the teaching plan, adding methods tools classes, classes, integrated course such as three categories.

[2]. In real project, for traction, strengthening the combination of professional theoretical knowledge and practical scientific research project.

[3]. Establish experimental equipment research classroom, theoretical teaching, group discussion, experiment teaching and course design in the same classroom.

[4]. Examination way to attach more importance to students at ordinary times to discuss and the performance of the project. The model outside the teaching system of innovation into the system, significantly enhance the students' practical ability and innovation consciousness.

4.3 Based on the freedom to explore patterns for self-development, college students' research and development plan

[1]. Teachers of undergraduate published scientific research topic, and decompose the corpus for undergraduate study.

[2]. The volume of activities according to students’ study recognized student extracurricular study score. Inquiry teaching for the purpose of this model from pursuing exploration tool value to explore the intrinsic value pursuit, focusing on exploring for the teachers and students to improve their own quality.

[3]. Examination way to attach more importance to students at ordinary times to discuss and the performance of the project.

5. CONCLUSION

Through the exploration and practice of cultivating innovative talents, we achieve the effective combination of theory teaching and practice teaching design. And make the discipline construction achievements into high quality undergraduate teaching resources. We also introduced the teaching

system (second class) of students within the academic activities of science and technology to the teaching system (first class). On solving the current higher education of professional quality of large scale and professional education to improve the current contradictions, group innovation personnel training mode, elite and highlighting students pay attention to and promote the cultivation of innovative talents, has very important significance.

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