

The New Apprenticeship-based Employment and Internship Base for Intelligent Manufacturing Enterprises

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Abstract

This paper focuses on the new apprenticeship - based employment and internship base for intelligent manufacturing enterprises jointly established by YX Semiconductor (Ningbo) Co., Ltd. and Zhejiang Dongfang Vocational and Technical College. Against the backdrop of the national policy of emphasizing the training of skilled talents, and combining the development needs of enterprises and the advantages of school educational resources, the construction of the base aims to achieve the linkage between employment and training, and the effective connection between supply and demand. The expected goals are elaborated, including the co - construction of training bases, the implementation of apprentice training, the development of courses and the cultivation of order - based classes. The construction content includes the establishment of training plans and curriculum systems, and the construction of training bases. The operation mechanism and guarantee measures are analyzed, highlighting the dual - principal - body role of the school and the enterprise in education and the multi - faceted guarantee function. The positive effects and far - reaching impact of the base on enterprises' competitiveness, students' employability and the school's educational reform are discussed, and the future prospects of deepening cooperation is forecasted, providing reference examples for relevant fields.

Keywords

Intelligent Manufacturing; New Apprenticeship System; Employment and Internship Base; School - Enterprise Cooperation.

1. Introduction

In the era of the vigorous development of the intelligent manufacturing industry, skilled talents have become the core element driving the continuous upgrading of the industry[1]. The new enterprise apprenticeship system, an innovative and highly promising talent training model, skillfully integrates the advantages of enterprise practice and school education. The new apprenticeship - based employment and internship base jointly established by YX Semiconductor (Ningbo) Co., Ltd. and Zhejiang Dongfang Vocational and Technical College is undoubtedly an active exploration and vivid practice of this innovative model in the field of practice . It not only helps solve the problem of shortage of skilled talents in enterprises but also provides students with a vocational education path that better meets actual needs, which is of profound significance for promoting the high - quality development of the intelligent manufacturing industry[2].

2. Base Construction Background and Significance

2.1. Policy Background

The state and local governments actively advocate the training of skilled talents and have introduced a series of incentive policies. The "Implementation plan for the New Enterprise Apprenticeship System in Zhejiang Province" formulated by Zhejiang Province aims to

comprehensively promote enterprises to carry out large - scale skill talent training and improve the pertinence and effectiveness of training. The relevant implementation rules issued by the Ningbo Municipal Bureau of Human Resources and Social Security have included the training subsidies for the new enterprise apprenticeship system in the skill training subsidy project, providing support at the economic level. The notice issued by the Ministry of Human Resources and Social Security also clearly states that it is necessary to strengthen and improve this system. These policies create a favorable policy environment for the construction of the school - enterprise cooperation employment and internship base and provide solid policy basis and guarantee.

2.2. Industrial Background

YX Semiconductor (Ningbo) Co., Ltd. focuses on the fields of integrated circuit packaging and testing, especially in high - end packaging and advanced packaging technology. With the rapid development of intelligent manufacturing technology and the acceleration of industrial upgrading, enterprises have an urgent demand for skilled talents with advanced technical capabilities and comprehensive qualities. For example, in the advanced packaging process, employees need to be proficient in high - precision equipment operation and complex process management, which puts forward higher requirements for talent training and also highlights the importance of the construction of the employment and internship base to meet the talent needs of enterprises.

2.3. Educational Background

Zhejiang Dongfang Vocational and Technical College has rich and diverse educational resources. Its School of Intelligent Manufacturing covers multiple majors such as electrical automation technology and intelligent control technology[3]. These majors are highly compatible with the employment needs of manufacturing enterprises, and the college sends a large number of professionals to the industry every year. However, there is a certain disconnect between the traditional education mode and the actual needs of enterprises. Through the school - enterprise cooperation to build an employment and internship base, the college can better combine teaching with practice, optimize the curriculum setting and teaching methods according to the feedback from enterprises, and improve the practicality and effectiveness of talent training, providing a solid bridge for students from campus to the workplace[4].

