Academic Journal of Management and Social Sciences
ISSN: 2958-4396 | Vol. 10, No. 3, 2025

Research on the Construction of Talent Training Platform for On-site Engineers in Electrical Appliances Major in Vocational Education

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Abstract: This article focuses on the construction of a talent training platform for on-site engineers in vocational education and electrical appliances majors. Against the background of global economic integration and scientific and technological revolution, the transformation and upgrading of the manufacturing industry has prompted a surge in demand for on-site engineers. Although the state and local governments have introduced relevant policies to promote the training of on-site engineers, there are still many problems in terms of training standards, organizational structure and school-enterprise cooperation. The training of on-site engineers majoring in electrical appliances faces difficulties such as high requirements for practice sites, insufficient hours, and difficulties in maintaining and upgrading training sites. To this end, this paper puts forward the necessity of building a practical platform for electrical field engineers, and expounds in detail the construction of the talent training platform from three dimensions: accurately positioning talent training, promoting students 'comprehensive development and high-quality employment, and realizing collaborative education inside and outside the school. Path, aiming to provide reference for vocational colleges to cultivate field engineers who meet the needs of enterprises in the context of intelligent industries.

Keywords: Construction of “Five Key Components”; Field Engineers; Talent Training Platform; Vocational Education.

1. Introduction

In the process of deep integration of global economic integration and a new round of scientific and technological revolution, the digitalization and intelligent transformation of manufacturing is becoming the core engine in reshaping the global industrial landscape. As indispensable professional and technical talents in the manufacturing industry, on-site engineers shoulder the important task of improving the production efficiency of enterprises, ensuring product quality, and enhancing innovation capabilities. In September 2022, the General Office of the Ministry of Education and other five departments issued the "Notice on Implementing the Special Training Plan for On-site Engineers in Vocational Education". The document proposes to target technical positions in key fields where talents are scarce under digital and intelligent occupational scenarios, and match vocational education resources[1-3]. By 2025, a total of no less than 200,000 on-site engineers with craftsmanship spirit, sophisticated operation, understanding craftsmanship, management, good collaboration, and innovation will be cultivated. As a strong economic province and a major manufacturing province in China, Zhejiang Province launched the "First Batch of Special Training Plan Projects for On-Site Engineers" in June 2024. For Zhejiang, accelerating the training and introduction of on-site engineers and building a team of high-quality skilled talents is not only an inevitable requirement to promote the high-quality development of Zhejiang Province's manufacturing industry and achieve economic transformation and upgrading, but also a strategic measure to enhance Zhejiang Province's competitiveness in the national and even global manufacturing industry. The electrical appliance industry is a dominant industry in Wenzhou, Zhejiang Province. It is also an important starting point for the Zhejiang Province and Wenzhou Municipal Government to build a world-class advanced manufacturing cluster and build a modern industrial system. Wenzhou is the largest low-voltage electrical industry base in the country, with 11 state-owned electrical industry gold business cards such as "Electrical Capital of China" and a national-level electrical industry base. In order to respond to the new challenges brought by the scientific and technological revolution and industrial transformation to the training of on-site engineers, this paper proposes to build a practical platform for on-site engineers in vocational education and improve the engineering practical application capabilities of vocational education intelligent electrical talents. The purpose is to provide reference for vocational colleges on how to cultivate on-site engineers who meet the real needs of enterprises in the context of intelligent industry.

2. Overview of Vocational Education Field Engineers

On April 27, 2022, Chen Ziji, former director of the Vocational Education and Adult Education Department of the Ministry of Education, said at a press conference to introduce the newly revised "Vocational Education Law of the People's Republic of China": It is necessary to launch the implementation of the "Special Training Plan for On-site Engineers" and take the lead in accelerating the training of on-site engineers for digital, networked, and intelligent career scenarios in areas where talents are scarce such as advanced manufacturing. It can be seen that vocational education on-site engineers focus on digital, online and intelligent pharmaceutical industry application scenarios. Vocational education on-site engineers are based on the apprenticeship system with China characteristics and aim to cultivate high-quality engineering talents with the ability to solve complex problems on site as soon as possible, focusing on practicality. On-site engineers are exclusive talents in my country's

engineering field and engineering departments. Vocational education on-site engineers are high-quality engineering talents trained relying on the vocational education system. The position of an enterprise on-site engineer can be described as "responsible for technical support from the site, technical debugging of new products and technical support for large project projects, solving technical difficulties on the site, coordinating and handling quality feedback, and preparing relevant on-site information and on-site process document". The current emphasis on the training of on-site engineers in vocational education is not only a rational appeal for the development of vocational education itself, but also a realistic need for industrial upgrading and economic development.

3. Blocking Points in the Execution Process of Vocational Education On-Site Engineers

Vocational education on-site engineers are still a "new business", and some issues in the specific practice implementation process need to be sorted out and refined to ensure the smooth completion of the training goals.

