Research on Reform and Innovation of Training Mode of Electrical Automation Professionals under the Background of New Engineering Disciplines

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Abstract

It has become the common voice of both schools and enterprises to cultivate intelligent electrical innovative talents under the background of intelligent manufacturing, and to reform, optimize and innovate the talent training mode. This paper starts with the problems that need to be solved in the talent training of electrical automation, and reforms and innovates the curriculum system and practical teaching system, so as to build a talent training mode of supporting industry, platform linkage and tutor cooperation, trying to provide a new perspective and reference sample for the talent training of new engineering disciplines.

Keywords

Talent training mode; Optimize and innovate; New engineering disciplines.

1. Introduction

In the context of the new economic development, the Internet, the Internet of Things, big data, artificial intelligence and other technologies have produced profound changes in the industrial production pattern, providing important conditions for promoting my country's industrial transformation and upgrading. Our country's industrial development is changing from "Made in China" to "Intelligent Manufacturing in China". Talents are an important support for promoting industrial development. Therefore, it is necessary to strengthen the training of engineering talents and cultivate professionals who meet the needs of industrial development. The development of Zhejiang's manufacturing industry urgently needs a large number of intelligent electrical talents and technical support focusing on automatic production line and intelligent technology. The electrical industry, Wenzhou’s largest pillar industry, also urgently needs a large number of intelligent electrical talents and technical support focusing on intelligent electrical apparatus development and application technologies.

In order to accurately match the regional development strategy, lead the transformation and upgrading of the electrical industry, and provide technical and talent support, it is necessary to break the traditional electric automation talent cultivation concept, establish a new talent training model, and cultivate intelligent electric innovative talents that adapt to economic development. The electrical automation major jointly run by Wenzhou University and Wenzhou Polytechnic and Technical College is based on the needs of regional electrical industry transformation and upgrading, and relies on the advantages of the school's technological innovation platform to realize the linkage of the three major platforms of "technological innovation service platform, productive training base, and industry-education alliance". "Teacher tutor, senior tutor, and enterprise tutor" coordinated to educate people to cultivate intelligent electrical technical talents with technical innovation, skill innovation and job innovation.
2. Training Model Reform

2.1. Build A Deep-Linked "Industry-University-Research and Innovation" Platform System

This major has led the construction of three provincial-level science and technology service platforms, two provincial-level enterprise research institutes, ten school-enterprise R&D centers, one national productive training base. It has established an intelligent manufacturing industry teaching alliance of government, school, enterprise and enterprise with Wenzhou electric industry and its gathering place, Yueqing, Wenzhou. Science and technology innovation service platform, productive training base and Industry Education Alliance are linked and coordinated to educate people, forming a long-term and in-depth industry education cooperation relationship between specialty and industry.

Relying on the technological innovation service platform of enterprises and their technical teams, the students are trained to develop their special skills in the research and development of technical application of production line and electrical products, and gradually have the ability of technological application and innovation to develop new functions of products. Relying on the productive training base, the students will be trained with the basic knowledge and skills required for technical services for the electrical industry, so that the students can develop expertise in electrical product quality control and adjustment, production line adjustment and maintenance and other skills, and gradually develop the ability of skills innovation to expand new uses and uses of skills. Relying on a large number of cooperative enterprise resources in the electric industry production and teaching alliance, students are arranged to carry out production practice projects in the production and R & D front line of the enterprise. Under the joint guidance of enterprise tutors and school tutors, the students' strong post adaptability, occupation post migration ability and creativity ability are cultivated. The specialty and industry support each other, integrate and develop, educate, employ, innovate and develop cooperatively.

2.2. Optimize the Ability Progressive Course System

The demand for intelligent transformation and upgrading of the electrical industry, serving "intelligent products" and "intelligent production", realizing from "single technology" to "comprehensive technology" to "technical innovation", building a progressive curriculum system that provide talents and technical support for corresponding positions with different emphasis.

Take the electrical automation technology major as an example. This major provides technical skills support for intelligent control of automated production lines. In the first and second semesters, it mainly offers basic courses of "electrical control", including electrical and electronic technology, automatic detection technology, and single-chip technology, Programming, etc.; In the third and fourth semesters, it mainly offer courses on the application of single technology of "intelligent control" of production line, including intelligent sensing technology, electrical control and PLC technology, motion control technology, etc.; in the fifth and sixth semester, it mainly offer courses in the comprehensive application of "intelligent control" of production lines, including automatic production line technology and intelligent production line technology, etc.; in the seventh and the sixth semester, it will mainly offer courses on the comprehensive application of "intelligent control" of production lines in the eighth semester, it mainly set up the innovation and practice of "intelligent control of production line" technical skills, including graduation design and post practice. The course modules are layered and progressive, step by step, and gradually cultivate students' technological innovation, skill innovation, and job innovation ability. In the design of the ability module curriculum teaching standard, the "1+X" certificate skill points and knowledge points
are deconstructed and integrated into the ability course credits, and the pilot of the "1+X" certificate should be seamlessly connected. At the same time, the credit management regulations of professional elective courses should be further improved to realize credit exchange, and students should be guided to acquire skills certificates in multiple fields on the basis of mastering core technical skills of electrical major, so as to grow into compound talents.

