

Research on the Construction of Public Practice Teaching Platform under the Background of New Engineering

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Abstract: Under the background of new engineering, the paper studies and explores the construction of a public practice teaching platform for electronic information majors in local undergraduate universities, and analyzes the current situation and main problems in the construction of public practice teaching platforms for electronic information majors in local universities in China. To these problems, taking the construction of a public practice teaching platform for electronic information majors at Hubei University of Science and Technology as an example, this paper elaborates on the path of constructing a public practical teaching platform for electronic information majors from the aspects of integrating professional basic courses, public basic experimental training teaching platform and public innovation practical teaching platform.

1. Introduction

The development of higher education in our country is undergoing profound changes, shifting from large-scale expansion to high-quality development, constantly promoting the construction of higher education connotation and characteristic development, in order to meet the aspirations of the people to receive higher education and the needs of rapid economic and social development. At the same time, in June 2016, China became the 18th official member of the Washington Accord, an international agreement for mutual recognition of undergraduate engineering degrees, bringing new opportunities and challenges to engineering education in China. In order to proactively respond to the new round of technological revolution and industrial transformation, support innovation driven development, and implement a series of national strategies such as “Made in China 2025”, the Ministry of Education has actively promoted the construction of new engineering disciplines since February 2017. It has successively formed the “Fudan Consensus”, “Tian Da Action” and “Beijing Guidelines”, played the main theme of talent cultivation in new engineering disciplines, opened up new paths for engineering education reform, and issued notices on conducting research and practice in new engineering disciplines and recommending research and practice projects in new engineering disciplines. It has made every effort to explore and form a Chinese model and experience leading global engineering education, and assisted in the construction of a strong higher education country.

The new engineering major is an upgrade and transformation of traditional engineering majors using intelligent manufacturing, cloud computing, artificial intelligence, robotics, etc. Compared to traditional engineering talents, the future emerging industries and new economy require high-quality composite new engineering talents with strong practical ability, innovation ability, and international competitiveness. The electronic information major is in line with the requirements of the new engineering construction, and its talent cultivation mode needs to integrate the engineering, practical, and technological characteristics of electronic information majors. Students are required to have good engineering practice ability, innovation consciousness, and innovation ability. Combined with the positioning of talent cultivation and the needs of engineering education

professional certification, it opens up new development paths for talent cultivation. Starting from the current situation of engineering education in electronic information, guided by the ability of engineering practice innovation, with the goal of strengthening practical links, promoting theoretical teaching, highlighting ability cultivation, and improving teaching quality, we aim to construct a theoretical and practical curriculum system, public training practice platform, and innovative practice platform that meet the requirements of certification standards. Among them, integrating existing resources to build a good public training practice platform is a common requirement for the construction of new engineering disciplines and the certification of engineering education majors. The research on the construction of electronic information public practice teaching platforms under the dual background of new engineering and engineering education professional certification in local universities is of great significance for the transformation of existing engineering majors into new engineering majors and the certification of engineering education majors.

2. Analysis of the Current Situation of Public Basic Practice Teaching in Domestic Electronic Information Majors

According to the Implementation Plan for the Review and Evaluation of Undergraduate Education in Ordinary Higher Education Institutions(2021-2025) issued by the Ministry of Education, ordinary undergraduate universities in China are roughly divided into three categories. The first category is Double First-Class universities that serve major national strategic needs. The second category is ordinary undergraduate universities that focus on academic talent cultivation. The third category is ordinary undergraduate universities that focus on applied talent cultivation. Most local undergraduate universities basically belong to the third category. In the early 21st century, in order to meet the desire of the people to receive higher education and the needs of rapid economic and social development, the scale of higher education in China rapidly expanded. Many higher vocational colleges and technical colleges were upgraded to applied undergraduate universities after mergers. Due to their short establishment time and lack of accumulation and experience in undergraduate talent training, the vast majority of professional undergraduate talent training programs were copied from Double First Class universities or academic universities.

The early 21st century is also a golden period for the rapid development of electronic information and computer technology in China. Electronic information related majors are also flourishing in newly established local applied undergraduate universities. From the current perspective of talent cultivation in Chinese universities combined with the specific realities of local universities, the electronic information majors in applied undergraduate universities mainly aim to cultivate advanced applied professionals with basic knowledge of electronic information, computer technology and other related disciplines, good practical skills in electronic information and computer technology applications, and the ability to engage in research, design, development, management and maintenance in related fields such as electronic information and computer technology. However, due to a weak foundation in engineering and scattered resources, as well as limited traditional engineering training concepts, local applied undergraduate universities cannot effectively adapt to the needs of emerging industries and the new economy in the future. Therefore, under the rapid development of new engineering and the requirements of engineering education professional certification, there are generally prominent problems in the training of talents in new majors such as electronic information, such as unclear training objectives, lack of craftsmanship spirit, lack of practical hands-on ability, and lack of ability to serve local social and economic development.[1-4]

3. Problems in the Construction of Public Practice Teaching Platforms for Electronic Information Majors in Local Undergraduate Universities in China

