

Practice and Countermeasures for Cultivating Craftsmanship Skills of Vocational College Students through Industry-Education Integration

Qingge Du*

Sanmenxia Polytechnic, Sanmenxia 472000, Henan, China

**Author to whom correspondence should be addressed.*

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Abstract: As China's industrial structure continues to upgrade, the market's demands for technical and skilled talents are steadily rising. Employers now place not only high value on students' practical skills but also increasingly emphasize their professional attitude, professional ethics, and innovative capabilities—essentially the “craftsman spirit” advocated in the new era. As the primary arena for cultivating technical and skilled talents, higher vocational colleges must leverage an educational model that integrates industry with education and fosters collaboration between schools and enterprises to embed the craftsman spirit throughout the entire process of talent cultivation. In recent years, domestic higher vocational colleges have actively responded to national vocational education reform policies by continuously advancing initiatives such as joint establishment of practical training bases with enterprises, pilot programs for the modern apprenticeship system, and customized training classes, thereby accumulating substantial practical experience in cultivating the craftsman spirit. However, from the perspective of overall educational outcomes, the cultivation of the craftsman spirit among higher vocational students still faces several practical challenges at this stage, including insufficient depth of school-enterprise collaborative education, an incomplete framework for cultivating these competencies, a weak linkage between teaching and practice, and outdated assessment and evaluation methods. Based on this analysis, this paper examines the current state of craftsman spirit cultivation in higher vocational colleges, identifies the prominent issues and underlying causes within the implementation process, and proposes improvement strategies focusing on areas such as school-enterprise collaboration mechanisms, curriculum and teaching reforms, faculty development, diversified evaluation systems, and the cultivation of an educational culture, with the aim of further enhancing the quality of craftsman talent cultivation in higher vocational colleges and supplying high-quality technical and skilled professionals to local industries.

Keywords: Industry-education integration; Higher vocational colleges; Craftsmanship competencies; Talent development

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1.Introduction

As efforts to advance high-quality development intensify, the transformation and upgrading of the real economy have imposed higher demands on the quality of vocational education talent cultivation. Currently, the industry most urgently requires skilled artisans who possess both technical competence and strong professional qualities. The “15th Five-Year Plan for Education Development” explicitly states that efforts should be accelerated to advance the “New Dual Highs” initiative in vocational education—focusing on enhancing institutional capacity and improving the quality of industry-education integration—to establish a modern vocational education system and cultivate master craftsmen, skilled artisans, and highly skilled professionals ^[1]. The “Vocational Education Law of the People’s Republic of China” legally establishes an educational model based on industry-education integration and school-enterprise cooperation, stipulating that industries and enterprises must actively participate in talent cultivation to achieve deep integration between the education chain and the industrial chain ^[2]. Craftsmanship literacy is not merely a set of technical skills; it represents a comprehensive set of professional qualities encompassing a dedication to one’s profession, a pursuit of excellence, a focused and persistent work attitude, an enterprising spirit that upholds tradition while embracing innovation, and a professional ethic grounded in compliance with laws and regulations. These intrinsic qualities cannot be cultivated solely through classroom-based theoretical instruction; rather, they must be gradually developed through exposure to authentic corporate production environments, hands-on job practice, and long-term professional immersion. The industry-education integration model can break down the barriers between campus teaching and enterprise production by providing students with realistic job training scenarios, high-quality industry faculty, and a comprehensive environment for vocational education—making it an effective approach for cultivating the craftsmanship literacy of higher vocational college students.

Currently, higher vocational colleges are generally advancing reforms to integrate industry with education by establishing industry-oriented colleges, school-enterprise practical training centers, and implementing the modern apprenticeship system, all of which aim to incorporate the spirit of craftsmanship into talent cultivation. However, in practice, most school-enterprise collaborations remain at a superficial level, focusing merely on arranging student internships or facilitating job placement; consequently, the cultivation of craftsmanship competencies often remains merely a formality, without establishing a systematic and sustained cultivation mechanism ^[3]. Analyzing the current state of talent cultivation, examining the existing challenges within this process, investigating their underlying causes, and proposing improvement measures hold significant practical importance for enhancing the quality of higher vocational education and fostering students’ long-term professional development.

