



Practical Application Research of Industry Colleges in Higher Vocational Institutions--A Case Study of Kunpeng Industry College

Lei Xiang, Qi He *

Department of Information Engineering Hunan Automotive Engineering Vocational University,
Zhuzhou, Hunan, 412001 China

*Corresponding author: Qi He
279487906@qq.com, *52944069@qq.com

Abstract. The "Five Golden Constructions" constitute the core "new infrastructure" for driving high-quality development in vocational education. As an institutionalized vehicle for industry-education integration, the industry college provides an organized practical platform for implementing the Five Golden Constructions. Grounded in the typological characteristics of vocational education—namely "cross-boundary, integration, and reconstruction"—and integrating the concept of professional clusters, this paper systematically examines the theoretical logic and operational mechanisms underlying the practice of industry colleges. Taking Kunpeng Industry College as a representative case, the study conducts applied research centered on the Five Golden elements. Through deep integration of professional clusters with the Five Golden Constructions, a new paradigm of collaborative education has emerged, oriented toward industrial clusters and bonded by industry-education integration. Empirical data from diverse practical outcomes indicate that this model offers a replicable framework for higher vocational institutions to systematically implement the Five Golden Constructions.

Keywords: Industry College; Five Golden Constructions; Professional Clusters; Industry-Education Integration

1 Introduction

Under the background of digital economy and industrial upgrading, deepening the integration of industry and education is the main line of vocational education reform, but the structural dilemma of "hot schools and cold enterprises" has not been solved for a long time, with more surface cooperation and less deep linkage, and the dislocation of talent supply and industrial demand is prominent. Taking Kunpeng Institute of technology as a case, this paper deeply analyzes its practice path of "cluster docking, course certificate integration, school enterprise co editing, two-way flow, virtual and real combination", refines the construction paradigm of "professional cluster building framework, hardware elements filling flesh and blood", reshapes the operation mech-

anism of industry education integration with systematic reform, and tries to solve the fragmentation dilemma. It provides a reference and popularized landing scheme for the connotation construction of the Institute of industry.

2 Analysis of Existing Problems in Industry-Education Integration in Vocational Education

Currently, industry-education integration in China's vocational education still faces several structural challenges that urgently require breakthroughs at the levels of institutional design and operational mechanisms.

First, institutional logic contradiction. Schools follow educational logic, pursuing systematic and long-term talent cultivation; enterprises follow market logic, pursuing profits and risk control. This misalignment of values has led to the persistent problem of "enthusiastic schools but lukewarm enterprises," with enterprise participation in talent cultivation mostly remaining at a shallow level.

Second, high collaboration input costs. School-enterprise cooperation requires substantial non-teaching costs such as coordination, curriculum development, and quality assessment[1]. Information asymmetry and the lack of benefit-sharing mechanisms make it difficult for enterprises to calculate direct returns, while they bear hidden risks such as disruption of production order, thereby lacking intrinsic motivation for sustained participation.

Third, fragmented resource integration. Key elements such as curricula, faculty, and training facilities have not been systematically aligned. Most cooperation remains at superficial levels such as "plaque-based bases" and "visiting internships," lacking deep integration through joint development of loose-leaf teaching materials, co-cultivation of double-qualified teaching teams, and co-definition of industry standards, making it difficult to form a closed-loop ecosystem.

Fourth, simplistic outcome evaluation. Existing evaluations focus heavily on output indicators such as employment rates and certificate numbers, while neglecting enterprise benefits and industrial adaptability. They lack dynamic monitoring of process quality and long-term value, resulting in industry-education integration that is "integrated in name but not in depth," or even formalism[2].

The above problems indicate that fragmented projects or one-sided policy pushes can hardly address the high costs of school-enterprise cooperation. The "Five Golden Constructions" approach responds to these pain points at a systemic level: "Golden Majors" aligned with industrial chains resolve target misalignment; "Golden Courses" and "Golden Teaching Materials" integrated with real production tasks reduce enterprise development costs; shared "Golden Bases" materialize resources; and "Golden Faculty" strengthen process evaluation and feedback. Restructuring the intrinsic incentives and operational mechanisms of industry-education integration around the "Five Golden Constructions" is the only way to fundamentally resolve the collaboration dilemma and demonstrate its unique value distinct from traditional approaches.

