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Research on the Innovation Path of Vocational Talent Training Mode under the Vocational Education Group Mode

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Abstract: *With the continuous deepening of China's industrial upgrading and economic structural adjustment, the traditional isolated talent cultivation model of vocational colleges has become difficult to adapt to the composite requirements of the new era for high-quality technical and skilled talents. As an important platform for integrating resources from government, industry, enterprises, and schools, vocational education groups provide new opportunities and practical fields for innovating vocational talent cultivation models. Based on the background of the vocational education group model, this paper deeply explores the innovative path of vocational talent cultivation under this model. The research suggests that the core of its innovation lies in breaking organizational barriers and building a new educational ecosystem of "diversified collaboration and coexistence and growth". Through the systematic implementation of the above paths, it aims to effectively enhance the cultivation quality, adaptability, and sustainable development ability of vocational talents, providing strong talent support for the improvement of the modern vocational education system and regional economic and social development.*

Keywords: *Vocational Education Group; Talent Training; Industry-Education Integration; Innovative Path; School-Enterprise Cooperation*

1. Introduction

In the context of accelerating the development of a modern vocational education system, the group-based operation model of vocational education has become a crucial breakthrough for deepening industry-education integration. As an organizational form that integrates resources from governments, industries, enterprises, and schools, vocational education groups provide new ecological solutions for cultivating technical and skilled talents through resource sharing and complementary advantages. In recent years, China's vocational education groups have evolved through three phases: the initial stage of emergence, the expansion phase, and the quality innovation phase, achieving a transformation from non-existence to establishment and growth in industry-education integration. By 2025, with the introduction of the concept of "new-quality productive forces" and profound adjustments in economic structures, the vocational education group model has been endowed with greater strategic significance. Innovations in its talent cultivation model have become a key factor influencing regional economic development and industrial upgrading.

The current wave of digital transformation and intelligent manufacturing has raised the bar for technical and skilled professionals, while structural gaps between traditional vocational education models and industry demands have become increasingly apparent. On one hand, enterprises grapple with shortages of high-quality technical talent; on the other, vocational graduates face challenges like employment difficulties and mismatched job qualifications. Against this backdrop, exploring innovative pathways for talent development under the vocational education consortium model carries both theoretical significance and urgent practical importance. Starting from these real-world challenges, this paper systematically examines multidimensional innovation strategies for talent cultivation within the vocational education consortium framework, aiming to provide actionable insights for educational reform in vocational institutions.

2. Development background and significance of vocational education group operation

The vocational education group is a new educational model that integrates vocational education

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resources through group-based organization, achieving economies of scale and cluster advantages. From a developmental perspective, China's group-based vocational education has roughly gone through three stages: the initial stage (1990s to early 21st century), the expansion stage (2000-2015), and the quality innovation stage (2015-present) (As shown in Table 1). During the quality innovation phase, vocational education groups have moved beyond mere quantitative expansion to focus more on connotative development and quality enhancement, particularly demonstrating significant improvements in the depth and breadth of industry-education integration.

The significance of group-based vocational education lies in three key aspects. First, it effectively addresses the persistent issue of "hot schools but cold enterprises." Through group operations, enterprises transition from mere employers to active participants and beneficiaries in talent development, significantly boosting their engagement and enthusiasm for vocational education. A prime example is the "factory-school integration and mutual prosperity" ecosystem established by Xiangdian Group and Hunan Electric Vocational & Technical College [1]. This collaboration incorporates institutional development into corporate strategic planning, creating a governance framework characterized by "joint talent cultivation, coordinated process management, shared achievement recognition, and collaborative responsibility fulfillment."

Secondly, the group-based operation of vocational education has achieved resource integration and optimized allocation. By jointly establishing training bases, sharing teaching resources, and forming collaborative teaching teams, vocational education groups have broken down barriers between vocational colleges and industry enterprises, enabling efficient alignment between educational resources and industrial resources. For instance, the Zhangjiang Science City Intelligent Manufacturing Industry-Education Consortium launched by the Pudong Vocational Education Group leverages industrial parks as a foundation to integrate multiple resources, encouraging various stakeholders to participate in vocational education operations[2]. This initiative has established a practical bridge for cultivating talent in the intelligent manufacturing sector.

