Research and Practice on Talent Training Based on Intelligent Manufacturing Industry College

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Abstract. This article takes the Intelligent Manufacturing Industry College jointly built by schools and enterprises as a carrier to deepen the integration of industry and education. Combining the education supply and industrial demand of intelligent manufacturing talents in China, it constructs a talent training mode and practical methods suitable for the intelligent manufacturing professional group of our school, cultivates students' labor spirit and craftsmanship spirit, and serves the development of regional economy.

Keywords: Intelligent Manufacturing Industry College; professional group; integration of industry and education.

1 INTRODUCTION

Since the beginning of the new century, China's education industry has flourished, cultivating and delivering a large number of high-quality talents for socialist modernization construction, and making significant contributions to accelerating the development and strengthening of the modern industrial system. However, due to various factors such as systems and mechanisms, the supply side of talent cultivation and the demand side of industries cannot fully adapt in terms of structure, quality, and level. Deepening the integration of industry and education, promoting the organic connection between the education chain, talent chain, industry chain, and innovation chain, is an urgent requirement for promoting the supply side structural reform of human resources. It is of great significance for comprehensively improving the quality of education, expanding employment and entrepreneurship, promoting economic transformation and upgrading, and cultivating new driving forces for economic development under the new situation[1].

With the continuous development of new technologies, new economies, new formats, and new industries in recent years, the Industrial College, as the latest talent training model of industry education integration and school enterprise cooperation, can solve the problems of inadequate structure, quality, and level of talent training supply side and industry demand side through the integration of industry and resources, market

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and talent, and technology and curriculum. Therefore, it can achieve the training goal of "knowledge & practice" for technical and skilled talents.

At present, the construction of industrial colleges in China has just begun, and the first batch of industrial colleges were only released at the end of 2021. Research on the implementation route and training methods of industrial colleges is still in the exploratory and practical stage, and requires vocational colleges to conduct in-depth research in conjunction with enterprises.

2 BUILD A TALENT CULTIVATION MODEL BASED ON INDUSTRIAL COLLEGES

Currently, departments at all levels have issued implementation plans to deepen the integration of industry and education, incorporating it into local economic development plans and various stages of economic transformation and upgrading. This strengthens the important role of enterprises as the main body, supports their deep participation in vocational education and teaching reforms, promotes task-based training models that are oriented towards the real production environment of enterprises, and builds various forms of industry education integration training bases. However, in the process of integrating industry and education and building school enterprise cooperation, there are many practical problems faced[2-5]

In job practice, the job level and technical content are relatively low. The main practical positions for students are assembly line operators, and the lack of guidance from enterprise masters has led to problems such as mismatch between practical positions and majors, long working hours, and low internship salaries.

Taking the employment survey of the 2023 graduates from seven vocational colleges in Chongqing University City, Yongchuan, Jiangjin and other places as an example, only 28.6% believe that the job they are engaged in is strongly related to their professional knowledge, 45.4% of graduates believe that there is a certain relationship, but they need to relearn their work skills, and the remaining 26% of graduates are engaged in jobs completely unrelated to their major.

Based on the above situation, in order to better promote the deep integration of industry and education, improve the quality of talent training, and promote industrial transformation and upgrading. This article aims to establish an industry college in the construction of high-level professional groups in intelligent manufacturing, based on the successful experience of "industry education integration" at home and abroad, combined with the education supply and industry demand of intelligent manufacturing talents in China, to achieve "self generation" of industry education integration. Based on the integration of "industry university research training and innovation", it promotes the upgrading of "single base" to "comprehensive platform", explores the talent training mode of intelligent manufacturing professional groups, and constructs suitable training and practical methods for technical and skilled talents in vocational colleges to meet the requirements of talent structure training in the intelligent manufacturing industry[6-9].

Promote the integration of talent cultivation and industry demand, take industry university cooperation and collaborative education as the approach, aim to strengthen students' vocational competence and sustainable development ability, focus on improving students' practical and innovative abilities, innovate multiple teaching modes, and jointly plan talent cultivation goals. The cultivation process is shown in Figure 1.

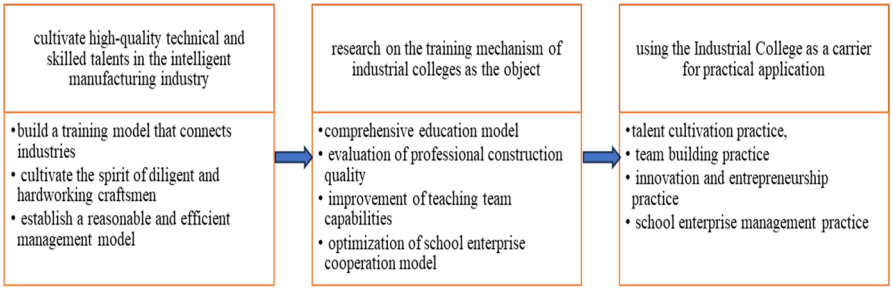


Fig. 1. Talent Training Model Based on Industrial College

3 TALENT CULTIVATION PRACTICE BASED ON INDUSTRIAL COLLEGES

3.1 Construction of Intelligent Manufacturing Industry Cluster under the Industrial College Platform

Focusing on the high-quality development direction of manufacturing industry in the new era and new journey, we aim to build an intelligent manufacturing professional group with industrial robot technology as the core, new energy vehicle technology, intelligent connected vehicle technology, intelligent robot technology, and intelligent control technology as the support, serving the intelligent production application scenarios of intelligent connected new energy vehicles in the modern manufacturing cluster system.

