

Research on the Practical Course System of Electronic Information Science and Technology Based on the Foster of Creative Talents

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Abstract. The core of practical course is to cultivate students' practical and creative abilities. In the problems existing in the practical course of Electronic Information Science and Technology in Harbin University of Science and Technology, the reform and reconstruction of the practical course are carried out based on the results of goal-oriented in order to improve the connotation and quality of the foster of creative talents. With the aim of cultivating students' creative ability, the multi-level practical course system is integrated. Through exploration and practice, the practical course system is effective in training creative talents. And students' creative and practical application ability is significantly improved.

Introduction

The rapid progress of electronic information science and technology and the rapid integration of disciplines are one of the most important pushers to promote the technology in modern society[1]. With the rapid development of information technology, such as micro-nano system, industrial Internet, intelligent wearable equipment and artificial intelligence, the requirements of the electronic information industry for the practical ability, creative ability and multi-disciplinary cross-comprehensive ability of the graduates in this major are constantly increasing[2-4].

Practice teaching is a very important link in the talent training program of electronic information science and technology. The quality of practice course will directly affect the training quality[5,6]. In order to meet the demand for talents in the industry, the major of Electronic Information Science and Technology in Harbin University of Science and Technology combs and summarizes the existing training system of creative talents. Aiming at the common problems existing in the training of students' practical and creative abilities, this paper points out the role and significance of the practical course system in the foster of creative talents, tries to construct a multi-integration and hierarchical practical course system. This system highlights the main position of students. Therefore, it is very important to reform and improve the practical course system.

Problems in Practical Course of Electronic Information Science and Technology

The key to cultivating creative talents lies in strengthening teaching and practice. In teaching, we need to design professional courses and teaching links. This teaching system will strengthen the general education, master the knowledge points of the professional personnel training. In practice, through building professional practice platform, organizing various practical training projects, the students' creative thinking and sense of teamwork will be stimulated. The students' expression ability and creative ability will be improved[7,8]. Practical Course Links of electronic information science and technology in Harbin university of science and technology is still some shortcomings in practical course, which are mainly manifested in:

(1) The concept of professional practice teaching is backward. The practical course system is imperfect. A planning system, clear objectives and gradual practical course system is lack. These problems are not conducive to the foster of students' practical ability.

(2) Practice projects are limited to classroom teaching content, mostly focusing on curriculum design, lacking comprehensive practice of combining students' independent inquiry and teachers' projects, and not fully reflecting the student-centered teaching concept.

(3) The current system is lack of teachers, weak interdisciplinary integration, lagging behind advanced technology in practice, inadequate depth of practical projects and lack of innovation.

(4) The fit between production practice enterprises and specialties is weak, mainly based on visits, and students cannot conduct in-depth professional research and training, which cannot meet the requirements of production, teaching, research and teaching.

Reform and Construction of Practical Course System

Establishing Hierarchical Practice Course Platform

At present, the development of electronic information industry is characterized by "innovation, intelligence and integration". Intelligent products basically include the application of electronic technology. It is necessary for students to have multi-disciplinary practical ability. Based on the characteristics of information industry with multi-disciplinary integration, when setting up professional practice links, the practice links of related majors are assisted on the basis of professional practice. In order to foster creative talents, the specialty of electronic information science and technology has set up a hierarchical practical course link, which takes students as the center and combines the advantages of professional teachers to cultivate professionals with strong creative practical ability. According to the principle of improving students' creative practical ability step by step, this paper emphasizes the training of students' professional practical ability, comprehensive design practical ability and creative ability, and constructs a "three-level" professional practical course platform, as shown in Fig. 1.

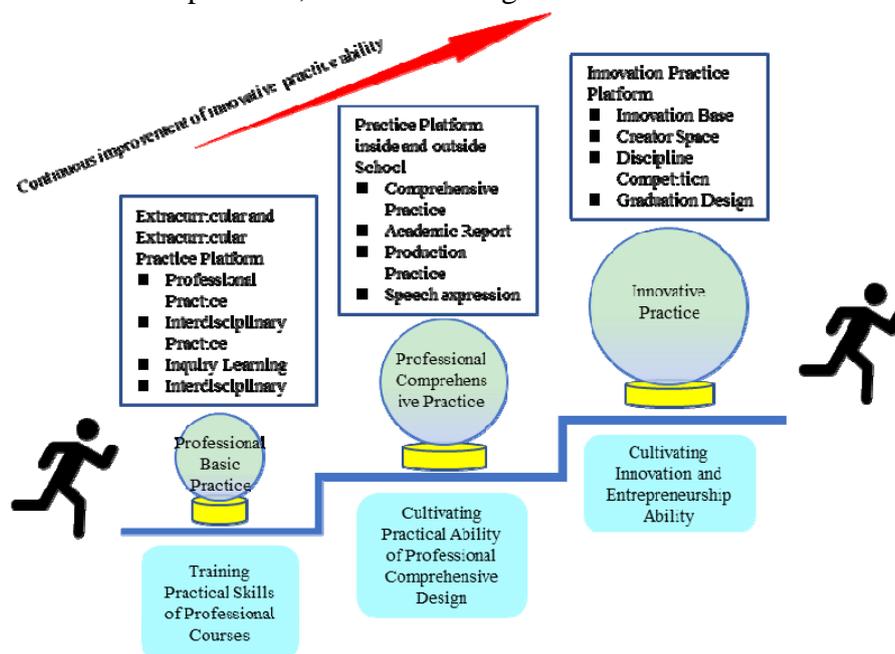


Figure 1. "Three-level" professional practice course platform

Professional practice course platform is divided into three platforms: professional basic practice, professional comprehensive practice and creative practice. Professional basic practice platform is "in and out of class" practice platform, which mainly includes curriculum experiment and related practice of professional basic courses. The emphasis is on strengthening professional theory learning, guiding students to acquire knowledge across majors, improving scientific knowledge system, advocating multi-disciplinary cross-exploratory practice projects, integrating theory and practice organically, and training students' creative consciousness and ability to solve practical engineering problems. Professional comprehensive practice platform is "inside and outside school" practice