Thirdly, the group-based operation of vocational education has facilitated an organic connection between educational and industrial chains. By aligning professional clusters with industrial clusters, curriculum content with occupational standards, and teaching processes with production processes, vocational education groups enable talent cultivation to better meet actual industry demands. Fujian University of Technology and Ningde Vocational Education Group jointly established the New Energy Industry College, focusing on talent needs in Ningde's new energy sector. They collaboratively designed training objectives, formulated cultivation standards and plans, achieving deep integration between education and industry.[3]

Table 1 Development stage and characteristics of vocational education group operation

Development	stage time span	main features	typical patterns
Early development period	1990s-early 2000s	Self-organized, exploratory collaborations	intercollegiate alliances and regional cooperation
Scale expansion period	2000-2015 Policy promotion	scale expansion regional vocational education groups	industry vocational education groups
Quality innovation period	2015 to now connotation construction	quality improvement industry-education integration community	municipal consortium

3. Realistic dilemma of talent training under vocational education group mode

Although the group-based operation of vocational education has made remarkable progress, there are still many practical difficulties in the actual operation process of talent training, which restrict the further improvement of the quality of vocational education.

3.1 The school-enterprise cooperation mechanism is not perfect, and the phenomenon of "cooperation but not integration" is prominent

Currently, many vocational education groups still maintain superficial school-enterprise collaborations, lacking long-term mechanisms for deep integration. On one hand, enterprises show insufficient intrinsic motivation in talent development, viewing participation in vocational education as social responsibility rather than strategic investment, resulting in inadequate engagement and limited

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resource allocation. On the other hand, the imperfect interest distribution and risk-sharing mechanisms between schools and enterprises hinder sustainable cooperation. Furthermore, the incomplete governance structure within these groups, with unclear delineation of decision-making authority, implementation rights, and oversight responsibilities, leads to inefficient resource allocation and underutilized synergistic effects.[4]

3.2 The teaching content is out of step with the development of industry technology, and the practical teaching link is weak

Amid rapid technological transformation and industrial upgrading, vocational colleges struggle to keep pace with industry advancements in curriculum updates. Many institutions still rely on outdated textbooks and teaching methods, failing to incorporate cutting-edge technologies, standards, and manufacturing processes.[5] While vocational education groups emphasize integrating theory with practice, practical training remains underdeveloped due to insufficient investment in facilities and limited internship opportunities at enterprises. Moreover, traditional evaluation systems that prioritize theoretical knowledge over hands-on experience make it challenging to comprehensively assess students' technical competencies and professional development.

3.3 The shortage of "double-qualified" teachers and the lack of professional development channels

A high-caliber teaching force is fundamental to quality vocational education. However, vocational education institutions currently face widespread challenges in both quantity and quality of "dual-qualified" teachers. On one hand, industry experts lack systematic training in pedagogical theories and methodologies, resulting in suboptimal teaching outcomes. On the other hand, vocational college faculty members lack practical industry experience and channels for updating professional skills. Furthermore, institutional barriers hinder two-way mobility between vocational educators and industry professionals, while mismatched policies regarding professional title evaluations and compensation packages continue to impede the development of dual-qualified teaching teams.[6]

3.4 Digital transformation lags behind and the smart education ecology has not yet been formed

As digital transformation accelerates, vocational education faces urgent demands for intelligent upgrading. However, many vocational education groups currently lag behind in developing digital platforms, creating smart teaching resources, and innovating online practical teaching models. The insufficient deep integration of digital technologies into educational scenarios has prevented full utilization of big data, artificial intelligence, and virtual reality in personalized learning, precision teaching, and intelligent assessment. This gap hinders vocational education groups from building an open, shared, and interconnected smart education ecosystem, ultimately limiting the improvement of talent cultivation quality (As shown in Table 2). The lack of practical experience among teachers and the inadequate two-way flow hinder the development of a dual-qualified teacher team; improving the two-way flow mechanism is essential.

Table 2 The main problems and solutions of talent training under the vocational education group model

Existing problems	specific manifestations and solutions
The school-enterprise cooperation mechanism is not perfect, the enterprise participation is low, the benefit distribution mechanism is not perfect	The construction of symbiotic and co-growing governance mechanism, the rights, responsibilities and interests are defined
The teaching content is out of line with the industry, the curriculum is updated slowly, and the practical teaching link is weak	The "post-course-competition-certificate" integrated curriculum system is established to meet the industry standards
The shortage of "double-qualified" teachers	The lack of practical experience of teachers and the poor two-way flow create a dual-qualified teacher team and improve the two-way flow mechanism the lack

The digital transformation lags behind, the intelligent teaching platform is lacking, and the digital resources are insufficient to build an intelligent education ecosystem and innovate digital teaching models.

