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Practical Dilemmas and Optimization Paths of Innovation and Entrepreneurship Education in Higher Vocational Colleges under the Background of New Quality Productive Forces

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Abstract

Driven by technological innovation, new quality productive forces place higher demands on the overall competence of the labor force, thereby assigning new contemporary connotations and missions to innovation and entrepreneurship education in higher vocational colleges. This paper examines the practical challenges confronted by such education within this emerging context. The findings indicate several prominent issues: a misalignment between curriculum design and industrial needs, insufficient innovation and entrepreneurship capabilities among faculty, inadequate depth in practical training platforms and industry-education integration, and a limited guiding function of existing evaluation mechanisms. To address these challenges, this paper proposes a set of systematic optimization strategies: reconstructing the curriculum system based on the integrated development of science–education–industry; cultivating "dual-qualified" faculty who possess both theoretical knowledge and practical experience; building collaborative practical training platforms that involve government, industry, academia, research, and application sectors; and establishing diversified evaluation mechanisms that emphasize innovative outcomes. The study concludes that higher vocational colleges must actively align with the development requirements of new quality productive forces, deepen the reform of innovation and entrepreneurship education, and cultivate high-quality technical and skilled talents who demonstrate innovative thinking, entrepreneurial awareness, and creative problem-solving capabilities.

Keywords: New Quality Productive Forces; Higher Vocational Colleges; Innovation and Entrepreneurship Education; Practical Dilemmas; Optimization Paths

1. Introduction

At present, the world is experiencing a new wave of scientific and technological revolution and industrial transformation. Breakthroughs in artificial intelligence, big data, quantum information, and other frontier technologies are accelerating, giving rise to new quality productive forces—an economic paradigm driven by technological innovation, grounded in the enhancement of labor competence, and supported by emerging production factors such as data. During an inspection tour in Heilongjiang, President Xi Jinping first articulated this significant concept, emphasizing the need to "integrate scientific and technological innovation resources, lead the development of strategic emerging industries and future industries, and accelerate the formation of new quality productive forces" (Xinhua News Agency, 2024). The emergence and evolution of new quality productive forces signify a transition from traditional productivity to advanced productivity. Their core driving force lies in technological innovation, their key carrier is a modern industrial system, and their fundamental guarantee is the cultivation of a high-quality labor force.

As a vital component of China's higher education system, higher vocational colleges undertake the mission of cultivating high-caliber technical and skilled talents, exemplary craftsmen, and master-level artisans. They function as an essential "talent incubator" for regional economic development and industrial upgrading. In the context of the rapid development of new quality productive forces, societal demand for talent has shifted from traditional skill-based, execution-oriented roles to roles requiring innovation, interdisciplinarity, and developmental capacity. Innovation and entrepreneurship education (hereafter referred to as "dual-innovation" education) is a critical means to foster innovative thinking and entrepreneurial competence, and it directly influences whether higher vocational colleges can effectively support the talent needs associated with new quality productive forces.

However, current practices of dual-innovation education in many higher vocational colleges still face multiple challenges concerning educational philosophy, instructional models, curriculum content, and teaching methods, which are misaligned with the demands of new quality productive forces. Therefore, analyzing these practical dilemmas and exploring scientifically grounded and feasible optimization strategies is not only necessary for deepening educational reform in higher vocational colleges, but also an urgent task for serving national strategic goals and promoting high-quality economic and social development. This paper will conduct a systematic investigation centered on these core issues.

2. The Intrinsic Logical Connection Between New Quality Productive Forces and Innovation and Entrepreneurship Education in Higher Vocational Colleges

There is a profound internal logical relationship between new quality productive forces and innovation and entrepreneurship education in higher vocational colleges, with the two mutually reinforcing and promoting each other.

First, new quality productive forces provide a new direction and value orientation for innovation and entrepreneurship education. They emphasize high-tech, high-efficiency, and high-quality industrial sectors such as artificial intelligence, biomanufacturing, and commercial

aerospace. This requires higher vocational colleges to break away from traditional models of innovation and entrepreneurship education, shifting the focus from general entrepreneurial knowledge dissemination to fostering technological innovation and the commercialization of scientific achievements, particularly in strategic emerging and future-oriented industries. As Zhou Wenqing argues, vocational education must adapt to industrial transformation: "Program offerings, curriculum content, and instructional methods require systematic restructuring to meet the new demands on talent knowledge structures and competencies brought about by the development of new quality productive forces" (Zhou, 2025). Therefore, innovation and entrepreneurship education is no longer a peripheral "supplement," but a core component in cultivating the talent structure required by new quality productive forces.