3. Expected Goals of the Base

3.1. Co - construction of Training Bases

The construction of the training base aims to create a comprehensive platform integrating teaching, practice, and scientific research. The enterprise provides advanced venues and equipment, such as high - precision packaging and testing equipment, to provide students and employees with a real working environment. The school invests high - quality teaching staff and rich course training resources, complementing each other's advantages. Through co - construction, the organic integration of practical teaching and theoretical teaching is achieved, and the practical operation ability and problem - solving ability of students and employees are improved, laying a solid foundation for the cultivation of high - quality skilled talents.

3.2. Carry Out Apprentice Training

Adopt the enterprise - school dual - system and work - integrated learning mode, giving full play to the practical advantages of enterprises and the theoretical teaching advantages of schools. Enterprise masters teach practical operation skills and industry experience in the production line, while school teachers strengthen students' foundation in theoretical courses. Provide systematic job - skills training for enterprise employees every year to help them keep up with

the pace of technological development. At the same time, provide students with internship and practice opportunities, enabling them to exercise in real work scenarios, and cultivate practical talents who understand both theory and practical operation, meeting the enterprise's demand for different levels of skilled talents.

3.3. Develop Training Courses

The school and enterprise closely cooperate, conduct in - depth research on enterprise job requirements and industry development trends, and jointly develop training course outlines, teaching designs, and supporting teaching resource libraries. The course content is closely centered around the actual work tasks and skill requirements of the enterprise, and the latest industry standards and technological trends are incorporated. For example, in the integrated circuit packaging course, the relevant knowledge of advanced packaging technology is updated in a timely manner. Through the co - construction and sharing of teaching resources, ensure that the training content is accurately connected to the enterprise's needs, improve the pertinence and applicability of talent training, and cultivate professional talents who meet the enterprise's job requirements.

3.4. Order - based Class Training

Sign an order - based class training agreement. According to the enterprise's talent demand plan, select a certain number of students from the school every year and form order - based classes for targeted training. The school and enterprise jointly formulate the training plan, and the enterprise participates in the teaching process, providing internship positions and practical guidance. Students clarify their employment direction during the learning process and directly enter the enterprise for employment after graduation, achieving the seamless connection between talent cultivation and enterprise demand, providing the enterprise with scarce high - quality skilled talents, and at the same time improve the quality and stability of students' employment.

4. Construction Content of the Base

4.1. Training Plan and Curriculum Construction

In - depth enterprise research is the cornerstone of building a scientific and reasonable training plan and curriculum system. The school - enterprise parties need to organize professional teams to go deep into the production line of YX Semiconductor (Ningbo) Co., Ltd. Through interviews, observation, questionnaires and other methods to comprehensively understand the work processes, technical requirements and employees' skill status of various positions in the enterprise. For example, in the integrated circuit packaging position, the operation points of different packaging processes and the setting of equipment parameters are carefully mastered. Based on the research results, a skill - improvement training plan is jointly developed, clarifying the training objectives, content, methods and progress arrangement. The job content is decomposed into specific project tasks. For example, the chip packaging process is decomposed into chip mounting, wire bonding, encapsulation testing and other projects, and each project is further refined into several sub - tasks. According to the task requirements, a customized training curriculum system including theoretical knowledge, practical skills and professional quality training is constructed. In the curriculum design, the job - ability requirements are transformed into teaching objectives, the work content is incorporated into teaching cases, and the assessment methods are connected with the training evaluation methods to ensure the consistency of learning and application. Carefully write the training plan and curriculum standards, clarify the teaching syllabus, teaching key points, teaching method suggestions and assessment and evaluation indicators of each course, provide comprehensive and accurate guidance for the training work, and improve the scientificity, standardization and efficiency of

training, so as to cultivate high - skilled talents with solid theory and excellent skills for the enterprise.

