Electrical Engineering and Automation Practice Teaching Reform

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Abstract: Electrical engineering automation major has high requirements for engineering technology, and the teaching system of the major is mainly composed of theoretical knowledge learning and field practice. This article mainly analyzes the problems related to the reform of practical teaching in the teaching process of this specialty, and then briefly discusses the innovative reform of practical teaching of electrical engineering and its automation from the aspects of talent training and curriculum development.

Keywords: Electrical Engineering and Automation Teaching; Practice Base; Graduation Design; Improvement Measures

1. Introduction

The most striking feature of this major is its strong practicality. Electrical engineering related majors mainly train high-quality applied talents with relevant professional knowledge, natural science knowledge, human science knowledge, electronic information knowledge, computer professional knowledge, and strong innovation and practical ability for the society. Therefore, practical teaching is considered as an indispensable part of the teaching system of this specialty, which plays an important role in improving the students' practical innovation ability. If we want to improve the practice teaching level of this specialty, we must focus on the realization of the talents training goal of this specialty. At the same time, we also need to make some innovations in the practice teaching mode of this specialty.

2. Practical teaching of electrical engineering related majors

2.1 Relevant content of electrical engineering and its automation practice teaching system

After the school has implemented teaching rectification from the electrical engineering and automation majors, it has increased the proportion of practical lessons in the entire professional curriculum, and the credit percentage of practical teaching has been gradually increased to about 35%, which has increased the school's emphasis on practical teaching to a certain extent. Practical teaching mainly includes three aspects: teaching, learning, and doing. But these three parts are not the way to separate teaching, but to coordinate the three together, the so-called teacher is doing the teaching, students are doing the learning, so that teaching, learning, and doing the three can be developed in the practice link. The practice link also includes internships, experiments, practical training, and curriculum designs. The practice link is not only a key link in the teaching process, but also an important way to improve the quality of teaching.²

2.2 The advantages of electrical engineering and its automation practice teaching

Practical teaching has the following advantages: First of all, students can use practical teaching to deepen their impressions and understanding of the theoretical knowledge learned in the classroom, so that students can make good use of this training platform and strengthen their hands-on ability; Secondly, in this process, students can truly experience the working experience of electrical engineers, making them more interested in studying the major, thereby effectively playing their main role and learning to learn independently; Finally, practical learning is helpful to promote students' innovation and enhance their entrepreneurial ability. In short, the key to cultivating advanced applied talents is non-practical teaching, and this is consistent with the purpose of the school’s practical teaching. It can effectively improve the quality of teaching, open up a platform for student employment, and ensure that students can engage in work related to this major after graduation.

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2.3 The goal of electrical engineering and its automation practice teaching

The main employment direction of electrical engineering and automation is the front line of power industrial production. Cultivating advanced applied talents with solid theoretical knowledge, high comprehensive quality and strong practical ability is the teaching goal of this specialty. For example, field electrical engineers need practitioners to have the ability to design electrical systems, the ability to organize and implement engineering projects, and the ability to technically transform. However, the capabilities mentioned therein are refined into different capabilities. For example, the design ability is mainly based on the design of electrical equipment, electrical equipment, and electrical systems. This requires a high degree of mastery of students' professional theoretical knowledge and proficiency in the application. The field work ability is mainly the ability to test, install and debug. Electrical engineering and automation majors focus on this as the ultimate goal of teaching.[2]

3. Reform path of electrical engineering and automation practice teaching

3.1 Build a talent training model that meets the needs of socio-economic development

Scientifically positioning electrical engineering and its automation specialty is the key to innovation and reform of its talent training model. Schools should uphold certain principles and reform this model into a teacher-led teaching system and students as the main teaching system, and put the quality of teaching first, so as to achieve the goal of cultivating high-quality, high-skilled talents for relevant enterprises at the national level. At the same time, schools should always adhere to the cultivation of students' hands-on ability, so as to ensure the employment rate of the specialty and highlight its practicality.

This model accelerates the pace of reforming the curriculum system, mainly to train a group of talents who are adapted to the national economic development trend under the new teaching system, so as to achieve the comprehensive development of talents, it has become a national talent with ethics, ideals, strong professional skills, practical hands-on ability, and the ability to engage in related occupations[3].

