Discussion on Teaching Reform of Mechanical and Electrical Specialty Based on Engineering Education Concept

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Abstract: The construction of "new engineering" takes the new economy and new industry as the background and strengthens the innovation consciousness, the engineering idea and the integration of disciplines and specialties. The engineering education accreditation and the "new engineering" construction have the same goal to the talent training. For mechanical and electrical majors, through the engineering education accreditation, according to the international engineer standard, it has important practical significance for improving students' professional ability and professional accomplishment to construct the professional teaching system connected with the engineer system, promote the reform of engineering education teaching mode, and enhance the adaptability of engineering education personnel training to future posts.

1. Introduction

In recent years, "new engineering" construction has promoted the reform of engineering education in our country, but the quality of the personnel training can not meet the demand of the society for the engineering technical personnel, which indicates that the construction of engineering education has a long way to go.

It is an effective way to promote engineering education accreditation for the "new engineering" construction. On the basis of full study and understanding of the accreditation system, the authentication mode and the running mechanism of the engineering education accreditation. According to the standards of the accreditation, the personnel training scheme is revised and the professional curriculum system is optimized [1].

2. Understanding of the Connotation of Engineering Education Accreditation

2.1 Understanding of the Washington Agreement

The Washington Agreement is one of the most influential mutual recognition agreements for engineering education degrees in the world. China has officially joined the organization since 2016, which has realized a major breakthrough in higher education, and marked the international recognition of the engineering education accreditation standard. The Washington Agreement advocates three educational concepts of student-centered, output-oriented and continuous improvement, requires implementing the three major education ideas to the whole process of personnel training from training objectives to graduation requirements, from graduation requirements to the course system [2].

2.2 Understanding of the Connotation of Engineering Education Accreditation

The engineering education accreditation is the specialized certification for the engineering education of higher education institutions, and the quality assurance of engineering education which is widely used in the world. It is also an important basis for the international mutual recognition of the engineering education and the engineer's qualification.

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The standard of engineering education accreditation is to incorporate the industry and enterprise-recognized indicator into the professional construction system of high education, so that the employment standards of the industry and enterprise can be penetrated into the education process, and promote professional education to adjust the training goals, teaching content and reconstruction course system.

3. Main issues to Be Addressed

3.1 Determine the Target Position of Professional Personnel Training

The purpose of engineering in colleges and universities is to train high-level engineering technical personnel with practical application ability. According to the engineering education accreditation standards, the training goal should reflect the professional ability requirements of the students at the time of graduation and about 5 years after graduation. Under the guidance of new engineering construction, the engineering graduates of higher learning should know the new technology, new industry and new mode in the new round of technology revolution, and have the ability to apply, develop and innovate new technologies, so as to promote the development and upgrading of the specialty and the industry. Therefore, it is necessary to combine the characteristics of the specialty for the mechanical and electrical specialty, consider the construction requirements of the "new engineering department" as a whole, focus on the training of engineering science and technology talents in the new field, reform and upgrade the task of the traditional engineering specialty, and formulate the professional training goal.

3.2 Specify the Graduation Requirements of Professional Personnel Training

The professional graduation requirements must be clear, open and measurable, and the graduation requirements should be able to support the achievement of training objectives. China's engineering education accreditation standard specifies 12 specific contents that must be included in the requirements of engineering professional graduation: engineering knowledge, problem analysis, design solution, research, use of modern tools, engineering and social, environmental and sustainable development, professional specifications, personal and team, communication, project management and lifelong learning, which gives professional knowledge and ability of graduation requirements. The students are required to master the knowledge of mathematics, natural science, engineering basic knowledge and electrical engineering. Through practice, grasp the basic skills of electrical engineering operation and analysis, engineering design and development, the students should have the ability to analyze and solve complex engineering problems, and have the quality cultivation of humanities and social science, laws and regulations and responsibility morality. Decompose the indicators of graduation requirements and clarify the connotation of graduation requirements [3].

