Research on the New Mode of Training Talents of Electronic Information Science and Technology Based on Information Technology

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Abstract: In response to the new round of industrial and technological revolution, the state has put forward the educational concept of "new engineering" in the field of higher education. Most of the applied undergraduate engineering talents training are applied to the training mode of the ordinary universities before, which leads to the unclear training objectives, obvious characteristics and the low quality of graduates. This paper mainly introduces the reform method of the training mode of Engineering Specialty in Applied Undergraduate Colleges under the background of new engineering, taking the reform of the training mode of electronic information science and technology as an example.

Keywords: New Engineering, Electronic Information Science and Technology, OBE Education Mode, Talent Training

1. Introduction

In the complex world environment, the rapid rise of China has caused a strong panic in the West, which has suppressed and "blocked the neck" of us in various aspects including information technology.

China's information technology and industrial technology will also face great challenges.

The increasingly mature "Internet Plus" technology has triggered a round of technological and industrial revolution around the world.

As early as 2017, China deployed the national strategy of engineering talent training reform, and put forward the professional construction concept of "new engineering" [1] in the engineering field, where higher education accounts for more than half of the country. The talent training concept of New Engineering is to cultivate senior applied talents who can solve complex engineering problems across the field. Applied undergraduate are mostly run by the local colleges and universities and independent colleges, before its talent training mode mostly from ordinary universities, especially engineering major, training mode in use for decades, almost lead to talent training target is not clear, can't keep pace with The Times, cultivating mode is not advanced, quality of graduates generally is not high. Our university is an application-oriented undergraduate university. The major of Electronic Information Science and Technology is a typical engineering major with rapid technological development and strong practicality, which is one of the key majors in the reform of "new engineering" and is the most representative among engineering majors. This major is also an old one, and it is a special major under the first-level discipline of information and communication engineering. It is offered in most colleges and universities in China. Through various investigations, it is found that there are many problems in its talent training mode, which can not adapt to the training requirements of new engineering talents, and necessary transformation must be carried out.

This paper mainly introduces the reform method of training mode for engineering majors in applied undergraduate colleges based on "OBE" education mode, taking the reform of training mode for electronic information science and technology majors in our university as an example.

2. Problems Faced By Electronic Information Science and Technology Majors

According to a variety of literature, statistical reports and a questionnaire survey of graduates, parents and employers in our school last year, we found that the major currently has the following

problems:

2.1 The Contradiction between the Talent Demand of Employers and the Ability of Graduates to Adapt to the Post

Now the gap between the demand for talents in electronic information and emerging industries and the ability of graduates to adapt to the post is gradually increasing, and the contradiction is prominent. The students we cultivate can not better connect with the actual post, the ability to solve practical problems is poor, lack of core competitiveness of the post.

2.2 The Training Objectives of Talents Are All the Same and Lack of Advancement and Individuation

The existing talent training objectives of this major do not combine the actual situation of each school, and apply the guidance opinions of the professional training objectives given by the state more than ten years ago. The results are all the same and lack of advancement and individualization. In the questionnaire of graduates, 42.5 students were asked "the training objective is too broad and not accurate".

2.3 The Curriculum System Is Outdated

The existing courses are mostly the knowledge content of decades ago, and the core components, application of new technologies and key generic technologies are relatively weak. The curriculum system is mainly based on knowledge integrity and systematicness, and the curriculum system is obsolete.

2.4 Backward Teaching Mode

A teacher teaches only one course in his whole life and lacks knowledge diversity. Theory and practice course two sheets; There are more barriers between courses and less communication between teachers of different courses. College teaching activities lack experienced enterprise engineers to participate in. These are relatively backward and affect the development of engineering teaching mode

3. The Reform Measures of Personnel Training Mode of Electronic Information Science and Technology Major in Our University

3.1 Talent Training Objective

Electronic Information Science and Technology has a long history of professional precipitation and inheritance advantages. In the traditional training goal, it is necessary to cultivate both research and design talents who can engage in research and application of technical talents. However, the goal is not specific and clear, resulting in the cultivation of talents who are not high and low. The major of Electronic Information Science and Technology of our school takes the personnel training objectives and requirements of engineering education certification as the standard [2], and the concept of "OBE [3]" as the basic requirements of the personnel training mode, and redefines the personnel training objectives, namely: Cultivate high-quality application-oriented talents who can serve the economic and technological development of Shaanxi Province, "develop five education simultaneously", master solid professional knowledge and skills, and can solve complex intelligent electronic equipment, automation system and other fields across the field.