platform, which mainly includes professional courses related comprehensive practice. Through academic reports, production practice and work exhibition, this platform aims at helping students to contact the frontier of disciplines and specialties, taking students as the center and combining teachers' scientific research projects, to complete professional comprehensive practice. This will stimulate students' creative thinking, and improve students' comprehensive practical ability. Creative practice platform is on the basis of consolidating the training of practice platform in the first two stages, combining innovation practice base, creator space and subject competition, innovation practice platform actively promotes creative practice projects. Under the guidance of professional teachers, students play their initiative and creativity. They will give full play to their learning knowledge, design electronic works. Professional skills have been significantly improved. The subject competition and graduation design are completed, and the effectiveness of professional innovation and practice ability training will be test with the results.

Practical Course Methods and Means of Multi-integration

In order to improve the teaching quality of comprehensive practice and keep up with the frontier, the specialty has reformed the comprehensive practice. Combining with teachers' scientific research and inquiry-oriented projects, CDIO (Conceive Design Implement and Operate) mode is adopted to run the conception and operation through the whole practice process. The teaching methods of practical courses are reformed in various forms. With specific projects as the main line, professional teachers follow up and guide the whole process, multi-integration of practical course methods are explored. And evaluation methods with learning results as the core are established. Student-centered, case-based, heuristic and interactive teaching methods are used to organically integrate theoretical knowledge with engineering practice. This will guide students to put forward their own ideas and opinions, explore and innovate in the process of project implementation, so as to improve students' ability to use the knowledge they have learnt and the knowledge they have learnt from different disciplines. In the process of the implementation in project research, students experience the whole process of scientific research, such as project application, project design, question opening and defense, actual debugging, summary and acceptance. It will make students change from "receptor" to "subject" in experiment, and cultivate students' ability to apply, comprehend and synthesize.

Perfecting the Training System of Diversified Practice Teaching

According to the characteristics of students and aiming at individualized training, we adopt a diversified practical course training system. College students' entrepreneurship base, open laboratory, creator space and subject competition, we advocate the combination of students' self-study and teacher's guidance, adopt "tutor-graduate-undergraduate" practice guidance mode, multi-to-Multi deep interaction, guide students to contact the frontier of disciplines, and encourage students to enter the lab early. Extracurricular help and peer learning can effectively improve students' creative practical ability. A step-by-step practical course system has been constructed, requiring sophomores to actively declare and participate in the "school-provincial-national" three-level creative entrepreneurship training program through independent research. Senior students complete graduation projects related to production practice and teachers' scientific research projects. It has formed a virtuous circle mechanism of "learning-speculation-practice-R&D" for the foster of students' creative practical ability. The final assessment is to evaluate the effect of implementation by participating in subject competitions, scientific research, publishing papers or patented achievements, and to improve the training system of professional practical course.

Promoting the Foster of Innovation Ability through Discipline Competition

Through opening laboratories, innovation and entrepreneurship center managed by students and ICAN innovation practice base of Chinese university students are established, with setting up ICAN university students' scientific and technological innovation team, organizing and developing holiday scientific and technological practice training activities, vigorously carrying out the second classroom activities. Discipline competition is an effective way to improve the comprehensive quality of

students. A group of teachers with solid theoretical foundation, rich practical experience and wide specialty are selected to form a coaching team, and training plans and competition schemes are elaborated, providing training experimental sites, experimental equipment and components for the competition. This material provides a reliable guarantee for the competition. It advocates "emphasizing participation", encourages the spirit of "daring to compete and innovate", and conducts systematic training for the students participating in the competition. After comprehensive assessment, excellent students are selected for intensive training, and the actual combat simulation is carried out. Finally, they are organized to participate in the national discipline competition.

Discipline competition focuses on basic and frontier science and technology, which can cultivate students' creative spirit, collaborative spirit and conscious consciousness. In the contest of mathematical modeling, it includes the National Undergraduate Electronic Design Competition, the ICAN innovation and entrepreneurship competition for Chinese university students, the China (International) sensor innovation design competition, the Chinese university intelligent robot creative competition, the "Internet+" innovation and entrepreneurship competition, the China TRIZ cup university student innovation method competition, the challenge cup and the sharing cup innovation competition of science and technology resources sharing service for college students. Exceeding 60% of the students have achieved excellent results. The development of students' extracurricular science and technology activities has also promoted the continuous improvement of professional curriculum reform and practical course system, and promoted the improvement of young teachers' practical ability and comprehensive quality.

Conclusions

Through the above practice teaching reform, the specialty of electronic information science and technology has constructed a multi-level and three-level practice teaching training platform, improved the practice course system, and established a variety of practice training methods. We realize the three transformations from "teacher-centered" to "student-centered", "teaching-centered" to "learning-centered", "supply-centered" to "demand-centered", and systematically promote the reform and innovation of practical course in training creative and entrepreneurial talents. Students' initiative and enthusiasm have been improved, and their creative and practical abilities have been enhanced. More than 70% of students participate in the creative entrepreneurship training program. Since the reform of practical course, more than 60% of students have participated in professional subject competitions, 20 students have won the second and third prizes of national subject competitions in the past three years, and 50 students have won the provincial awards of subject competitions. The students' ability of professional innovation and practice has been greatly improved. Most of the graduates have achieved the results of training objectives and the employment rate is over 95%, and the reform has achieved good results.

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