The establishment time of electronic information majors in local applied undergraduate universities in China is basically concentrated in the early 21st century, mainly focusing on three

types of majors: computer science, electronic information science, and communication science. The engineering basic courses of electronic information majors mainly consist of more than ten courses in four categories: mathematics, physics, electronic technology, and computer science. Among them, except for mathematics, which emphasizes theoretical teaching, the other three categories are basically taught in a "theory+practice" way. Therefore, the investment in electronic information majors is relatively large, especially the demand for laboratory construction investment is high. Through relevant literature research and years of professional construction practice, it is found that local applied undergraduate universities have weak engineering foundations, scattered resources, and relatively tight operating funds, The construction of public practice teaching platforms for electronic information majors in local undergraduate universities mainly faces the following problems. [5-6]

a) In the education and teaching of electronic information majors, only the teaching of core courses is emphasized, and there is no emphasis on the teaching of public basic courses in engineering majors. At the same time, there is a phenomenon of inconsistent teaching plans and fragmented teaching in public basic courses. Due to the lack of official national standards for the teaching quality of undergraduate majors in ordinary colleges and universities at that time, most of the training plans for electronic information majors were formulated based on other existing professional training plans, and combined with the basic conditions of the university's college majors (experimental resources and teaching staff) to set up basic course teaching plans. Therefore, the arrangement of engineering public basic course teaching plans for electronic information related majors in various universities was not unified, and there was a phenomenon of fragmentation, especially for basic courses such as higher mathematics, university physics, analog circuits, digital circuits, circuit theory, etc., which had different hours, credits, and teaching syllabus. Even different engineering majors in the same university also had this phenomenon. [7]

b) The public practice teaching platform for electronic information majors has poor conditions, and there is also a problem of redundant construction in different departments. Due to the weak foundation in engineering and relatively tight funding, the construction of public practical teaching platforms for electronic information majors in local application-oriented undergraduate universities mainly focuses on university physics experiments, electronic technology (analog electronics, digital electronics), and computer rooms, which can only meet the needs of demonstration and evidence-based experimental teaching. The development of comprehensive and design oriented experimental projects is insufficient, and the basic conditions for conducting comprehensive and design oriented experimental project training are not met. Students' independent learning and research abilities and practical application abilities are difficult to exercise. At the same time, due to the long service life of the equipment, severe aging of the equipment, insufficient school funding, and slow upgrading and updating of experimental equipment, there are also some colleges with good educational efficiency and sufficient funding that have built their own engineering basic laboratories, resulting in the problem of redundant construction of public basic practical teaching platforms in the school. [8]

c) The form of practical teaching is single, there is a lack of interdisciplinary integration, the content of practical teaching lacks innovation, the cooperation between schools and enterprises is not close enough, and innovation and entrepreneurship education is merely a formality. In the teaching process, there is a common phenomenon of emphasizing theory over practice. There are weak links in practical teaching and extracurricular activities, and there are almost no innovative practical teaching platforms that inspire students' innovative thinking. There is no scientific and systematic student innovation and entrepreneurship training plan or online and offline integrated innovation and entrepreneurship courses, and there is a lack of basic innovation and entrepreneurship training platforms. At the same time, school enterprise cooperation is merely a formality, and students' course internships are often superficial. Graduation internships are mainly scattered internships, and the effectiveness of internships is difficult to guarantee. The overall scientific research strength of local applied universities is poor, and there are relatively few scientific research projects for teachers. Students' extracurricular scientific and technological

activities have not been widely carried out, and the breadth and depth of cultivating students' innovation and entrepreneurship abilities are insufficient. All of these affect the cultivation of applied new engineering talents that meet the needs of society.[9-10]

4. Exploration on the Construction of Public Practice Teaching Platform for Electronic Information Majors in Local Undergraduate Universities under the Background of New Engineering

This article takes electronic information science and technology, computer science and technology, medical information engineering, software engineering and other new engineering majors related to electronic information at Hubei University of Science and Technology as the research object. In response to several common problems in the practical teaching process of electronic information majors in newly established local undergraduate universities, this article explores the construction path of public practical teaching platforms for electronic information majors in local undergraduate universities under the background of new engineering from several aspects, including the integration of basic courses in electronic information related majors under the requirements of engineering education professional certification standards, the construction of a public experimental training teaching platform for electronic information majors based on the integration of basic courses, and the construction of a public innovation practice platform for electronic information majors in accordance with the requirements of new engineering construction.

4.1. Complete the integration of basic courses related to electronic information in accordance with the certification standards for engineering education majors

This paper centers on the educational philosophy of "human-centered" and "student-oriented" for electronic information engineering majors, guided by the concept of "ability orientation" and with the goal of "engineering professional practice", focusing on what students "should receive", cultivating electronic information engineering and technical talents with good engineering practice ability, innovation consciousness and innovation ability, in line with the development of contemporary information technology and social progress, and meeting the demand of society for electronic information engineering and technical talents.