3.2 Establish "OBE" Concept and Professional Certification Requirements of Talent Training Mode

With OBE(Outcomes Based Education, abbreviated as OBE) as the basis for results-oriented Education concept and professional certification requirements, the program builds a "trinity" talent training program that includes positions, abilities and courses, and establishes an output-oriented, whole-process and all-dimensional talent training program.
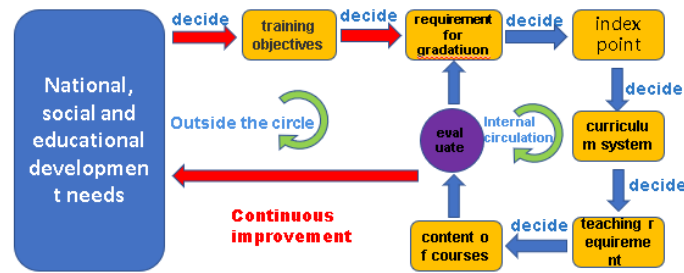
Figure 1: Talent training mode based on the concept of "OBE"

3.3 Implement the School-Enterprise Cooperation and Collaborative Education Teaching Mode [4]

In the construction of new engineering majors, the teaching mode should not be single, and the higher education of engineering should no longer be determined by the school alone. Must carry out the school-enterprise cooperation, the cooperative education personnel training mode. Especially in an "application-oriented" undergraduate program like our university, this model must be put into place. In order to truly achieve school-enterprise cooperation and collaborative education, we must take students as the center and conduct it from four aspects: discipline, curriculum, practical training and teachers.

First, interdisciplinary integration, innovation of curriculum system and assessment method, craftsmanship spirit through all teaching links, based on the "OBE" teaching model, to ensure the knowledge system of qualified talents. This major has signed school-enterprise cooperation and cooperative education agreement with four enterprises in the city. The talent training program is jointly formulated by the school and the enterprise. There are two enterprise tutors who are respectively teaching the courses of "embedded system" and "electronic technology practical training" of this major [5].

Second, the multi-party collaborative teaching mode of large courses, using project-driven excavation of students' potential, school-enterprise cooperation to expand the space of entrepreneurship and innovation, industry-university-research cooperation to improve the innovation ability, to ensure the teaching mechanism of students' innovation and entrepreneurship.

The major has jointly created a mass innovation space with enterprises, and each year, students get an average of 5 innovation and entrepreneurship projects for college students.

Third, build engineering training platform through multi-party cooperation, start virtual simulation laboratory, collaborative innovation center, engineering technology center, etc., and guarantee its multi-type practice education platform. This major has established a virtual simulation experiment platform of analog electronic technology and a collaborative innovation center.

Fourthly, multi-tutor cooperative training guidance, training project-driven teachers, double-teacher teachers and skillful teachers, to ensure its multi-level teaching staff. Every year, 2 teachers of this major go to the enterprise for temporary exercise.
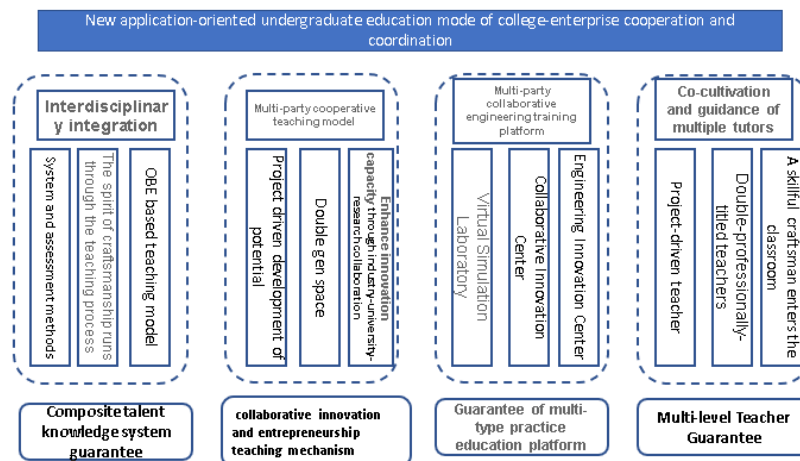

Figure 2: Block diagram of the study on school-enterprise collaborative education mode

4. Constructing "Trinity" Curriculum System, Strengthening Curriculum Ideological and Political Education

A "trinity" curriculum system integrating employment positions, certificates and courses is established, and courses such as information technology and artificial intelligence are integrated. Practical application-oriented integrated circuits, intelligent manufacturing and artificial intelligence will be taken as the main content of teaching content adjustment and optimization. In the current complex world environment, the semiconductor application technology especially chip production technology become a stumbling block, curb China's numerous development in this case, in the electronic information science and technology professional courses teaching, must focus on strengthening the introduction of the course ideological instruction, guides the student to the correct world outlook and values, can make their efforts to study for the revitalization of the semiconductor technology in China, Attention should be paid to the transformation of practical teaching to enterprises, the reconstruction of content experiment system, and the strengthening of course design. For example, the original analog circuit and digital circuit experiment in class will be integrated into "electronic technology experiment course", which can be taught jointly by schools and enterprises.