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4. Innovative path of talent training mode under vocational education group model

In view of the above difficulties, vocational education groups need to explore innovative paths of talent training mode from multiple dimensions and build a new talent training system that meets the development requirements of new quality productivity.

4.1 Build a "symbiotic and co-growing" governance mechanism to realize collaborative education among multiple subjects

Establishing a scientific and efficient governance mechanism forms the foundation for effective operation of vocational education groups. First, it is essential to clarify the rights, responsibilities, and interests of all stakeholders within the group. A three-tier governance structure should be established, featuring council decision-making, expert committee consultation, and implementation by operational bodies, ensuring both scientific decision-making and effective execution. Second, innovative benefit-sharing mechanisms should be developed through approaches like "talent sharing," "joint technical research," and "mutually beneficial outcomes" to enhance enterprises' intrinsic motivation in talent cultivation. The Shanghai Pudong Vocational Education Group has laid an organizational foundation for continuous integration of high-quality resources and deepened industry-education collaboration by revising its charter and improving its council system.[7]

Furthermore, a diversified collaborative education mechanism should be established with government leadership, industry guidance, enterprise participation, and school-centered initiatives. The government should provide institutional safeguards for school-enterprise cooperation through policy support and project guidance. Industry organizations should act as bridges by promptly releasing talent demands and skill standards. Enterprises should deeply engage in professional planning, curriculum development, and teaching implementation. Schools should adjust training programs according to industrial needs to achieve synchronized resonance between talent cultivation and industry demands. For instance, Xiangdian Group and Hunan Electric Vocational & Technical College have achieved seamless integration of "teaching scenarios" with "production sites" and "curriculum content" with "technical standards" through jointly establishing industrial colleges, municipal industry-education consortiums, sharing national-level training bases, and jointly investing R&D resources.

4.2 Deepen the comprehensive education of "post, course, competition and certificate", and build a modular curriculum system

Course instruction serves as the cornerstone of talent development. Vocational education groups should deepen the "position-course-competition-certificate" integrated training model, seamlessly integrating job requirements, curriculum content, skills competitions, and professional qualification certifications. Specifically, this requires restructuring course content and teaching standards through three key dimensions: position competency orientation, skills competition guidance, and certification verification. In its research on the "position-course-competition-certificate" integrated talent development model, Qingdao Hotel Management Vocational College has proposed establishing a correspondence framework linking "position competencies → curriculum modules → competition projects → certification standards". By implementing dynamic curriculum updates, competition-driven innovation, and certification alignment mechanisms, the program enables real-time monitoring of students' learning outcomes and their alignment with job competency requirements.

In curriculum design, modularization should be implemented to enhance flexibility and adaptability. Aligning with technical domains and occupational requirements, courses are organized into three modules: general competency, core professional skills, and career development, catering to students 'personalized growth and career planning needs. A dynamic content update mechanism ensures continuous alignment with industry advancements through regular reviews and updates by industry experts. At Tianjin University of Science and Technology's Pulp and Paper Engineering program, the "industry-academia-research chain integration" concept has been adopted in new engineering education initiatives. By incorporating cutting-edge industry standards into curricula, the program achieves high-quality collaborative development in applied talent cultivation.

4.3 Build a "dual-ability" teaching staff and improve the professional development system for teachers

A high-caliber faculty team is crucial for ensuring the quality of talent cultivation. Vocational

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education groups should focus on building a "dual-capability" faculty that excels in both theoretical instruction and practical skills. On one hand, they should establish a two-way mobility mechanism between enterprise technical experts and school teachers, attracting highly skilled professionals through a "engineer-teaching" and "technician-lecturing" dual-hire system. Xiangdian Group has vigorously implemented this dual-hire system, forming a high-level technical expert team of 198 members including 3 chief technicians and 41 senior technicians. These experts, who are frontline production backbone personnel, also serve as industry mentors in classrooms, bringing the latest enterprise technologies, processes, and standards into the educational environment.[8]