Second, innovation and entrepreneurship education injects vitality into the development of new quality productive forces. Since the essence of new quality productive forces is "innovation," and innovation ultimately relies on human initiative and creativity, cultivating innovative talent is crucial. Through innovation and entrepreneurship education, higher vocational colleges can stimulate students' innovative thinking, strengthen their ability to identify and solve practical problems, and enable them to become not only users of technology, but also improvers, innovators, and even creators of technology. These technically skilled talents with "dual-innovation" capabilities form the frontline force in promoting technological progress, process optimization, and business model innovation in enterprises. They act as "catalysts" for transferring scientific and technological achievements from laboratories to industrial production, integrating professional knowledge with market needs, conducting micro-innovations and small-scale inventions, and even establishing technology-based enterprises—thereby directly contributing to the formation and enhancement of new quality productive forces (Lü and Liang,2025).

Finally, both are aligned with the broader goal of promoting high-quality development. Whether advancing the formation of new quality productive forces or deepening innovation and entrepreneurship education, the ultimate purpose is to support high-quality economic and social development. Through high-standard innovation and entrepreneurship education, higher vocational colleges can cultivate talent more closely aligned with industrial upgrading needs, enhance employment quality, create new forms of work opportunities, and promote the comprehensive development of individuals at the micro level while improving national innovation capacity and core competitiveness at the macro level (Ma and He, 2024).

3. Practical Dilemmas of Innovation and Entrepreneurship Education in Higher Vocational Colleges under the Background of New Quality Productive Forces

Under the high requirements of new quality productive forces, the shortcomings of the traditional innovation and entrepreneurship education model in higher vocational colleges are becoming increasingly apparent, mainly facing the following four dilemmas.

3.1. Disconnect Between Curriculum System and Industrial Needs, Outdated and Rigid Content

The curriculum serves as the primary vehicle for talent cultivation. However, the current innovation and entrepreneurship curriculum systems in many higher vocational colleges exhibit evident delays and fragmentation. On one hand, course content still centers on general knowledge modules such as Entrepreneurship Fundamentals, Marketing, and Company Law, lacking substantive integration with specialized disciplines and emerging technologies (Gan et al, 2025). As a result, the curriculum fails to reflect the demands of new quality productive forces for digital, intelligent, and green competencies. The knowledge students acquire is thus disconnected from real-world industrial scenarios and technological frontiers.

On the other hand, the curriculum structure remains compartmentalized, with innovation and entrepreneurship courses and professional courses often operating independently of one another. As Huang Hui, Deputy Director of the Ministry of Education's Vocational Education Development Center, has noted, "In some vocational colleges, innovation and entrepreneurship education exists externally to the professional talent training system, lacking organic integration with professional education, which significantly diminishes educational effectiveness." This separation makes it difficult for students to internalize innovative thinking within their disciplinary learning processes, and prevents them from applying their professional skills meaningfully in innovation and entrepreneurship practices.

3.2. Insufficient "Innovation and Entrepreneurship" Capability of Teaching Staff, Homogeneous Structure

Teachers are the foundation and source of vitality for education. The success of innovation and entrepreneurship education in higher vocational colleges hinges on the teachers. However, the current teaching staff faces the dilemma of being "dual-qualified" but not proficient in "innovation and entrepreneurship." While most professional teachers possess solid theoretical expertise in their fields, they lack enterprise work experience and real entrepreneurial experience. Their understanding of practical knowledge such as market dynamics, business models, and financing channels is often superficial, leading to "armchair theorizing" in teaching. Conversely, the few teachers dedicated to innovation and entrepreneurship education often lack professional backgrounds in specific industrial fields, making it difficult for them to guide students in high-tech innovation projects (Tian and Ma, 2025). This structural contradiction renders the teaching staff inadequate for the compound teaching tasks combining "technology + innovation" required under the background of new quality productive forces. Research by numerous scholars also confirms that "insufficient enterprise practical experience and the need for improvement in technological R&D and innovation capability are key bottlenecks constraining the quality of the 'dual-qualified' teaching staff in vocational colleges."