Against the backdrop of the in-depth implementation of the "Five Golden Constructions," industry colleges, as a new organizational form of industry-education

integration, are increasingly becoming the institutional platforms and core carriers for higher vocational colleges to operationalize the "Five Golden Constructions." The Kunpeng Industry College is an industry-education integration platform jointly established by the researcher's institution and Huawei along with other Kunpeng ecosystem enterprises. It aims to build a four-in-one industrial ecosystem involving "government, enterprises, schools, and industry associations" and to cultivate compound, practice-oriented talents in the field of IT application innovation (xinchuang). Systematic explorations have been carried out in areas such as professional cluster development, curriculum system restructuring, faculty development, and construction of practical training platforms, resulting in rich accumulated experience in construction.

3 Logical Framework of the Five Golden Constructions from the Perspective of Industry Colleges

It is necessary to clarify the theoretical relationships among industry colleges, professional clusters, and the Five Golden Constructions. These relationships are not a mere policy overlay but a structural manifestation of the inherent logic of vocational education.

3.1 Typological Characteristics of Vocational Education and the Institutional Response of Industry Colleges

As a distinct educational type, vocational education is characterized by "cross-boundary, integration, and reconstruction"—that is, crossing boundaries between industry and education, and reconstructing the logical chain from knowledge acquisition to competency development. However, traditional academic structures, specialty setups, and training models often remain bound by convention, making it difficult to translate enterprises' real needs into teachable elements.

The industry college is precisely an institutional response to this challenge. It is not merely a nameplate but a substantive educational platform that adopts professional clusters as its organizational form, industry-education integration as its operational mechanism, and the Five Golden Constructions as its quality assurance lever. By breaking down barriers between schools and industries, it reorients the allocation of teaching elements away from traditional specialty-based logic and toward the competency demands of industrial chains and job clusters. Thus, the industry college becomes an institutional embodiment of the typological characteristics of vocational education.

3.2 The Elemental Logic and Mutual Support of the Five Golden Constructions

From the perspective of vocational education's elemental theory:

The core of golden specialties (Jin Zhuan) lies in dynamically aligning specialty offerings with regional industrial clusters. The "golden" nature is reflected in four dimensions: (1) service effectiveness, the degree of fit between specialty structure and

industrial structure; (2) faculty quality, the proportion of dual-qualified teachers and participation of enterprise engineers; (3) outcome richness, including competition results, graduate salaries, and employer satisfaction; and (4) demonstration depth, the replicability of the construction model across similar institutions[3].

The core of golden courses (Jin Ke) is a work-process orientation, treating "job content – professional standards – learning tasks" as different facets of a single continuum. It shifts course logic from "specialty-centered" to "production-centered," moving from knowledge-and-skill instruction to typical task-driven learning.

The core of golden textbooks (Jin jiao Cai) consists of joint school–enterprise development that incorporates cutting-edge technologies and real projects, forming a new four-in-one textbook model: "paper-based textbook + digital resources + virtual simulation + online assessment." Textbooks are no longer static repositories of knowledge but dynamic windows reflecting the evolution of industrial technology.

The core of golden teachers (Jin Shi) is building a high-quality "dual-qualified" faculty. Dual qualification should not merely mean holding two certificates; it refers to cross-boundary professionals capable of project development, technical service, and pedagogical transformation within real production scenarios. The key mechanism is the "two-way flow and integration" of school and enterprise personnel.

The core of golden bases (Jin Di) is constructing industry-education integrated internship and training facilities. The construction standard is not the total value of equipment but whether the training environment is "zero distance" from real production settings and whether training projects match real enterprise tasks in difficulty.[4] The mainstream direction is production-oriented training bases that combine virtual and physical elements.

Notably, the Five Golden are not a simple list but an organic system: golden specialties provide the direction; golden courses serve as the core vehicle for transmitting knowledge, skills, and professionalism; golden textbooks are the carrier that solidifies course content; golden teachers are the key to activating all elements; and golden bases are the platform that supplies authentic or simulated conditions for practical teaching. The five elements are mutually reinforcing and indispensable.

3.3 Professional Clusters as the Organizational Framework for Integrating the Five Golden Elements

The concept of professional clusters is derived from applying industrial cluster theory to vocational education. It requires breaking the linear boundaries of traditional specialties and organizing several specialties linked by industry chain or common technical foundation into a cluster that shares resources and develops collaboratively.

Professional clusters are deeply coupled with the Five Golden Constructions. A clustered specialty layout provides a systemic perspective for building golden specialties; course sharing and modular integration across specialties create collaborative space for developing golden courses; a clustered teacher allocation mechanism requires that golden teachers construction transcend departmental boundaries toward cross-specialty teamwork; and cluster-based textbook development and base utilization

naturally demand resource sharing and standard mutual recognition at the levels of golden textbooks and golden bases.