On the other hand, it is essential to improve the professional development system for vocational college teachers by establishing a regular training mechanism. Teachers should be regularly organized to participate in enterprise-based practical training, engage in technological research and development, contribute to process improvements, and enhance their practical teaching capabilities. Simultaneously, conducting training on teaching methods and educational technology will boost teachers' instructional design skills and classroom management abilities. Additionally, the teacher evaluation system should be reformed by incorporating participation in enterprise practices, technology R&D, and curriculum development into assessment criteria to motivate professional growth. The Pudong Vocational Education Group has particularly emphasized promoting two-way faculty mobility in its innovative school-enterprise cooperation mechanisms, establishing an enterprise-led evaluation system that provides institutional guarantees for building a "dual-qualified" teacher team.

4.4 Promote digital transformation and build a smart education ecosystem

To address challenges in the digital age, vocational education groups must accelerate digital transformation and build smart educational ecosystems. By establishing digital platforms that integrate virtual simulation training, online courses, and digital teaching materials, they can break through time and space constraints to achieve resource sharing and precise alignment with industry needs. For instance, Shenzhen Open University's research demonstrates that digital platforms enable resource sharing and demand matching. Intelligent technologies facilitate deeper integration of collaborative education mechanisms, while innovations like virtual reality technologies are reshaping practical teaching models.

In practical implementation, vocational education groups can establish smart teaching platforms and develop AI-powered personalized learning systems to provide customized study paths and resource recommendations for students. By utilizing virtual reality (VR) and augmented reality (AR) technologies, they can create simulated work environment training platforms to address challenges like internship shortages and equipment limitations. Through big data analytics, these systems collect and analyze student learning data to enable precise performance evaluations and timely interventions. The 2025 World Digital Education Conference's Vocational Education Parallel Conference systematically reviewed international organizations' and governments' initiatives in building intelligent ecosystems for vocational education, highlighting how smart technologies are driving comprehensive innovations across classroom transformation, teacher professionalization, school-enterprise collaboration, and smart governance systems.

4.5 Cultivate artisan culture, cultivate professional spirit and innovative literacy

Vocational education is not merely about skill transmission, but more importantly, it cultivates professional ethos and craftsman culture. Vocational education groups should integrate the nurturing of craftsmanship spirit throughout the entire talent development process, fostering students 'pursuit of excellence and meticulous professionalism through campus culture, curriculum design, practical activities, and other channels. Xiangdian Group and Hunan Electric Power University have incorporated military-grade qualities of "strictness, precision, practicality, and perseverance" along with the patriotic ethos of "industrial dedication to the nation" into their educational practices. By widely implementing mentorship programs, skills competitions, and establishing national-level master craftsmen studios, they create an environment that reveres craftsmanship and prioritizes quality, allowing the spirit of craftsmanship to take root and flourish in students' hearts.

Meanwhile, to meet the demands of new-quality productive forces, vocational education groups should prioritize cultivating students 'innovative literacy and sustainable development capabilities. By incorporating green skills, digital literacy, and entrepreneurial competencies into talent development programs, students can better adapt to future industrial transformations and career shifts. In its research

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on "Green Craftsmen" talent cultivation in technical colleges under the new-quality productive forces framework, Qingdao Hotel Management Vocational College innovatively introduced a "Green Skills Certificate" certification system. This initiative integrates professional qualification standards such as carbon emission administrators and energy managers into curriculum design, achieving seamless integration of coursework and certification requirements. Such efforts effectively enhance students' sustainable development capabilities.

5. Typical case analysis: the practice of Xiangdian Group and Hunan Electric Vocational and Technical College

The cooperation between Xiangdian Group Co., Ltd. and Hunan Institute of Electrical Technology is a model of talent training under the vocational education group mode, and its "school-enterprise integration" deep integration mode provides valuable experience for other vocational education groups.

5.1 Historical origin and symbiotic mechanism of factory-school integration

Established in 1936, Xiangdian Group is known as the "cradle of China's electrical products" and the "backbone of national industry." The Electrical Vocational College under its auspices, originally founded as an apprenticeship training school in 1941, stands as one of the pioneers in enterprise-run vocational education. For over 80 years, the school and enterprise have shared the same roots and thrived together, establishing a unique ecosystem of "factory-school integration and mutual prosperity." This profound historical connection has laid a solid foundation for deep integration between the school and enterprise, closely aligning talent cultivation with corporate needs.

