

# Exploration and Research on the Diversified Collaborative Education Model of Intelligent Manufacturing Professional Groups under the Background of the Integration of Suzhou Wuxi Changzhou Urban Vocational Education Circle

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**Abstract:** With the rapid development of global economic integration and intelligent manufacturing, vocational education plays an important role in cultivating high-quality technical and skilled talents. As an important base for China's economic development and intelligent manufacturing industry, the development of vocational education in the Suzhou Wuxi Changzhou metropolitan area is particularly crucial. This article analyzes the current development status and existing problems of the Suzhou Wuxi Changzhou Urban Vocational Education Circle, constructs a diversified collaborative education model for intelligent manufacturing professional groups, and verifies the effectiveness of this model in improving education quality and promoting industrial development through empirical research and case analysis. Finally, the possible challenges and response strategies in the implementation process are discussed.

**Keywords:** Suzhou Wuxi Changzhou Urban Vocational Education Circle; Intelligent manufacturing; Professional group; Multi-dimensional collaboration; Education mode

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## 1. Introduction

As an important engine of China's economic development, the Suzhou Wuxi Changzhou metropolitan area's level of vocational education development is directly related to regional industrial upgrading and economic transformation. However, there are still some problems in the current Suzhou Wuxi Changzhou Urban Vocational Education Circle in terms of talent cultivation in the field of intelligent manufacturing, such as an imperfect talent cultivation system, unreasonable allocation of educational resources, and low degree of school-enterprise cooperation. Therefore, exploring a diversified collaborative education model that meets the development needs of the intelligent manufacturing industry is of great significance.

## **1.1. Integration of Suzhou Wuxi Changzhou Vocational Education Circle**

The Suzhou Wuxi Changzhou Urban Vocational Education Circle refers to the vocational education consortium of Suzhou, Wuxi, and Changzhou in Jiangsu Province. In recent years, the Suzhou Wuxi Changzhou Urban Vocational Education Circle has continuously promoted integrated development in policy guidance, resource sharing, and talent cultivation in order to improve the ability of vocational education to serve regional economic and social development. In recent years, the Suzhou Wuxi Changzhou Urban Vocational Education Circle has actively promoted the integrated development of vocational education, providing strong support for regional economic and social development through measures such as optimizing talent training structure, strengthening school-enterprise cooperation, and improving education and teaching quality.

In Jiangsu Province, the Suzhou Wuxi Changzhou region has gathered 34 higher vocational schools, with a student population of over 240,000. In addition, there are 53 secondary vocational schools in the region, with a total of nearly 210,000 students enrolled. It is worth noting that Wuxi City is known as the first “Pilot city for comprehensive reform of higher vocational education development promoted by local governments” in China, while the Science and Education City of Changzhou City shoulders the responsibility of being a national pilot zone for higher vocational education reform. The Suzhou Wuxi Changzhou region has successfully cultivated three high-level schools and five high-level professional group schools, which account for 40% of the total number of “Double high” universities in Jiangsu Province <sup>[1]</sup>. All three cities have established vocational education parks, achieving synchronous planning, construction, and growth of intelligent manufacturing professional groups and industrial parks in vocational schools.

## **2. The current situation of the construction of intelligent manufacturing professional groups in the Suzhou Wuxi Changzhou metropolitan area**

In the context of the integration of Suzhou Wuxi Changzhou Urban Vocational Education Circle, the construction and development of intelligent manufacturing professional groups have become an important direction for local vocational education. In the field of intelligent manufacturing, various universities and professional groups actively cooperate with enterprises and research institutions to jointly promote talent cultivation and technological innovation <sup>[2]</sup>. At present, the construction of intelligent manufacturing professional groups in the Suzhou Wuxi Changzhou region is mainly reflected in the following aspects.

### **2.1. Talent cultivation**

The intelligent manufacturing professional group optimizes course settings, strengthens practical teaching, and cultivates students with a solid theoretical foundation and strong hands-on ability. At the same time, by collaborating with enterprises and providing internship and training opportunities, students can better understand industry needs and development trends <sup>[3]</sup>.

### **2.2. Technological innovation**

The intelligent manufacturing professional group in the Suzhou Wuxi Changzhou region actively participates in technological innovation projects of enterprises and industries, carries out industry-university research cooperation, and promotes the transformation of scientific and technological achievements. By co-building research and development centers, laboratories, and other forms with enterprises, schools can provide students with a platform for practical innovation.

### **2.3. Teacher team construction**

The intelligent manufacturing professional group in the Suzhou Wuxi Changzhou region focuses on the construction of the teacher team, introducing and cultivating a group of teachers with rich practical experience and theoretical level. At the same time, the teaching ability and research level of teachers can be enhanced through teacher training, academic exchanges, and other means.