4.2. Construction of the Training Base

The construction of the training base is closely centered around the school's majors and enterprise needs. Students majoring in electrical automation technology, intelligent control technology and other majors in the school have certain knowledge reserves and practical hands - on abilities in circuit principles, automatic control, motor drive and other aspects. The enterprise has high requirements for the installation, debugging and maintenance of the electrical system in the process of integrated circuit packaging and testing. Taking the cultivation of electrical skills as a core breakthrough can effectively meet the needs of both parties. The school invests more funds to build an electrical examination and training room according to high standards, equipped with complete and advanced electrical training equipment such as intelligent electrical experimental platforms, electrical control system training devices, electrical tools and measuring instruments. These devices can not only meet the basic electrical skill training of intern students, such as circuit connection, electrical component identification and detection, but also meet the needs of enterprise employees to improve their electrical skills, such as the diagnosis and troubleshooting of complex electrical systems. During the training process, a teaching mode combining theoretical learning and practical operation is adopted. First, through theoretical courses, electrical principles, electrical safety knowledge, circuit design methods, etc. are explained, and then students and employees are arranged to operate on the training equipment, such as installing and debug the electrical system according to the circuit diagram and conduct performance tests. Through repeated practice, their solid electrical skills are cultivated, and their abilities in electrical system installation, debugging and maintenance are improved, providing technical support for the stable operation of enterprise production, promoting enterprise technological innovation and production efficiency, and at the same time providing students with a good practical platform to enhance their employment competitiveness.

4.3. Construction of the Teaching Staff

The teaching staff is a key factor in ensuring the training quality of the base. The school and enterprise jointly strive to build a high - quality and professional "double - type" teaching staff. On one hand, the school sends backbone teachers to practice in enterprises, participate in enterprise production projects, technical research and employee training, etc., understand the latest industry trends and actual enterprise needs, and improve practical teaching ability. For example, teachers participate in the electrical control system upgrade project of integrated circuit packaging equipment in the enterprise and integrate the actual project experience into teaching. On the other hand, the enterprise selects technical experts and skilled craftsmen with excellent skills and rich experience to serve as part - time teachers, come to the school to carry out practical teaching, case analysis and skill guidance. These part - time teachers can impart advanced technologies, operation skills and industry standards in actual work. At the same time, a teaching staff training and communication mechanism is established. Teachers are regularly organized to participate in industry training, academic seminars and other activities to promote experience sharing and knowledge update among teachers. In addition, the school and enterprise jointly formulate teaching staff assessment and evaluation standards, and assess teachers from multiple dimensions such as teaching ability, practical ability and enterprise satisfaction, to encourage teachers to continuously improve their own quality and ensure that the teaching staff always maintain a high - level teaching ability, providing a strong guarantee for the cultivation of skilled talents to meet the needs of intelligent manufacturing enterprises.

4.4. Construction of the Quality Monitoring and Evaluation System

Constructing a sound quality monitoring and evaluation system is crucial for ensuring the construction and operation effect of the base. During the training process, multiple quality monitoring nodes are set up. Before class, the teaching plans and teaching plans of teachers are reviewed to ensure that the teaching content meets the requirements of the training plan. During class, through teaching supervision, student evaluation and enterprise feedback, the teaching quality is monitored in real time, and problems in the teaching process such as improper teaching methods and unreasonable teaching progress are promptly discovered and solved. After class, the students' homework, test scores and practical operation results are analyzed and evaluated to understand the students' mastery of knowledge and skills. At the same time, a comprehensive evaluation index system is established, including the implementation of the training plan, the rationality of the curriculum system, the utilization rate of the training base equipment, the teaching effect of the teaching staff, students' learning achievements (such as skill improvement level, professional quality cultivation, employment situation, etc.) and enterprise satisfaction. Regular evaluation work is carried out. According to the evaluation results, experience and lessons are summarized, and the training plan, curriculum setting, teaching methods and training base construction are adjusted and optimized in a timely manner, forming a continuous improvement closed - loop management mechanism. Through effective quality monitoring and evaluation, the construction level and training quality of the base are continuously improved, and more high - quality skilled talents are cultivated for the enterprise and society.

4.5. Innovation and Expansion of the Cooperation Mechanism

In order to make the base construction more dynamic and sustainable, the school and enterprise actively explore the innovation and expansion of the cooperation mechanism. In terms of the cooperation mode, in addition to traditional apprentice training and order - based class training, try to carry out industry - university - research cooperation projects. For example, jointly carry out scientific research projects related to integrated circuit packaging technology. The school uses its scientific research resources to solve technical problems for the enterprise, and the enterprise provides the school with a scientific research practice platform and data support, realizing the in - depth integration of industry - university - research. In terms of the scope of cooperation, gradually expand from single skill training to the whole chain of talent cultivation, including students' career planning guidance, innovation and entrepreneurship education, etc. The two parties jointly hold career planning lectures, entrepreneurship competitions and other activities to cultivate students' career development awareness and innovation and entrepreneurship ability. In addition, actively expand external cooperation and exchanges, establish cooperation relationships with other enterprises, universities, industry associations, etc., share resources and develop together. For example, carry out skill competition and exchange activities with enterprises in the same industry to promote the improvement of students' and employees' skill levels. Carry out cooperation such as curriculum co - construction and teacher exchange with other universities to broaden the cooperation vision and enhance the influence of the base. Through the innovation and expansion of the cooperation mechanism, continuously enrich the connotation of the base construction and improve the competitiveness and service ability of the base.