In terms of governance mechanisms, Xiangdian Group, as the host organization, has integrated school development into its corporate strategic planning, establishing a governance framework characterized by "joint talent cultivation, coordinated process management, shared achievement recognition, and collaborative responsibility fulfillment." Through joint initiatives such as co-establishing Xiangdian Motor College and municipal industry-education consortiums, sharing national-level training bases, and jointly investing R&D resources, the school-enterprise partnership achieves seamless integration between "educational scenarios" and "production sites," as well as "curriculum content" and "technical standards." This fundamentally resolves the chronic issues of "academic enthusiasm versus corporate apathy" and "collaboration without integration."

5.2 Construction mode of "dual habitat and dual ability" teaching staff

Xiangdian Group has vigorously implemented a dual-appointment system combining "engineers and teachers" with "technicians and lecturers". The company has assembled a high-caliber technical team of 198 experts, including 3 chief technicians and 41 senior technicians, who actively participate in teaching. These experts serve dual roles as frontline production specialists and classroom industry mentors, integrating the company's latest technologies, processes, and standards into their instruction. This approach ensures talent development that balances cutting-edge innovation with practical applicability.

This "dual-competency" faculty development model has achieved resource sharing between schools and enterprises, effectively addressing the shortage of dual-qualified teachers in vocational colleges. Meanwhile, by establishing effective incentive mechanisms and supportive policies, it ensures that enterprise technicians have the motivation, time, and capability to participate in teaching activities, thereby guaranteeing steady improvements in educational quality.

5.3 Education ecology integrating artisan spirit and vocational skills

Xiangdian Group and Electrical Vocational College have integrated the military-grade qualities of "strictness, precision, practicality, and perseverance" with the revolutionary spirit of "industrial patriotism" throughout their educational programs. By implementing mentorship programs, skills competitions, and establishing national-level master craftsmen studios, they cultivate an environment that reveres craftsmanship and prioritizes quality. This approach allows the artisan ethos to take root and flourish in students' hearts.[9]

This "spirit + skill" educational ecosystem not only cultivates students' professional competencies but also shapes their career ethos and values, achieving simultaneous enhancement of technical skills

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and professional qualities. Over the past eight decades, Electrical Vocational College has trained nearly ten thousand skilled technicians for enterprises. Many of these graduates have progressed to become team leaders, workshop supervisors, and even mid-to-senior management personnel, which fully demonstrates the effectiveness of this educational model.

6. Conclusions and Prospects

The innovation of talent cultivation models in vocational colleges under the vocational education group system is an inevitable choice to meet the requirements of new-quality productive forces development and deepen industry-education integration. This paper analyzes the main challenges faced by current vocational education groups and proposes innovative approaches from multiple dimensions including governance mechanisms, curriculum systems, faculty development, and digital transformation. Through an in-depth discussion using Xiangdian Group's typical case as a reference, the study reveals that only by establishing a multi-stakeholder collaborative governance mechanism, deepening the integration of positions, courses, competitions, and certifications in curriculum systems, building dual-skilled faculty teams, promoting digital transformation, and cultivating a strong craftsmanship culture can we effectively enhance the quality of vocational education talent cultivation.

Looking ahead, the group-based operation of vocational education will exhibit four key development trends: First, intelligent transformation. Technologies such as artificial intelligence, big data, and virtual reality will be more widely applied in vocational education, accelerating the formation of a smart education ecosystem. Second, green transition. With the development of new productive forces, green skills and sustainable development concepts will be more deeply integrated into talent cultivation systems. Third, international expansion. Vocational education groups will prioritize global collaboration and exchange, cultivating technical professionals with worldwide perspectives and international competitiveness. Fourth, lifelong learning services. These groups will provide lifelong education programs to broader social groups, building an all-rounder talent development framework.

The continuous innovation and improvement of the vocational education group model will provide stronger technical and skilled talent support for China's high-quality economic development, injecting new vitality into the construction of a modern vocational education system with Chinese characteristics. As an important direction for the development of vocational education, vocational education groups need to continuously summarize experience through practical exploration, optimize their models, and better serve industrial transformation and upgrading as well as the comprehensive development of individuals.

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