In terms of the overall planning of teaching content, schools need to develop teaching estimates to enable students to have the following capabilities: ① While mastering professional skills, they have a solid foundation of humanities knowledge and a high level of language communication; ② To study the courses of this major well, no matter they are studying theoretical knowledge or developing practical ability, they must not be taken lightly, and they must also be proficient in computer office skills; ③ Understand the data analysis methods, engineering design methods and related experimental techniques of electrical engineering and other aspects of this specialty; ① Understand and analyze the situation of the industry at home and abroad, and clarify related policies and laws; ④ Analyze the employment prospects of the specialty and predict its future development trends; ⑥ Have a certain critical thinking ability, think in practice, provide bold and reasonable new ideas for practice in thinking.

The school should develop a teaching mode with school characteristics. Whether it is to build a learning platform or to train talents, it is necessary to continuously reform the teaching mode. At present, the school teaching system is dominated by theoretical learning and practical internship, which focuses on basic and professional practice. This requires the school to coordinate the two parts of the teaching, organically integrate the two, so as to develop the school's characteristic education.

3.2 Set up a reasonable curriculum system

In order to be consistent with the talent training model, electrical engineering and its automation specialty need to continuously make content reforms and means optimization. The so-called curriculum rectification is not simply to piece together the knowledge of all the courses, but to build a reasonable, effective and complete teaching curriculum system in a rational and well-founded way.

According to the different grades, this major has set up two learning platforms for students: one is the "public basic curriculum platform" and the other is the "professional basic curriculum platform". The former is mainly applicable to first and second-grade students; the latter is mainly aimed at the practical teaching of third and fourth-grade students, which lays the foundation for employment in the later graduation. These two learning platforms are set up to ensure that students can choose teaching courses according to their own strengths, and promote strengths and avoid weaknesses. While consolidating theoretical knowledge, students can also improve the level of hands-on operation in the field. In the same way, the "professional basic course platform" for the third and fourth grades focuses on the expansion of the professional direction, and provides related courses to provide students with a simulated employment choice module to achieve academic learning. Of course, in order to improve teaching efficiency, courses related to electrical engineering and automation should also be offered, such as courses in economics, humanities, and administration. [4]

3.3 Constantly improve the practice teaching system

Firstly, schools need to continuously reform the relevant content of practical teaching. In the process of reform and innovation, the principle that needs to be adhered to is "people-oriented", and then the subject content is flexibly allocated to supplement teaching. In order to encourage students to conduct experiments according to their own needs,
the school can adopt open experimental content and methods, and the laboratory is open at any time to provide a strong guarantee for the improvement of student operating skills.

Secondly, the school can divide the internship into two parts: cognitive internship and production internship, and use the combination of the two methods to provide students with good internship conditions to ensure that students can successfully complete the internship. In the part of cognitive internship, the school can organize students to visit the production models of outstanding companies; In the production practice link, based on cooperation with related enterprises, the school can provide students with opportunities for field operations, encourage students to follow the learning of enterprise employees, and improve students' practical operation ability.

Finally, pay attention to the topic of graduation design and related inquiry. The most effective and direct way to check the progress of students' related courses is the graduation design. Teachers provide some professional guidance and help when students determine the topic of graduation design, promote students to go to the company for internship according to the topic, and then carry out research and exploration of graduation design.

All in all, the electrical engineering and its automation major need to undergo further reforms to adapt to the development of the electrical information industry, and in the process, advance teaching reforms to make teaching methods and content more in line with the talent training goals of the major. A large number of examples show that electrical engineering and its automation specialty can only move towards a better future in the end by continuous reform and summing up development experience.

4. Conclusion

With the continuous progress of the reform of practical teaching, students’ comprehensive ability to use knowledge, practical ability and innovative ability have been improved to a certain extent. Experimental teaching is a non-negligible part of the entire curriculum. Therefore, although the practical teaching reform and innovation of electrical engineering and its automation specialty is a long process, universities are still exploring and researching.

References