The five majors within the professional group are closely connected to the industry, and there are increasingly more intelligent production application scenarios for intelligent connected new energy vehicles; Having the same professional background, all majors within the group belong to the category of equipment manufacturing; Related to employment positions, mainly engaged in operation and management positions related to the production and manufacturing of intelligent connected new energy vehicles; Professional courses are interconnected, and platform courses cover a comprehensive range of core courses with cross integration.

3.2 Establish a School Enterprise Cooperation Mechanism Based on Modern Industrial Colleges

Based on the Industrial College, a committee for the construction of the Industrial College is jointly established by the school and enterprises, allowing enterprises to fully

participate in the management of education and the entire process of talent cultivation, become the leading force in cooperative education, and establish professional group talent cultivation standards in accordance with industry and enterprise standards, and establish a new process for talent cultivation in the Industrial College. Establish a dynamic adjustment mechanism for professional development around the integration of professional construction with industry demand. Based on the upgraded and adjusted demand for professional talents in the intelligent manufacturing industry, improve talent training programs, participate in systematic project-based course construction and practical training project development, and drive the development of the intelligent manufacturing professional group. Deeply integrate cutting-edge technology with classroom teaching, enterprise technology with practical teaching, and enterprise engineers with school teachers, to achieve the integration of schools with industries, majors with enterprises, and course content with professional standards. The school enterprise cooperation mechanism guided by industrial demand and based on universities is shown in Figure 2.

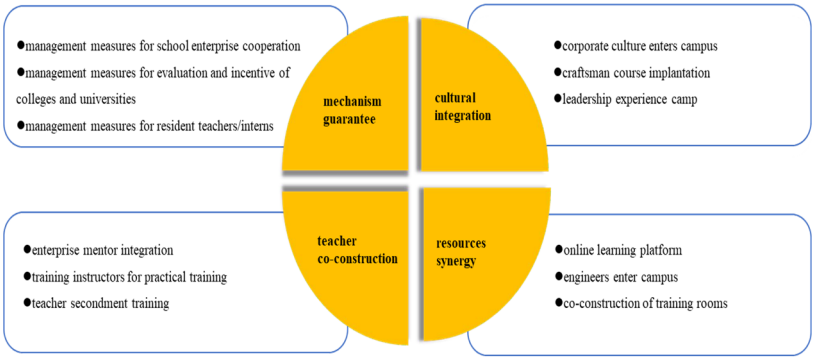


Fig. 2. school enterprise cooperation mechanism based on industrial colleges

3.3 Construction of Teaching Quality Monitoring and Evaluation Mechanism under the Industrial College Platform

Taking advantage of the deep integration of industry and education, as well as the collaborative education between schools and enterprises, a closed loop is formed in terms of talent training objectives, graduation requirements, curriculum system construction, classroom teaching, student management, teaching team building, curriculum construction, and evaluation of training effectiveness. The construction of cultivation and evaluation is shown in Figure 3.

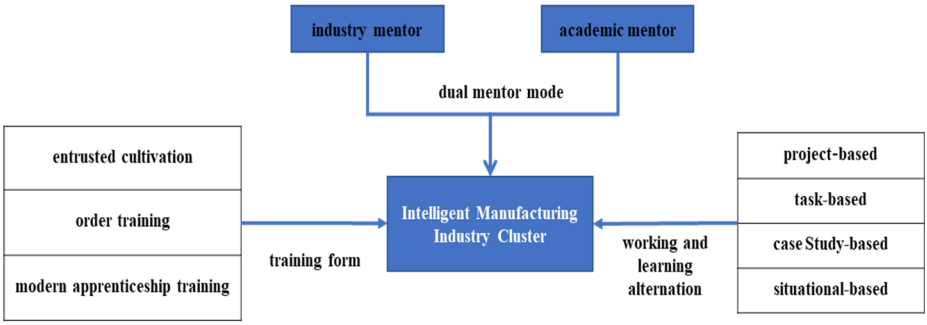


Fig. 3. Construction of Talent Cultivation and Evaluation under the Industrial College Platform

3.4 Curriculum System Construction under the Industrial College Platform

Guided by the demands of vocational positions, we aim to cultivate students' learning ability, application ability, collaboration ability, and innovation ability, forming a curriculum system based on industry needs and vocational positions, and creating a distinctive "foundation & development & enterprise" trinity curriculum system that integrates theory and practice, as shown in Figure 4.