3.1. Training Standards and Organizational Structure Need to be Clarified

Although the "Notice on Implementing the Special Training Plan for Vocational Education On-site Engineers" has determined the overall thinking, work goals, key tasks, and organization and implementation from a macro level, this belongs to a "top-level design. [4-5]" There are no clear requirements in terms of specific training standards, organizational framework, and practical implementation rules. In particular, the training standards, as the ultimate goal of talent training, are the main basis for assessing whether the talent training process plays an effective function. Vocational education on-site engineers are high-quality engineering and technical talents. Unlike technical and skilled talents, separate training standards need to be formulated. In addition, the organizational structure for training on-site engineers in vocational education has not yet been established. The organizational structure is related to enrollment, professional setting, project selection, etc. Only by clarifying the management subject, training subject, docking subject and other organizations can we achieve clear rights and responsibilities and clear functions during the training process of on-site engineers in vocational education.

3.2. The Motivation for Two-Way Education Between Schools and Enterprises is Still Insufficient

Vocational education on-site engineers are inseparable from both schools and enterprises. Only the deep integration of schools and enterprises can we successfully cultivate on-site engineers who meet the requirements. Vocational education on-site engineers use the apprenticeship system with China characteristics as the main form of training. At present, my country's modern apprenticeship system and policy guarantees are not sufficient, such as insufficient special funds, lack of specialized institutions to coordinate, lack of clear systems, and imperfect incentive measures, resulting in schools and enterprises It is difficult to jointly implement the modern apprenticeship system. If the modern apprenticeship system fails to make further breakthrough progress and the main role of enterprises in educating people cannot be effectively exerted, it will be difficult for the training of on-site engineers in vocational education to achieve the expected results.

4. Difficulties in Training On-Site Engineers in Vocational Education for Electrical Appliances Majors

The training of on-site engineers majoring in electrical appliances faces many challenges at the practical level, and these difficulties restrict the improvement of the quality of talent training.

4.1. High Requirements for Practice Venues

Electrical majors need to master practical abilities in electrical assembly, electrical testing, electrical communication, complete electrical application, etc., and must have higher and more advanced engineering practice sites as teaching support. Due to the professional characteristics, virtual simulation and other methods cannot replace some practical training that requires real practical equipment. For example, at a time when the fields of intelligent electrical appliance integration, miniaturization and intelligent application of electrical appliances, and smart electricity are developing rapidly, the professional engineering practices of electrical appliances in many multi-vocational colleges are still based on traditional basic training content such as electrical assembly and assembly and motor control., cannot meet the actual needs for talents on future engineering sites.

4.2. High Standard Hours for Practice

At present, a common problem faced by electrical engineering majors is that the hours of practical courses are being compressed and the hours of general and public courses are increasing. Since many practical training projects require a whole week or even multiple weeks of practical training to achieve good practical results, such as practical teaching such as the installation and adjustment of complete sets of electrical appliances, due to insufficient course hours, some comprehensive practical training content can only be abandoned. The insufficient intensity of engineering practice training leads to a disconnect between engineering practice training and the project site and cannot adapt to the needs of society and industry.

4.3. It is Difficult to Maintain and Upgrade the Training Site

The construction cost of practical teaching on campus is high. It not only requires a large area of space, but also faces a long construction period. Subsequent maintenance costs are also a huge expense. Taking the construction of a smart electrical appliance application training site as an example, relevant training management personnel should be configured after completion, otherwise the serviceability of the equipment and the safety of the site cannot be guaranteed, which further exacerbates the maintenance and upgrading of the training site. difficulty.

5. Construction Path of Talent Training Platform for Electrical Field Engineers

5.1. Accurately Positioning The "Portrait of High-Skilled Talents" to Improve the Pertinence and Adaptability of Talent Training

(1) Diversified linkage makes industrial demand data scientific and accurate. Through closely connected enterprises, electrical industry surveys, graduate surveys, etc., we obtain data such as industrial development trends, new technology application trends, and corporate job needs to form basic data for the "portrait of high-skilled talents" of electrical appliances.

(2) Guided by industry needs, accurately position talent training specifications. Establish a steering committee for the construction of electrical appliances majors, formulate development plans, clarify the responsibilities of all parties, and ensure that the direction of professional construction is closely integrated with industrial needs. According to the requirements of knowledge, skills, and professionalism in the "Portrait of Highly Skilled Talents" of electrical appliances, adjust professional curriculum settings, teaching methods and assessment and evaluation methods to cultivate students to master advanced technologies and management concepts.

(3) Establish a linkage mechanism for the adjustment of "portraits of high-skilled talents" in electrical appliances and the training and training of professional talents. Based on the portraits of highly skilled talents, formulate professional adjustment goals and directions. Establish a committee composed of experts from schools, closely affiliated enterprises, and the electrical industry to be responsible for comprehensively planning and making decisions on the adjustment of professional talent training plans.

(4) Build a closed-loop management system for electrical professional adjustment. From smart electrical talent demand survey, professional setting demonstration, curriculum system design, teaching implementation to talent training quality evaluation, a complete closed loop is formed. Regularly evaluate the effectiveness of talent training, and promptly adjust the professional structure and talent training plan based on the evaluation results to improve the adaptability of talent training. According to the practical ability requirements in the "Portrait of Highly Skilled Talents", we actively introduce real projects from enterprises to improve students 'practical ability.