### **2.4. School-enterprise cooperation**

The intelligent manufacturing professional group in the Suzhou Wuxi Changzhou region has established close cooperation relationships with multiple enterprises, forming a virtuous cycle of school-enterprise cooperation. Enterprises participate in the construction and development of professional groups, providing internship and employment opportunities while the professional group provides technical support and talent cultivation for enterprises to meet their needs.

## **3. Exploration and practice of the education model under the integration of Suzhou Wuxi Changzhou Urban Vocational Education Circle**

In the context of the integration of vocational education circles in Suzhou, Wuxi, and Changzhou, practical on the diversified collaborative education model of intelligent manufacturing professional groups can be done, thus cultivating talents in the field of intelligent manufacturing who have both a solid theoretical foundation and rich practical experience. Based on the characteristics of the Suzhou Wuxi Changzhou Urban Vocational Education Circle, its advantages and challenges in the integration process have been clarified. The diversified collaborative education model includes multiple aspects such as school-enterprise cooperation, integration of industry and education, and international training. This diversified collaborative education model provides a new approach and practical path for talent cultivation in the field of intelligent manufacturing in China. The specific measures include the following.

### **3.1. Curriculum system and teaching content reform**

In the reform of the curriculum system, it is necessary to break through traditional disciplinary boundaries, with intelligent manufacturing as the core, and build an interdisciplinary and comprehensive curriculum system. At the same time, the curriculum should fully consider industry needs, strengthen practicality and applicability, and focus on cultivating students' innovative and practical abilities. In the reform of teaching content, the curriculum system should keep up with the trend of technological development, update teaching content in a timely manner, and integrate the latest technological knowledge and research results into teaching. The teaching content should focus on the combination of theory and practice and improve students' understanding and application abilities through case analysis, experimental operations, and other methods <sup>[4]</sup>. In addition, the exploration and research of diversified collaborative education models also need to be reflected in the reform of curriculum systems and teaching content. By collaborating with enterprises and introducing enterprise experts to participate in course design and teaching, students can be exposed to real work scenarios and enterprise needs, improving their practical abilities and employment competitiveness.

### **3.2. Teacher team construction and collaboration**

Build a teaching team with rich theoretical knowledge and practical experience. When introducing talents, it is important to focus on their academic background and value their practical abilities. For existing teachers, regular training and assessment should be conducted to enhance their professional competence and teaching ability.

Strengthen school-enterprise cooperation and introduce outstanding talents from the industry to participate in teaching. By collaborating with enterprises and tracking the latest developments in the industry, colleges aim to integrate practical teaching better and enhance students' employment competitiveness. Intelligent manufacturing technology is constantly being updated and developed to promote international exchange and cooperation among the teaching staff. Colleges need to draw on advanced international experience to enhance the international perspective and teaching level of teachers<sup>[5]</sup>. Colleges must establish and improve incentive mechanisms to encourage teachers to participate in educational reform and innovation actively. Enabling teachers to gain a sense of achievement in teaching can better stimulate their teaching enthusiasm and improve teaching quality.

### **3.3. Industry university research cooperation and innovation**

Collaboration between industry, academia, and research can help optimize the curriculum system of the intelligent manufacturing professional group. Through cooperation with enterprises, schools can timely understand industry trends and talent needs, adjust curriculum settings, make teaching content more practical and improve students' practical abilities<sup>[6]</sup>. Next, industry-university research cooperation can promote the construction of the teaching staff. The participation of enterprise engineers can provide practical experience and skill training for teachers, improve their teaching level and research ability, and thus enhance the overall teaching quality. Collaboration between industry, academia, and research can also help cultivate students' innovative abilities. By collaborating with enterprises to carry out research projects, students can be exposed to cutting-edge technologies, learn to solve practical problems, and cultivate innovative thinking and abilities. In addition, industry-university research cooperation can also broaden the employment channels for students<sup>[7]</sup>. By participating in the talent cultivation process, enterprises can better understand students' abilities and potential, provide them with more employment opportunities, and improve the quality of employment. Schools should establish long-term and stable cooperative relationships with enterprises and form an integrated education mechanism of industry, academia, and research.