3.3. Insufficient Depth of Practical Platforms and Industry-Education Integration, Weak Collaborative Education

Practice is the sole criterion for testing truth and the lifeblood of innovation and entrepreneurship education. Although most higher vocational colleges have established practical

platforms such as business incubators and maker spaces, most of these platforms have singular functions, primarily providing basic office space and simple policy consulting, and lack high-value-added services such as technical support, pilot-scale testing, and market connection. More importantly, industry-education integration and school-enterprise cooperation often remain at a superficial level, such as "signing agreements," "hanging plaques," and "short-term internships," failing to form a "community of shared future with intertwined interests." The lack of motivation and clear channels for enterprises to participate in innovation and entrepreneurship education results in students having limited exposure to real enterprise R&D processes and business environments (Yu and Zhang, 2024). Consequently, their innovation projects often "operate in isolation" and have very low market conversion rates. This "hollowing out" of practical platforms and "superficiality" of industry-education integration deprive innovation and entrepreneurship education of a solid practical foundation.

3.4. Weak Guidance of Evaluation Mechanisms, Lack of Incentive Effect

Evaluation functions as the “baton” that guides the direction of education. However, the current evaluation mechanisms for innovation and entrepreneurship education in higher vocational colleges still present several shortcomings. First, evaluation criteria remain overly singular, relying primarily on quantitative indicators such as course grades and competition awards, while placing insufficient emphasis on process-oriented and outcome-based dimensions—including students’ innovative thinking, practical application abilities, and the effectiveness of project incubation. Second, evaluation stakeholders are relatively homogeneous, with assessments mainly conducted within the institution. The absence of participation from external entities such as industry enterprises, entrepreneurship mentors, and investment institutions limits the validity and market relevance of evaluation results, making it difficult for them to reflect true societal and industrial recognition. Third, the utilization of evaluation results is inadequate. Evaluation outcomes are not effectively integrated into teachers’ professional title assessment, performance appraisal, or students’ credit recognition, awards, and honor systems. Consequently, both teachers and students lack strong intrinsic motivation to engage deeply in innovation and entrepreneurship activities. This evaluation mechanism, which tends to “emphasize form over substance,” significantly weakens the incentive and guiding functions of innovation and entrepreneurship education, thereby hindering its role in cultivating high-quality technical and skilled talent that meets the requirements of new quality productive forces.

4. Optimization Paths for Innovation and Entrepreneurship Education in Higher Vocational Colleges under the Background of New Quality Productive Forces

To address the aforementioned dilemmas, higher vocational colleges must orient themselves towards the development needs of new quality productive forces and undertake systematic and deep-seated reforms and innovations.

4.1. Restructuring the Curriculum System Centered on the Integration of "Science-Education-Industry"

Curriculum reform is the breakthrough point. Higher vocational colleges should break down disciplinary barriers and construct an integrated "science-education-industry" curriculum system that deeply merges technological innovation, professional education, and industrial needs.

(1) Content Update: Integrate knowledge, technologies, and case studies related to new quality productive forces, such as artificial intelligence, industrial internet, and green low-carbon development, into innovation and entrepreneurship courses. Develop modular course packages combining "major + innovation and entrepreneurship." For example, offer courses like "Innovative Design and Entrepreneurship of Intelligent Equipment" for mechatronics majors and "Data-Driven Business Model Innovation" for e-commerce majors.

(2) Model Innovation: Fully implement Project-Based Learning (PBL) and case teaching methods. Use real enterprise technical challenges or market pain points as project sources. Form interdisciplinary student teams who, under the joint guidance of teachers and enterprise mentors, complete the entire process from market research and technical solution design to prototype development and business plan writing.

(3) System Integration:Fully integrate innovation and entrepreneurship education into the talent training plan, achieving coherence from the "first classroom" to the "second classroom." Clearly define the cultivation objectives for innovative thinking and entrepreneurial ability within professional courses. Set innovation tasks during practical training and internships. Strengthen innovation and entrepreneurship practice through club activities, social practice, and skills competitions, forming an educational pattern involving all individuals, throughout the entire process, and across all aspects.