Table 1: "Trinity" curriculum system

Employment position	Qualification certificate	Supporting courses
Information processing technology	Information processing technician qualification certificate	Information processing technology
Hardware circuit design	Electronic Design Engineer; Electronic Information Engineer	circuitous philosophy; artificial circuit; digit circuit; electronic measurement; Signals and Systems; Electrical control and PLC; Fundamentals of MonoChip Computers & Applications; digital signal processing; fundamentals of sensors and application
PCB design		
FPGA design		
embedded development	ARM Engineer Qualification Certificate	ARM embedded; digit circuit; C language programming
network technique	Network engineer qualification certificate	computer networking technology; Information processing technology; Information processing technology
Industry and Automation	automation engineer	ARM embedded; Electrical control and PLC; circuitous philosophy; fundamentals of automatic control; principle and application of sensors
artificial intelligence	Artificial intelligence engineer	Machine vision and image processing; Introduction to Artificial Intelligence; Neural networks and deep learning; Information Fusion and Pattern Recognition
Innovative undertaking	Entrepreneurship Consultant	Innovation and Entrepreneurship Guidance; employment guidance for college students; College students career and development planning

4.1 Build a First-Class "Double-Qualified" Teaching Team [6]

Combined with the characteristics of integration of industry and education and strong professional practicality, it is necessary to build a "double-qualified" teacher team with strong professional ability. Most of the teachers in our school went to college directly after graduation, and many of them lacked working experience in enterprises and engineering practice. In recent years, this major has carried out the construction of "double-qualified" teaching staff through "internal training and external introduction". First, teachers are encouraged to improve their practical technical ability by obtaining professional skill qualification certificates or taking temporary posts in enterprises. Two industries or enterprises to hire "skilled craftsmen" into the classroom, to give students and teachers hand in hand practical skills guidance. The proportion of "double-qualified" teachers in this major exceeds 60%.Fundamentally enhance the power of professional teaching.

4.2 Taking the Competition as the Breakthrough Point, the Practical Teaching System of "Three Horizontal and Three Vertical" is Constructed
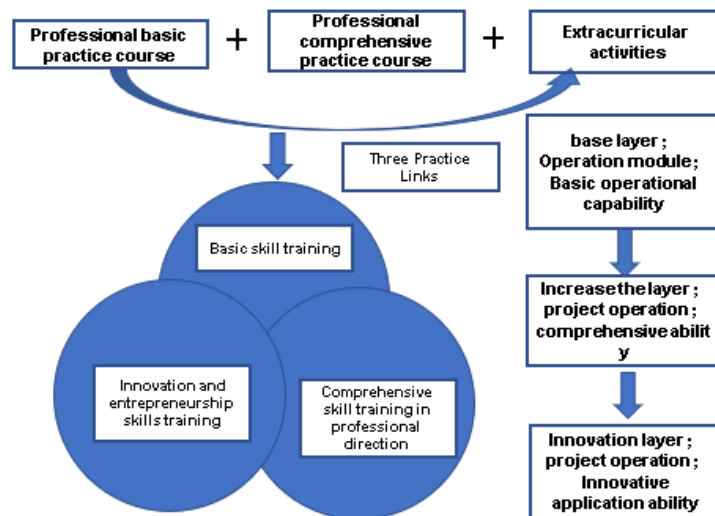

Figure 3: "Three Horizontal and Three Vertical" Practice Teaching System

Will contest of national undergraduate electronic design contest, and Internet + real proposition into the classroom, into the skill type classroom teaching mode, implement competition to project curriculum content, the competition content to carry out the link to a specific course, to do professional core courses to other professional courses, professional foundation courses, trunk course groups to achieve linkage through competition. Taking ability training as the core, the course content is closely connected with the requirements of enterprises' posts, highlighting practical teaching, and improving the "three horizontal and three vertical" practical teaching system of "one core, two platforms, three levels and the whole process" [7].

4.3 Establish Dynamic Talent Tracking and Feedback Measures

The whole process of talent training should be closed loop and dynamic. It should not only have the training objectives, training programs, good teaching methods and curriculum system in line with the actual situation. There should also be dynamic and comprehensive talent tracking and feedback measures. We know the development of electronic information science and technology industry through questionnaire, telephone consultation, data inquiry and other ways, and set up graduate tracking card. Investigate the graduates' ability to achieve the training goals in 5 years, form an investigation and analysis form, and feed back to the teaching organization department in real time. Make dynamic adjustment to the talent training program, and establish a dynamic adjustment mechanism of one fine-tuning every year and one major major in 4 years.

5. Conclusion

In the context of the introduction and deepening of a series of national strategies such as "Internet +" and "Made in China 2025", a difficult problem for application-oriented universities is to solve the innovative talent training model [8]. The training can meet the needs of regional economic and social development. Moreover, application-oriented talents with practical ability and innovative spirit who can solve complex engineering problems are an important task for the training of engineering professionals in new engineering. Xi 'an translation college of electronic information science and technology with the aid of IT professional advantage and electronic communications professional disciplines, combination of artificial intelligence, big data and emerging technologies, such as cloud computing to OBE "concept for the electronic information science and technology professional talent training basis, from the training goal, university-enterprise cooperation, practical teaching system, curriculum system, teaching staff, The reform in the dynamic feedback mechanism of talent training will not only greatly improve the professional certification of this major in the future, but also explore a new way for the reform of talent training mode of other engineering majors in our school.

Acknowledgments

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