### **3.4. Internationalization and cooperative education**

Universities have strengthened exchanges and cooperation with internationally renowned universities and signed multiple agreements for student exchange and teacher visits<sup>[8]</sup>. Students can go abroad for short-term learning or internships, broadening their international perspective and enhancing their cross-cultural communication skills. At the same time, internationally renowned scholars are invited to the school for lectures and discussions so that students and teachers can stay up-to-date with the latest developments in the field of intelligent manufacturing internationally. Establish close cooperation with well-known domestic and foreign enterprises and jointly establish an intelligent manufacturing training base. Enterprises not only provide students with internship and employment opportunities but also participate in curriculum design and teaching processes, making teaching content closely aligned with the needs of the enterprise and enhancing students' practical operational abilities. More emphasis is placed on cultivating students' interdisciplinary comprehensive literacy. By offering interdisciplinary courses and organizing various academic activities, students' innovative awareness is stimulated, and their comprehensive literacy is improved<sup>[9]</sup>.

## **4. A typical case of the integration of industry and education in the intelligent manufacturing major group of Suzhou Xichang Vocational College**

Wuxi Vocational and Technical College is deepening the reform of the "credit bank" and providing hierarchical

guidance and training for students. The proportion of practical talents trained through documentary evidence integration has reached 100%, and the proportion of composite talents trained in intelligent manufacturing professional clusters has reached 70% while establish an innovation college, implement system, model, and mechanism innovation, and cultivate 15% of top innovative technology skilled talents <sup>[10]</sup>.

Changzhou Mechanical and Electrical Vocational and Technical College continuously reforms its talent training mode, deeply integrates professional construction and industrial chain development and particularly accelerates the cultivation of high-quality skilled talents through a series of guiding education characteristic brand projects <sup>[11]</sup>. This not only provides urgently needed talent support for industry enterprises, but also promotes the transformation and upgrading of regional small and medium-sized enterprises and the high-quality development of industries, and constructs a coordinated development professional system with “intelligent manufacturing-oriented majors leading and manufacturing service-oriented majors assisting.”

Changzhou Engineering Vocational and Technical College closely integrates with the construction of Changzhou National Industry Education Integration Pilot City, focusing on cultivating high skilled applied talents with noble character, exquisite skills, comprehensive ability, innovative spirit, and international perspective. The college promotes high-quality development through the construction of “Jin Zhuan” <sup>[12]</sup>. The college actively aligns with the “14<sup>th</sup> Five Year Plan” for the development of advanced manufacturing clusters in Jiangsu Province and Changzhou City, especially key industries such as new energy and new materials, to ensure the comprehensive integration of industrial demand with education, teaching, and talent cultivation, gradually forming a collaborative innovation development pattern between education and industry <sup>[13]</sup>.

In order to cope with the transformation and upgrading of regional economy and promote the development of professional clusters, Suzhou Industrial Park Industrial Technology School has proposed the concept of diversified governance and established a cooperation mechanism of “Government, school, and enterprise” four party linkage, creating an intelligent manufacturing professional group construction model of “Four party linkage, six collaborations and six transformations” <sup>[13]</sup>.

## **5. Inspiration and suggestions on the diversified collaborative education model of intelligent manufacturing professional groups**

### **5.1. Improve policy support and promote the integration of vocational education resources**

The government should introduce relevant policies to encourage cooperation among various vocational education institutions within the Suzhou Wuxi Changzhou urban vocational education circle, share high-quality educational resources, and improve the quality of education and teaching.

### **5.2. Building a diversified collaborative education platform**

Through various forms such as inter school, school enterprise, school government, and international cooperation, universities aim to build a diversified collaborative education platform, achieve the sharing of high-quality educational resources, and improve the level of talent cultivation <sup>[14]</sup>.

### **5.3. Establish a dynamic adjustment mechanism to achieve coordinated development between professional groups and industries**

According to the development trends of the intelligent manufacturing industry, adjust the professional settings and talent training plans in a timely manner to ensure a close connection between professional groups and industrial development.

#### **5.4. Strengthen comprehensive quality education for students and cultivate intelligent manufacturing talents with international competitiveness**

By organizing various competitions, lectures, practical activities, etc., education sector aims to enhance the comprehensive quality of students and provide talent support for China's intelligent manufacturing industry to go global.

### **6. Conclusion**

With the continuous development of the regional economy in the Suzhou Wuxi Changzhou metropolitan area, the convergence and integration of resources has become an important goal and primary task for the three regions to jointly build a regional innovation service highland. University should actively promote the collaborative education of intelligent manufacturing, government, industry, academia, and research, leverage strengths and avoid weaknesses, and leverage the diverse functions of sports professionals to provide composite talents and precise intellectual support for the high-quality development of urban areas in regional industrial transformation and upgrading. Colleges should also provide strong mechanism guarantees and talent support for the high-quality and integrated development of regional economy and society<sup>[15]</sup>.

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The authors declare no conflict of interest.

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