Therefore, industry colleges should be designed organizationally according to the professional cluster concept, while the Five Golden Constructions serve as the internal quality assurance for realizing the functions of professional clusters. The two are mutually constitutive and together form the theoretical nucleus of industry college practice.

4 Case Analysis: An Applied Anatomy of the Five Golden Constructions at Kunpeng Industry College

Kunpeng Industry College takes Huawei's Kunpeng computing ecosystem as its core technical foundation, aligning with the national ITAI strategy and the development needs of the regional digital economy. Synthesizing industry college practices and adopting the perspective of a vocational education researcher, this section extracts five paired practical pathways organized around the Five Golden elements.

4.1 Golden Specialties: Cluster Alignment and Chain Integration

The primary task of constructing golden specialties is not to create an isolated exemplary specialty but to build professional clusters around industrial chains. Kunpeng Industry College's core approach is to establish a "one body, two wings" professional group structure, organically integrating golden specialty development with the clustered development of specialties such as artificial intelligence and big data.

The college focuses on the digital economy and new energy vehicles, building a full-chain professional system from underlying chip adaptation to upper-level application development around the Kunpeng ecosystem. Its specialties cover all programs within the School of Big Data and Artificial Intelligence, serving nearly 3,000 students. By integrating resources from the secondary school, it has constructed a three-in-one cluster architecture—"Kunpeng Industry College + Huawei ICT Academy + Digital Talent Training Base"—achieving precise alignment between professional groups and industrial chains, talent demand chains, and innovation chains.

This "cluster alignment, chain integration" approach shifts specialty provision from a supply-oriented logic ("offer specialties based on available teachers") to a demand-oriented logic ("build professional groups based on industrial talent needs") [5]. Data indicate that clustered specialty layout significantly enhances the fit between talent cultivation and industrial demand, providing a structural foundation for subsequent course, teacher, and base construction.

4.2 Golden Courses: Course–Certification Integration and Modular Reorganization

The key to constructing golden courses lies in breaking discipline-based curriculum logic and establishing a modular curriculum system based on work processes. Kunpeng

Industry College's golden course system highlights the core strategy of "course–certification integration"—embedding the standard requirements of Huawei's ICT certification system into the school curriculum. By frontloading certification content into the curriculum, students' course completion simultaneously functions as their exposure to industry standards, substantially shortening the school-to-work transition period.

The college integrates Huawei's certification system into teaching, aligning courses with Huawei certification levels and incorporating real enterprise cases, thereby achieving an integrated teaching model that combines "school classrooms, virtual classrooms, and enterprise workshops." ITAI technology is systematically embedded in multiple general courses. Job competency standards are transformed into course objectives, and typical work tasks are converted into teaching projects, attaining precise alignment between course content and professional standards. Practical results show that modular curriculum reorganization significantly enhances student motivation, giving them a clear understanding of "what to learn, what to test, and what to use."

4.3 Golden Textbooks: School–Enterprise Co-development and Form Innovation

Traditional textbook development, often undertaken independently by teachers, tends to lag behind the pace of industrial technological change. Kunpeng Industry College promotes a joint school–enterprise development mechanism, integrating cutting-edge technologies, real project cases, and digital resources into its textbooks. The textbook format is expanded from a single paper-based version to a three-dimensional resource package comprising "paper-based textbook + micro-lecture videos + virtual simulation projects + online assessment." This supports not only classroom instruction but also self-directed learning, remote training, and skills assessment. Organizationally, "loose-leaf" and "manual-style" designs are adopted, allowing quick updates in response to technological evolution, thereby truly achieving the principle of "teaching following industry output, with industry and education progressing together."

Vocational education researchers should recognize that the essence of golden textbook construction is transforming enterprises' technical knowledge from tacit to explicit and from fragmented to systematic. Enterprise engineers possess rich hands-on experience but may lack pedagogical transformation skills; school teachers excel in instructional design but may be disconnected from frontline practice. Joint textbook development is the key pathway to combining these two strengths[6].

4.4 Golden Teachers: Two-Way Flow and Dual Empowerment

The bottleneck in constructing golden teachers is often not whether teachers hold skill certificates, but whether they possess genuine project-based experience in enterprise settings. Kunpeng Industry College adopts "two-way flow" as its core mechanism, breaking down identity barriers between schools and enterprises. Relying on the Zhuzhou Digital Talent Training Base, it pools resources from government, universities, and enterprises for teacher training. To date, more than ten teachers have obtained

Huawei official authorized certification instructor qualifications, equipping them to deliver Huawei enterprise certifications. Simultaneously, a "school–enterprise dual-tutor system" is fully implemented, achieving "100% of specialized teachers holding certificates."