In response to the demands of new quality productive forces for intelligent technologies, Shenzhen Polytechnic took the lead in implementing the "AI + Majors" innovation and entrepreneurship curriculum reform. It integrated artificial intelligence and industrial internet into majors such as mechatronics and e-commerce, developing modular courses like "Innovative Design of Intelligent Equipment" and "Data-Driven E-Commerce Operations." The college adopted a "real-world enterprise projects + interdisciplinary teams" model—collaborating with Huawei and JingDong on themes such as "optimization of smart factory equipment" and "user growth for cross-border e-commerce platforms." These projects were jointly guided by academic instructors and enterprise engineers.

Over the past three years, students have developed 12 innovative outcomes based on course projects, three of which won provincial "Internet Plus" competition awards, and two projects were incubated in the college’s pilot base for technological commercialization. This case fully demonstrates how the integration of "science-education-industry" enhances students' innovation and practical capabilities.

4.2. Cultivating a "Dual-Qualified and Dual-Abled" Teaching Faculty

(1) Internal Cultivation and External Introduction: Implement a "Teacher Enterprise Practice Empowerment Plan," establish special funds to support professional teachers in undertaking posts for practical training or technical research for over six months in leading enterprises, high-tech firms, and research institutes, allowing them to personally participate in R&D and project incubation. Simultaneously, flexibly introduce a group of entrepreneurs, investors, technical experts, and outstanding alumni to serve as industry professors or entrepreneurship mentors, deeply involved in curriculum teaching and project guidance.

(2) Team Building: Establish "tripartite structure" teaching teams composed of professional teachers, innovation/entrepreneurship teachers, and industry mentors to jointly develop courses, guide projects, and evaluate outcomes. Through teamwork, compensate for the knowledge gaps of individual teachers and achieve complementary advantages.

(3) Incentive Mechanisms: Reform teacher evaluation and promotion systems. Incorporate teachers' contributions in guiding student innovation and entrepreneurship projects, commercializing technological achievements, and serving enterprise innovation into important indicators for performance assessment and professional title evaluation, thereby stimulating teachers' enthusiasm and creativity in engaging with innovation and entrepreneurship education.

Zhejiang Financial College implemented the "Financial Craftsman Cultivation Program." On one hand, it dispatched faculty from FinTech and Accounting majors to undertake practical training at Ant Group and Pan-China Certified Public Accountants, participating in projects such as blockchain-based financial product design and corporate financial digital transformation. On the other hand, the college flexibly recruited 15 industry mentors, including blockchain experts from Ant Group and CPAs from Pan-China, to form tripartite teams comprising "professional instructors, innovation/entrepreneurship teachers, and industry mentors."

Over the past two years, these teams have guided students in completing eight innovation projects, including "Blockchain-based Supply Chain Finance for SMEs" and "Intelligent Financial Robots." Two of these projects were approved at the provincial-level Innovation and Entrepreneurship Training Program. Additionally, faculty members were honored with the "Zhejiang Technical Expert" award, effectively addressing the challenge of "dual-qualified teachers lacking innovation and entrepreneurship capabilities."

4.3. Building Collaborative "Government-Industry-University-Research-Application" Practical Platforms

Platforms serve as foundational support. Higher vocational colleges should take proactive measures and collaborate with government, industry, and research institutions to construct comprehensive and efficiently operated “government–industry–university–research–application” collaborative platforms for talent cultivation.

(1) Substantive Construction: Existing on-campus makerspaces and incubators should be upgraded by introducing small-scale pilot production lines, testing equipment, and other facilities, thereby forming integrated, full-chain incubation systems that connect makerspace → incubator

→ accelerator. Meanwhile, colleges should jointly establish “Industry Colleges” or “Future Technology Colleges” with local governments and industrial parks, promoting the organic alignment of the education chain, talent chain, industrial chain, and innovation chain.

(2) Project-Based Operation: A project-driven operation mechanism should be implemented under the principle of “enterprises propose problems, universities explore solutions, and the market evaluates outcomes.” The college should regularly collect enterprises’ technological demands and innovation topics and publicly release them for faculty and students to undertake. The college provides space, equipment, and seed funding; enterprises offer technical mentorship and market resources; achievements are jointly shared and risks are co-managed, thereby enhancing the practicality and application value of innovation outcomes.