5.2. "Five Key Elements [6]" is Integrated and the Four Parties Work Together to Promote Students 'All-Round Development and High-Quality Employment

(1) Strengthen the training of on-site engineers. Strengthen the connection between curriculum and practice, and build a number of practical training bases derived from industrial practice, so that students can improve their ability to apply new electrical technologies in real work scenarios. At the same time, corporate engineers are introduced as mentors to impart new electrical technologies and engineering practical experience to improve students 'professional skills and engineering literacy.

(2) Carry out in-depth practice of apprenticeship with China characteristics. Professional and closely cooperative enterprises jointly build industrial colleges and training bases, jointly formulate talent training plans, and achieve accurate matching of professional settings with industrial needs. Actively carry out industry-university-research cooperation and promote technological innovation and achievement transformation. Carry out order-based training and apprenticeship training with China characteristics with close cooperation enterprises to make the talent training of intelligent electrical technology professional groups more in line with the actual needs of enterprises, enhance the pertinence and adaptability of talent training, and improve the quality of student employment.

(3) Closely focus on the development of the electrical industry, strengthen the adjustment and optimization of professional settings, and create a "golden profession". Clarify the training positioning of professional talents. Based on regional economic development and industrial needs, determine the goal of cultivating high-quality technical and skilled talents in electrical appliances majors. Refine the talent training specifications. Develop specific knowledge, skills and quality requirements based on job needs. Through the construction of the curriculum system and the design of practical teaching links, the precise positioning of talent training goals and specifications can be achieved.

(4) Build a "three-modernizations integration" curriculum system and create a number of gold courses. Implement "integration of three modernizations". Guided by the digitalization and intelligence of the electrical industry, we will embed the "three modernizations" new technologies of digitalization, intelligence and green into the professional curriculum system to promote the deep integration of new digital and intelligence technologies and electrical technologies. Implement "curriculum and certification integration". Integrate "Vocational Skills Level Certificate" into the curriculum system to realize the connection between academic certificates and vocational certificates. Implement "integration of classes and competitions". Linking competitions such as new power system technologies and applications, professional course teaching standards have built-in skills competition course modules, forming a parallel channel for rapid transformation of competitions and "tasks", teachers and "coaches", students and "players", and classrooms and "venues"., allowing modular teaching to be deeply cultivated and providing a solid foundation for creating a "golden course".

5.3. "Data-based Personality Training", Cultivating Talents Inside and Outside Schools

(1) Accurately evaluate to determine the path. Through big data analysis and other methods, we can understand the characteristics of students and outline an exclusive learning blueprint for each student. Create a "digital brain" and build a personalized learning path through intelligent evaluation. Guide students to explore independently. Based on students 'learning behavior data, accurately recommend appropriate learning resources and activities, teach students in accordance with their aptitude, and create a personalized learning experience for students.

(2) Integrate standards to improve quality. Closely combine the job ability map of electrical professional positions, and organically integrate job requirements and electrical

enterprise skill standards into professional talent training plans. What students learn will be more targeted and practical, and better adapt to future career challenges.

(3) Flexible modules to meet needs. Design flexible course modules based on the learning needs and progress of different students. Course modules can be reasonably combined and adjusted according to the specific conditions of professional students to meet the learning needs of different students. For students with rapid learning progress, extended course modules are provided to stimulate their innovative thinking and exploration spirit; for students with weak foundations, basic knowledge and skill modules are strengthened to help them gradually improve. Student-oriented, skillfully use digital technology, create flexible curriculum modules, and realize the key path of teaching students in accordance with their aptitude and building high-quality talents in smart electrical appliances.

6. Conclusion

This paper focuses on the construction of a talent training platform for on-site engineers in electrical appliances majors in vocational education. It elaborates on the platform construction from multiple dimensions such as accurately positioning talent training, promoting students 'comprehensive development and high-quality employment, and realizing collaborative education inside and outside the school. Specific path and implementation strategies. By building a "portrait of high-skilled talents", we can accurately match the needs of the industry, consolidate the foundation of professional development with the integrated construction of "hardware", and use "data-based personality training" to meet students 'personalized growth needs. This series of measures aims to cultivate more on-site engineer talents for vocational colleges in the context of intelligent industries that meet the real needs of enterprises, and contribute the power of vocational education to promote the transformation and upgrading of the manufacturing industry and enhance the competitiveness of the country's industries. In the future, we need to continue to pay attention to industrial trends and continuously optimize the talent training platform to adapt to the rapidly changing industry needs and inject a steady stream of vitality into the development of vocational education electrical majors.

Acknowledgments

This work was funded by the Wenzhou Polytechnic "Fourteenth Five-Year Plan" Teaching Construction and Teaching Reform Research Project, the project number: WZYZD202203. This work was also funded by the Vocational Education Research Plan of the National Electric Power Industry Teaching Steering Committee (Project Number: HZW2023002).

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