3.3 Optimized the Setting of Professional Curriculum System

When setting up the professional curriculum system, we must follow the concept of applied undergraduate talents training with wide caliber, thick foundation and heavy ability, seriously analyze the requirements of the industry and enterprises for the knowledge, ability, skills and comprehensive quality of talents. According to the professional training objectives and the graduation requirements indicators supported by the curriculum, we must develop the Syllabus, determine the corresponding relationship between the curriculum objectives and the relevant graduation requirements, between curriculum objectives and teaching contents and methods, the corresponding curriculum objectives of assessment links, ensure the consistency of curriculum objectives, curriculum content, curriculum assessment and graduation requirements.

3.4 Establish a Mechanism for Continuous Improvement of Curriculum Teaching

It plays an important role to establish teaching process quality monitoring mechanism, improve the quality standards of the main teaching link, regularly develop curriculum system and curriculum quality evaluation for standardizing teaching management, stabilizing teaching order and improving

teaching quality. Taking the main teaching link quality assessment results, graduate feedback information and social evaluation as the important basis for the continuous improvement of professional teaching quality, training objectives and graduation requirements, a clear feedback mechanism of evaluation results has been formed, and a stable information feedback channel has been established. According to the evaluation results, regular professional improvements have been carried out [4].

4. The Main Measures of Teaching Reform

4.1 Pay Attention to the Reform and Innovation of Training Mode

The engineering education accreditation standard should be student-centered, the people-oriented, the engineering practice-oriented, take the engineering professional practice as the purpose, emphasize the combination of theory and practice, construct a talent training model of work-study combination, and take the practice training into the various stages of the theoretical teaching. Carrying out the reform thought, every step needs the teacher to take the student as the center, design the teaching process around the curriculum goals. The above-mentioned ideas are embodied and institutionalized in the aspects of teaching plan, curriculum setting, credit distribution and assessment index system [5].

4.2 Carry Out the Talent Training Mode of Combining Work and Study

It is necessary to carry out the reform of the teaching method based on the systematization of work process, and implement the teaching mode based on the practical training base to carry out the combination of work and study. Scientifically organize and design teaching activities, establish the link between the work, the knowledge and the skills, carry out the integration and optimization of the course process, arrange the teaching with the project guidance and the task driving mode, complete the teaching task in the course of working and learning, and make the students learn the theoretical knowledge and the technical application, so as to effectively improve the engineering practice ability of the students [6].

4.3 Strengthen the Construction of "Double-teacher Type" Teaching Staff

According to the requirements of engineering education accreditation and the "new engineering subject" construction, various methods such as "going out" and "please come in" are adopted to improve teachers' professional knowledge and engineering practice ability, and teachers are selected to receive training and practical exercise to the corresponding high-tech enterprises in order to train "double-qualified" teachers with strong modern engineering consciousness. Efforts are made to build a "double-qualified" teaching team which is not only familiar with business but also with rich professional knowledge, constantly improve the proportion of "double-qualified" teachers, and gradually form a high-quality teaching team with high educational level and certain engineering experience, in order to improve the ability to guide students in engineering practice and engineering design, and to ensure the training quality of applied undergraduate talents.

4.4 Reform the Evaluation Method of Students' Academic Examination

Weaken the final evaluation and promote the formative assessment. The proportion of homework, periodic tests, mid-term results, curriculum design, and the experiment or the actual operation results should be increased in the course assessment results, which can comprehensively assess the ability and quality and truly reflect the training level of students' application ability. Pay attention to the training of students' practical ability and innovative spirit, encourage students to actively participate in various extracurricular scientific and technological activities, and improve students' ability to think and learn independently.

5. Conclusion

The engineering education mode has trained a large number of engineering and technical talents

for the country. The goal of engineering education is to train innovative talents with both engineering technology and humanistic literacy. "New Engineering" focuses on the Internet technological revolution, new technology development, manufacturing upgrading and other characteristics of the times, and puts forward higher requirements for engineering students' literacy: engineering students should not only have profound studies, but also have science, humanities, engineering literacy, practical ability and innovative consciousness. Under the background of new engineering, the talent training, based on the concept of engineering education, will develop in the direction of knowledge integration, technology frontier and professional integration.

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