By implementing teacher rotations into enterprise positions, teachers enhance their practical skills while providing enterprises with intellectual support for technical R&D and talent training. Enterprise engineers entering the classroom bring authentic cases to students while prompting systematic reflection on their own practical experience. This dual empowerment mechanism fundamentally changes the previous deadlock of "enterprises unwilling to send personnel, schools unable to send teachers out," transforming faculty development from one-way transfusion to two-way circulation[7].

4.5 Golden Bases: Virtual–Real Integration and Platform Synergy

The construction of golden bases at Kunpeng Industry College is characterized by a pronounced virtual–real integration. Leveraging Huawei's mature cloud platform technology, a comprehensive training base has been built that integrates teaching, training, R&D, and services. An industry-education integration training cloud platform for Kunpeng Industry College has been established, housing 68 training project cases deployed in environments such as the localized Kunpeng cloud platform, operating system, and database. Students can remotely access real enterprise-grade development environments via the cloud, completing the entire training process from environment configuration to code debugging, which significantly lowers the barrier associated with purchasing high-cost hardware. Furthermore, using the platform, multiple job fairs are held jointly with Huawei and ecosystem enterprises, forming a closed-loop chain from "talent cultivation – skill certification – internship – employment."

The virtual–real integrated platform model offers several advantages. First, it overcomes the spatiotemporal constraints of traditional training rooms, allowing students to train anytime, anywhere[8]. Second, it enables personalized "one-student-one-environment" training, resolving equipment shortages. Third, recording students' entire training process data via the cloud provides technical support for learning analytics and precise evaluation.

5 Practical Outcomes and Outcome Data Analysis

The ultimate goal of the Five Golden Constructions is to improve the quality of educational provision and talent cultivation. Kunpeng Industry College has achieved quantifiable and significant results across several key indicators, as detailed below.

5.1 Certification Pass Rates and Talent Cultivation Scale

Driven by the course–certification integration curriculum system, the certification pass rate of students at Kunpeng Industry College significantly exceeds that of conventional training channels. Over the past three years, 378 students have taken Huawei certifi-

cation exams, achieving a pass rate of 92%, leading comparable institutions. During the same period, students have won three national first prizes, twelve second prizes, and twelve third prizes in various skill competitions, as well as nine provincial first prizes, sixteen second prizes, and twenty-five third prizes.

These data strongly indicate that course–certification integration, through systematic curriculum restructuring, genuinely enhances students' technical competence. From the perspective of vocational education quality evaluation, third-party authoritative certification pass rates and skill competition outcomes better reflect the true quality of talent cultivation than internal assessments alone.

5.2 Employment Quality and Salary Levels

Employment rate and quality are the ultimate benchmarks for evaluating the effectiveness of the Five Golden Constructions. The overall employment rate for the 2025 graduating class of Kunpeng Industry College reached 92.3%, significantly higher than the average for comparable specialties in the same period. More revealing are the salary figures: the average monthly internship salary was 4,660 RMB, rising to 5,800 RMB upon formal employment; HCIE-certified students achieved monthly salaries up to 15,000 RMB, with annual salaries exceeding 100,000 RMB. Huawei certification functions as "hard currency" in corporate recruitment. From a vocational education perspective, high employment rates and salaries are not attributable to one or two courses but result from the systematic integration of the Five Golden: the professional cluster aligns with industry direction, courses integrate with certification, textbooks reflect cutting-edge technology, teachers possess practical capability, and the base provides an authentic environment—all five are indispensable.

5.3 Teaching Resource Construction Outcomes

The construction of teaching resource databases provides foundational support for the continuous improvement of the Five Golden Constructions. Kunpeng Industry College has established one provincial-level professional teaching resource database for big data technology. It has co-developed four textbooks with Huawei, including one national planned textbook, built the Zhuzhou Digital Talent Training Base, and introduced real enterprise project cases. Based on Kunpeng Industry College, the institution was officially approved as a "Huawei ICT Academy." Teachers, collaborating with enterprises, have won four provincial awards in teaching ability competitions.

The significance of these outcomes lies not only in quantitative accumulation but also in forming a replicable and extendable construction model. They provide reference curriculum systems, certification integration schemes, and training platform construction experience for subsequent institutions that join the Kunpeng ecosystem.