The school is currently in a historical opportunity period of further deepening the pilot program for transformation and development, completion and operation of the national demonstration university project for the integration of industry and education (the Industry Education Integration Engineering Training Building), and active construction of the Education Strong Country Project. The construction of new engineering disciplines and the certification of engineering education majors are forcing the school to promote the reform of engineering departments, break the current situation of independent teaching of basic courses in engineering departments, and take advantage of the opportunity of the school launching a new round of undergraduate talent training program revision work to build an electronic information related professional subject basic course system and practical teaching system that meets the certification standards for engineering education majors (expected 5 specific goals that students can achieve in about five years after graduation and 12 requirements for knowledge, ability, and quality that graduates of this major should meet). According to the requirements of the certification standards for engineering education majors, we will integrate the teaching system of public basic courses for electronic information engineering majors. Through various forms such as course teams, course groups, and course groups, we will integrate the basic course resources of engineering disciplines such as university physics, circuit theory, electronic technology, electronic technology, metalworking training, computer basics, C program design, artificial intelligence basics, and big data technology. We will also establish a teaching outline and corresponding public experimental training platform for engineering discipline basic courses that comply with the National Standards for Undergraduate Professional Teaching Quality in Ordinary Higher Education Institutions and the certification standards for engineering education majors in electronic information majors. The Electronic Information Professional Certification Standards of the China Engineering Education Professional Certification Association

stipulate the engineering basic knowledge of such majors. Each major establishes a complete practical teaching system based on its own characteristics, which mainly includes metalworking internship, electronic technology internship, various course design and comprehensive experiments, engineering awareness internship, professional internship (practice), etc.

4.2. Building a Public Experimental Training Platform for Electronic Information Majors Based on Basic Curriculum Integration

This article takes the electronic information major of Hubei University of Science and Technology as an example, combined with the actual situation of the school, and based on the practical teaching requirements of the Electronic Information and Electrical Engineering major certification of the Engineering Education Professional Certification Association, integrates our university's engineering public experimental training resources, and builds a practical platform based on talent training program research and practical course system reform. The original experimental resources are screened and reorganized, and the experimental system is integrated and optimized to construct a comprehensive practical teaching system for electronic information majors with basic skills training, professional ability improvement, innovative practical conditions, and engineering practical ability training as the main focus, achieving the construction goals of public basic skills experimental training, independent professional skills experiments, interest in innovative ability practical training, and practical engineering practical ability project training. To provide an excellent experimental and practical environment for cultivating application-oriented talents with certain practical abilities and innovative consciousness, in accordance with the "National Standards for Undergraduate Professional Teaching Quality in Ordinary Higher Education Institutions" and the certification standards for engineering education majors, relevant college public experimental and practical teaching resources are integrated. According to the requirements of the new talent training plan, a standardized public practical teaching platform for electronic information majors is established. The public practical teaching platform should at least include university physics laboratories, electronic circuit laboratories, signal processing laboratories, electronic technology training rooms, metalworking training rooms, computer basic laboratories and other public experimental and practical teaching platforms that meet the integration requirements of basic courses for electronic information majors.

4.3. Constructing a public innovation practice platform for electronic information majors in accordance with the requirements of the new engineering construction

New engineering is a national strategy to support service innovation driven development, with the Internet and industrial intelligence as the core and intelligent manufacturing, cloud computing, artificial intelligence, robots and other traditional engineering majors for upgrading. It mainly trains high-quality composite new engineering talents with strong practical ability, innovation ability and international competitiveness. However, due to the high cost of the construction of the innovation practice platform with the Internet and industrial intelligence as the core and the limited financial resources of local colleges and universities, it is basically impossible for colleges and universities to build independently. Generally, it can be built by applying for national policy support, or by cooperation between colleges and enterprises, alumni donation and other ways. Our school has applied for national policy support based on the characteristics of its electronic information major, and has been approved for the National Industry Education Integration Project and the National Education Strong Country Project, completing the construction of infrastructure; Strengthening cooperation with enterprises, actively planning and cooperating with enterprises through school enterprise cooperation and alumni donations to jointly build public innovation practice platforms for electronic information new engineering majors such as artificial intelligence, big data technology, 5G Internet of Things, etc. At the same time, advanced manufacturing CNC metalworking training rooms have been built with enterprises to provide high-quality practical teaching resources, serve teachers and students, and strive to improve students' practical and innovative abilities (artificial intelligence basic laboratory, big data technology laboratory, 5G Internet of Things laboratory, and advanced manufacturing CNC metalworking training room).

5. Conclusion

In summary, under the certification concept of the new engineering and engineering education majors, this article mainly conducts research on the integration of public basic courses and the construction of public experimental and innovative platforms for electronic information majors. Based on the new requirements put forward by the certification of the new engineering and engineering education majors for the new engineering majors, the integration of basic courses related to electronic information majors, the construction of professional basic public experimental and practical teaching platforms, and the construction of public innovative practice platforms are emphasized, focusing on the cultivation of students' engineering practice ability, scientific and technological innovation ability, and vocational skills, continuously improving the quality of talent cultivation.

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