(3) Ecological Cultivation: Financial resources such as angel investment and venture capital should be actively introduced. Regular project roadshows and investment-matching events should be organized to create financial support pathways for student innovation projects. Additionally, partnerships with professional service institutions in intellectual property, law, and finance should be strengthened to provide one-stop support for student entrepreneurship, thereby fostering a robust innovation and entrepreneurship ecosystem.

Jiangsu Vocational College of Economics and Trade collaborated with the Nanjing Jiangning High-Tech Zone Management Committee and the Jiangsu Association of Artificial Intelligence to establish the "Smart Industry Innovation and Entrepreneurship Park." They created an integrated platform spanning "makerspace-incubator-accelerator," equipped with an IoT pilot line and intelligent product testing facilities. The platform implements a mechanism where "enterprises pose challenges, and the college devises solutions." For instance, in partnership with Suning Tesco, it identified the need to "optimize intelligent retail terminals." Student teams conducted research and designed a "vision recognition-based restocking system for unmanned smart cabinets." Simultaneously, angel investment institutions were introduced to provide seed funding for outstanding projects, achieving deep integration of the educational and industrial chains.

4.4. Establishing a Diversified Evaluation Mechanism Guided by Innovative Outcomes

Evaluation serves as an essential guarantee, and higher vocational colleges must reform their evaluation mechanisms to ensure that this “baton” plays its proper guiding role.

(1) Diversified Evaluation Criteria: A comprehensive evaluation system should be established that integrates the dimensions of knowledge, ability, and outcomes. On the basis of assessing students’ mastery of theoretical knowledge related to innovation and entrepreneurship, greater emphasis should be placed on evaluating their innovative thinking, teamwork skills, and practical application abilities. Meanwhile, tangible innovative outcomes—such as patent applications, academic publications, project implementation, company establishment, and acquisition of investment—should be used as core evaluation indicators.

(2) Diversified Evaluation Subjects: A multi-stakeholder evaluation committee should be formed, consisting of university instructors, enterprise mentors, industry experts, and representatives from investment institutions. This committee should conduct multi-perspective

and comprehensive evaluations of students' innovation and entrepreneurship projects to enhance the objectivity, professionalism, and market orientation of evaluation results.

(3) Diversified Utilization of Evaluation Results: The outcomes of innovation and entrepreneurship evaluations should be closely linked to students' credit recognition, scholarship selection, and postgraduate recommendation opportunities. Meanwhile, they should also be integrated into teachers' performance assessments, commendation systems, and professional title promotions. In addition, establishing a "Innovation and Entrepreneurship Achievement Commercialization Award" can provide strong recognition and incentives to teacher-student teams that achieve significant accomplishments, thereby fostering a clear value orientation that respects innovation and emphasizes value creation.

5. Conclusion

The rise of new quality productive forces has created unprecedented development opportunities for higher vocational colleges, while also posing significant challenges. As a critical link between education and the economy, as well as between theory and practice, the reform and enhancement of innovation and entrepreneurship education has become an essential pathway for higher vocational colleges to respond to these evolving demands. In the face of practical difficulties—such as misalignment between curriculum and industry needs, insufficient faculty capacity, weak practical training platforms, and outdated evaluation systems—higher vocational colleges must adopt systematic and holistic reform strategies. Specifically, advancing reform requires restructuring the curriculum around the integrated development of science–education–industry, cultivating a "dual-qualified and dual-capable" faculty with both theoretical literacy and practical expertise, constructing collaborative practical training platforms across government–industry–university–research–application sectors, and establishing diversified, outcome-oriented evaluation mechanisms. Through these measures, higher vocational colleges can build a new ecosystem for innovation and entrepreneurship education that aligns with the developmental logic and talent demands of new quality productive forces. Only by doing so can higher vocational colleges effectively fulfill their mission of cultivating high-quality technical and skilled professionals equipped with innovative awareness, entrepreneurial capability, and creative potential, thereby contributing the vital "strength of vocational education" to accelerating the formation of new quality productive forces and advancing Chinese modernization.

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