5. Operation Mechanism and Guarantee Measures of the Base

5.1. Operation Mechanism

Establish a dual - principal - body mechanism for school - enterprise cooperation in talent cultivation, clarify the responsibilities and rights of both parties in talent cultivation. The

enterprise deeply participates in the enrollment process, puts forward selection standards according to its own needs. In the teaching process, enterprise masters and school teachers jointly teach, imparting practical experience and theoretical knowledge. In the assessment process, both parties jointly formulate evaluation standards to comprehensively evaluate students' learning achievements. Adopt an alternating work - study teaching mode. Students study theoretical knowledge in school in stages and conduct practical operations in enterprises, realizing the in - depth integration of theory and practice. For example, after students study theoretical courses such as circuit principles in school, they enter the enterprise to participate in the actual installation and debugging of the circuit system to improve their practical ability.

5.2. Guarantee Measures

A special school - enterprise cooperation management institution is established to be responsible for overall coordination of various affairs in the construction and operation of the base to ensure the smooth progress of cooperation. A sound teaching staff construction mechanism is established. By sending teachers to practice in enterprises, hiring enterprise technical experts as part - time teachers, etc., build a "double - type" teaching staff with solid theoretical foundation and rich practical experience. At the same time, improve the quality monitoring and evaluation system, monitor and evaluate from multiple dimensions such as the teaching process, students' learning effect and enterprise satisfaction, and timely discover problems and adjust and optimize to ensure the training quality and talent cultivation effect, providing a strong guarantee for the sustainable development of the base.

6. Construction Achievements and Impacts of the Base

6.1. Impact On Enterprises

It significantly improves the technical ability and comprehensive quality of enterprise employees, enabling them to master advanced packaging and testing technologies proficiently, effectively improve production efficiency and product quality. Through order - based class training, the enterprise has obtained a large number of high - quality skilled talents highly matched with the positions, enriching the enterprise's talent team, optimizing the talent structure, enhancing the enterprise's competitiveness in the market, and promoting the continuous innovation and development of the enterprise in the field of intelligent manufacturing.

6.2. Impact on Students

It provides students with diverse practical opportunities and broad employment channels, enabling them to accumulate valuable experience in a real work environment. During the internship process, students deeply understand the enterprise's needs and industry development trends, apply the learned theoretical knowledge to practice, and improve their vocational skills and employment competitiveness. After graduation, they can quickly adapt to the enterprise's working environment and realize the smooth transition from students to professionals, laying a solid foundation for personal career development.

6.3. Impact on the School

It effectively promotes the school's educational and teaching reform, makes the curriculum setting and teaching content more close to the actual needs of enterprises. Through cooperation with enterprises, the school has introduced advanced practical teaching concepts and technical resources, improving the quality of talent cultivation. It has strengthened the in - depth cooperation and communication between the school and enterprises, expanded the school's social service function, improved the school's reputation in the industry and social reputation, attracted more high - quality students, and form a virtuous cycle.

7. Conclusion and Outlook

The construction of the new apprenticeship - based employment and internship base for intelligent manufacturing enterprises is a successful example of school - enterprise cooperation, playing an irreplaceable important role in aspects such as skilled talent cultivation, industrial upgrading and educational teaching reform. In the future, the school and enterprise should further deepen cooperation, continuously optimize the base construction and operation mechanism, expand the cooperation field and depth. For example, carry out joint research and development and talent cultivation in emerging technology fields, explore cross - border cooperation in cultivating international skilled talents, etc. Continuously cultivate more high - quality skilled talents for the intelligent manufacturing industry, promote the industry to develop to a higher level. At the same time, provide valuable experience reference for other enterprises and schools in the construction of new apprenticeship - based employment and internship bases, and jointly contribute to the transformation and upgrading of China's manufacturing industry.

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