2.3. Deepen Practical Teaching Reform

This major has established a national-level productive training base, which includes basic training rooms such as electrical and electronic training rooms, professional training rooms such as intelligent control, automated production lines, smart appliances, and the Internet of Things, equipment Intelligent Technology Collaborative Innovation Center, industrial automation application research and development center, Internet of things application research and development center and skilled master studio. Through the collaborative innovation of bases, platforms and studios, we should deepen and improve the practical teaching system based on training, driven by R & D, and guided by innovation and entrepreneurship. "Learning by doing" and "learning by exploring" should be extended to "creating in doing" and "creating in exploring". "Innovation in doing" means to carry out practical teaching of real projects related to intelligent electrical products and intelligent production lines relying on professional training base, R & D platform and skill master studio. All teaching projects come from mature teaching cases such as enterprise technical transformation projects and skills competition projects. "Exploration in innovation" means that students join the tutor project team of R & D platform and master studio. Under the guidance of tutors and teams, they carry out real innovation and entrepreneurship project practice related to intelligent electrical, and gradually change from follow-up to independent innovation and carry out scientific and technological entrepreneurship.

2.4. Promote the Teaching Method of "Mentor + Project + Team"

Further promote the implementation of the "mentor + project + team" teaching method, and cultivate talents with technical skills. Take real projects, such as enterprise technical transformation projects, skills competition projects, etc., and their teams as the carrier to cultivate students' technical skills and practical skills and craftsmanship. The students are included in the project teams of different teachers, and the teachers of the team are the tutors to carry out the real project practice related to the intelligentization of electrical products and production lines. Students are integrated into the tutor team in the of practice. Through the real project experience, the technical skills are gradually mature, which can guide the new junior students in the project team and play the role of "mentor". Different types of tutors coordinate to guide students, professional tutors are responsible for project technical route design, software and hardware system framework design, technical control of key and difficult points, and other technical routes; the enterprise tutor is responsible for the guidance of the actual process and specification of the first-line electrical industry; the senior tutor is responsible for the guidance of specific technical points such as electric circuit construction, control program development, debugging and installation, etc. Based on the implementation, the cooperation atmosphere, rigorous style and pioneering spirit of the project team are the important factors to promote students to develop craftsmanship spirit.

3. Training Model Innovation

3.1. Three Platforms Linkage and Collaborative Education

Relying on regional pillar industries, build a deep-linked platform system of "industry-university-research-innovation" and focus on talent training. In the process of serving industrial technology upgrades and solving the actual technical problems of enterprises,
professional teachers and students will build a pillar industry-industry-education alliance, productive training base, technological innovation service platform to form an organic education platform system integrating industry, education, research and innovation. The in-depth linkage of similar platforms gathers and cultivates innovative talents in intelligent electrics.

Depending on the productive training base, teachers and students can acquire the basic knowledge and skills needed to provide technical services for the electrical industry, as well as relevant experimental and testing conditions. Relying on the service platform of science and technology innovation, it carries out the technical service project of "production line + product intelligence" for the electrical industry. Relying on the science and technology start-up company of Mass innovation space, it provides automatic production equipment and electrical products matching for the electrical industry chain. The electric industry Production and Education Alliance provides the above three platforms with technical innovation and technology demand, entrepreneurial market space, talent demand, talent resources, etc., so as to realize the integration of technology chain and talent chain between the electrical industry and electrical majors.

3.2. "Three Mentors" Linkage and Collaborative Education

The "teacher tutor + senior tutor + enterprise tutor" tutor system is constructed for collaborative education, which is driven by solving practical problems restricting the development of enterprises. The teaching method of "tutor + project + team" is implemented to realize the mutual combination and mutual support between in-class course teaching and after-class project education.

Each project team, the teacher tutor is responsible for the technical route design, the key technical breakthrough and project team management, enterprise supervisor is responsible for the production line actual business requirements and technology guidance, senior tutor led technology development of normal students and is responsible for the specific technical guidance, to achieve quality, skills, methods, combination of cultivation and employment guidance.

4. Conclusion

According to the needs of regional electrical industry transformation and upgrading, this major builds a deeply interconnected platform system of "industry-University-Research-Innovation". Based on the progressive course system of "intelligent product + intelligent production", this major deepens the integrated practice teaching reform of "training research and innovation" and promotes the teaching mode of "tutor + project + team". The three platforms of "science and technology innovation service platform, productive practical training base and industry-education alliance" are interconnected, and the three parties of "teacher tutor, senior tutor and enterprise tutor" are cooperating to cultivate talents with intelligent electrical technical skills with technical innovation, skill innovation and post innovation, providing new perspectives and reference samples for the training of new engineering talents.

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