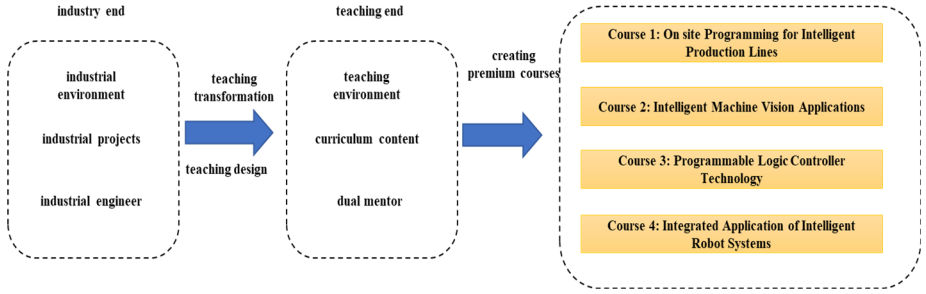
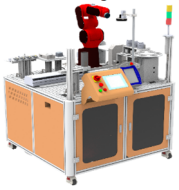


Fig. 4. Curriculum System under the Industry College Platform

The school and enterprise jointly plan the course system of the intelligent manufacturing professional group platform, combining the best industrial practices of manufacturing enterprises, based on industry standards, production processes, project development and other real industry needs, and relying on industry enterprise technological innovation projects, to build core technology course content, highlight comprehensiveness and practicality, and effectively improve students' awareness of the industry and their ability to solve complex problems. The practical teaching curriculum system of some platforms is shown in Table 1.

Table 1. Practical Teaching Curriculum System

Serial Number	Training System Name	Supporting Teaching Content
1	Intelligent Robot Training Platform Based on Machine Vision 	1. Intelligent Robot Programming Application 2. Intelligent Robot Vision Sorting Application
2	Integrated Innovation Training Platform for Robot Application Programming 	1. Robot System Integration Application (Integrated Programming Application 2. Application of Siemens PLC Programming and Configuration Programming 3. Application of Machine Vision Inspection 4. Offline programming application for robots
3	Training Platform Based on Siemens PLC Control 	1. Siemens PLC Programming Application 2. Application of PLC servo motor control system 3. Application of PLC stepper motor control system 4. Application of PLC Variable Frequency Control System

3.5 Enhancing the Teaching Team's Capabilities Based on Modern Industrial Colleges

The joint construction of a "dual teacher" teaching team by schools and enterprises is the foundation of industrial colleges. Through visiting engineers, practical training in enterprises, summer enterprise services, technology development services, and other means, full-time teachers can promote enterprise practical training and improve the "dual teacher" teaching team. Adopting the model of "enterprise teachers entering the school, the school hires enterprises for use", and incorporating talents from enterprises into the faculty team of the college.

4 CONCLUSION

This article takes the Intelligent Manufacturing Modern Industry College as the research and application carrier, and conducts research and practice on talent cultivation and college management in the construction process of the industrial college. It continuously optimizes and improves the operation mechanism and talent cultivation mode of the industrial college, and promotes the application of the results to the construction process of industrial colleges in other colleges or schools, improving the overall level of professional construction and talent cultivation. To provide high-quality technical and skilled talents for advanced manufacturing industry, serving the development of regional economy. Solved the problems of talent cultivation being disconnected from job requirements, practical activities being disconnected from production processes, and teaching content being disconnected from technological development during the training process.

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REFERENCE

1. Liu Zhihua, Huang Xiaoming, Liu Xugang. Research on the "Five in One and Four Chain Integration" Collaborative Education Model of Industry Education Integration in Vocational Colleges [J]. Modern Vocational Education, 2024.
2. Su Xinliu. Exploration and Practice of Modern Industry College Construction in Vocational Colleges [J]. Journal of Nanyang Normal University.
3. Wang Huiping, Ren Kuishan, Shi Tianyi. Research on the Construction Mode and Path of Industrial Colleges in Vocational Colleges [J]. Modern Vocational Education. 2024.
4. Fang Wenchao. Research on the Challenges and Countermeasures of Enterprises Supporting Vocational Education under the Background of Industry Education Integration [J]. Journal of Jilin Provincial Institute of Education, 2022.
5. Liu Renxiong, Huang Liwen, Shang Weilai, et al. Policy Origins and Promotion Paths for Deepening the Integration of Industry and Education in Higher Vocational Education: From the Perspective of Exploring the Construction of University Science and Technology Parks. Vocational and Technical Education, 2021.
6. Ning Hui. Research on the Path of Industry Education Integration in Vocational Colleges [J]. Vocational Education Research, 2021.
7. Zhao Yanhe. Research on the Construction of Long term Mechanisms for School Enterprise Cooperation under the Background of Industry Education Integration [J]. Liaoning Journal of Vocational Education, 2020.

8. Ping Qi, Pang Jianyong, Rong Chuanxin, etc Thoughts on the Construction of Undergraduate Mentor System under the Concept of "Three pronged Education" in the New Era [J] Journal of Anhui University of Science and Technology: Social Sciences Edition, 2020, 22 (4): 80.
9. Li Yanfeng, Li Xiaopeng. Practical Research on the Construction of Industrial Colleges from the Perspective of Deep Industry Education Integration [J]. Vocational and Technical, 2021.