6 Conclusions and Recommendations

By applying the "Five Golden Constructions" strategy to the operation and development of the Kunpeng Industry College, significant results have been achieved. Students enrolled in the Industry College have shown notable improvements in knowledge, skills, certifications, and other aspects. In particular, compared to the period before the Industry College was established, the quality of talent cultivation has been significantly enhanced. Therefore, the research team has drawn the following conclusions.

First, industry colleges provide a practical platform for the Five Golden Constructions. The Five Golden Constructions constitute a systemic project. Through organizational innovation, industry colleges integrate scattered teaching element reforms into an institutionalized implementation system, serving as an effective vehicle for operationalizing the Five Golden Constructions[9].

Second, the professional cluster concept and the Five Golden Constructions are deeply integrated, forming the dual driving force for industry college development. Professional clusters require cross-specialty resource restructuring and clustered competency cultivation, while the Five Golden Constructions provide the elemental support for such restructuring. This integration resolves the previous fragmentation of teaching elements, moving professional group construction from external morphological change to internal quality improvement, thereby creating a new dynamic in which "professional clusters build the skeleton, and the Five Golden elements supply the substance."

Third, the practical outcomes exemplified by Kunpeng Industry College offer quantifiable and replicable operational solutions for implementing the Five Golden Constructions in higher vocational institutions. With "course–certification integration" as its core strategy, "two-way flow" as its teacher mechanism, and "virtual–real integration" as its base model, Kunpeng Industry College has achieved solid results in certification pass rates, employment quality, and teaching resource development[10]. This model provides an important reference paradigm for the Five Golden Constructions in other industrial domains.

Looking ahead, industry college construction should focus on continuous improvement in the following three areas. First, further develop a long-term incentive mechanism for school–enterprise cooperation, using institutional designs such as cost-sharing and risk-sharing to address the systemic challenge of "schools enthusiastic, enterprises lukewarm." Second, promote the Five Golden elements from physical stacking to chemical reaction, establishing an interlinked evaluation and closed-loop improvement mechanism among the five components. Third, strengthen the dynamic adaptation mechanism between professional clusters and regional industrial clusters, building a linkage model that integrates industrial talent demand early-warning with dynamic specialty adjustment, thereby truly achieving the principle of "teaching following industry output, with industry and education progressing together," and ultimately cultivating a larger number of high-quality technical and skilled talents.

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References

1. Practical Pathways for Industry-Education Integration Driving the New "Five Golden Constructions" in Vocational Colleges [EB/OL]. China Internet Information Center, 2025-08-06.
2. Shi Junqi. "Double High" "Five Golden Constructions": Provincial Layout and Institutional Promotion Forming Joint Forces [N]. China Education Daily, 2025-03-11.
3. Multi-stakeholder Collaboration Builds Ecosystem, "Five Goldens" Foundation Cultivates Craftsmanship Talents [N]. China Education Daily, 2025-12-05.
4. Zeng Tianshan, Xu Ye, Lu Yuzheng. Leveraging Vocational Education Reform through the "Linkage" of Key Teaching Elements [N]. China Youth Daily, 2026-04-10.
5. Li Mingyi. Design and Exploration of Effective Integration between Higher Vocational Colleges and Kunpeng Industry – A Case Study of Hubei Science and Technology College [J]. China Educational Technology & Equipment, 2024(05):123-125.
6. Wu Huixin, Han Ke. Research on Industry-Education Integration Talent Training Model Based on Kunpeng Ecosystem [J]. Journal of North China University of Water Resources and Electric Power (Social Science Edition), 2023,39(05):38-42.
7. Cui Yi. Exploration and Practice of Kunpeng Industry College Construction under the Background of Industry-Education Integration – A Case Study of Hebei Youth Administrative Cadres College [J]. Journal of Hebei Youth Administrative Cadres College, 2023,35(03):65-68.
8. Gong Chengqing. Research and Practice on the Construction of Industry Colleges Featuring "Three Alignments, Five Co-constructions" [J]. Journal of Changjiang Engineering Vocational College, 2026,43(01):40-44.
9. Wang Taotao, Ma Fengqi. Research on the Motivation Mechanism for Enterprise Participation in Industry College Construction in Higher Vocational Colleges – Empirical Analysis Based on Multiple Factors [J]. Vocational and Technical Education, 2026,47(06):59-66.
10. Dong Jing, Li Zhaoping. Analysis of Realistic Dilemmas and Research on Construction Pathways for Industry Colleges in Vocational Colleges [J]. Shanxi Youth, 2026(01):52-54.

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