2. Current status and challenges in the cultivation of craftsmanship literacy among higher vocational college students within the context of industry–education integration

Driven by national policy guidance and industry demands, higher vocational colleges in China have been continuously advancing the integration of industry and education reform, actively exploring methods to cultivate craftsmanship competencies, and have already established a relatively stable practical model.

First, higher vocational colleges collaborate with enterprises to establish practical training platforms and create a professionalized training environment. To align teaching practices with the production standards of

enterprise positions, most higher vocational colleges have partnered with leading local industrial enterprises to jointly establish specialized practical training bases and shared productive training workshops. These institutions conduct practical training and management activities in accordance with the actual production processes, quality inspection standards, and on-site management systems of the enterprises, ensuring that students can operate according to job requirements during their on-campus training. Through continuous hands-on practice, students gradually develop standardized operational habits, prioritize quality, and cultivate a rigorous and meticulous work ethic, thereby laying a solid practical foundation for fostering the spirit of craftsmanship.

Second, higher vocational colleges should vigorously promote the modern apprenticeship system and the customized training program model to achieve collaborative education involving both the college and the enterprise. Currently, many higher vocational colleges have already implemented these two models in their key majors, enabling students to hold dual identities as both students and apprentices. Under the dual-qualified educator model, college faculty typically teach professional theory and fundamental skills, while technical experts from the enterprise provide guidance on practical job operations. Leveraging their extensive industry experience, enterprise mentors not only impart technical skills but also emphasize cultivating students' professional sense of responsibility, quality awareness, and industry-specific professional culture, gradually shaping students' professional character through their daily practice—both verbally and by example.

Third, it is essential to enrich the craft culture activities within campuses and foster a positive educational environment. Currently, most higher vocational colleges employ various methods—such as organizing skill competitions, hosting a skills culture festival, arranging craftsmanship lectures, and facilitating experience-sharing sessions among outstanding graduates—to widely disseminate the spirit of craftsmanship. Vocational skill competitions enable students to continuously refine their skills, improve their craftsmanship processes, and strive for the highest quality; inviting craftsmen to visit the campus allows students to directly engage with the career journeys of industry role models, which helps them develop a correct perspective on employment, strengthen their professional confidence, and gradually cultivate a campus culture that respects technical expertise and values artisanal dedication.

Fourth, educators must continuously strengthen the development of “dual-qualified” faculty teams to solidify the foundation for education. All universities should strictly implement a faculty enterprise practice system by regularly arranging for professional faculty members to participate in project-based practical work at enterprises, including production projects, process optimization, and technical development; this will enable faculty members to gain deeper insights into the industry and continuously update their knowledge. When returning to campus to teach, faculty members can incorporate real-world case studies from enterprises into their instruction, integrating industry quality standards and occupational competency requirements into both classroom teaching and practical training guidance, while emphasizing the cultivation of the “craftsman spirit” among students throughout their daily teaching activities.

3. Key challenges in leveraging industry-education integration to enhance the cultivation of craftsmanship competencies among higher vocational students

Although higher vocational colleges have undertaken extensive efforts in integrating industry with education to foster talent development, the effectiveness of cultivating craftsmanship competencies remains suboptimal,

necessitating further improvements to the overall quality of educational outcomes.

3.1. There is a mismatch between the educational objectives of schools and enterprises, resulting in low participation of enterprises in talent cultivation

There are significant differences in the value orientations of schools and enterprises regarding talent cultivation; such disparities directly impact the effectiveness of their joint educational collaboration. Higher vocational colleges adhere to the educational philosophy of fostering virtue through education, focusing on developing students' comprehensive professional competencies and long-term professional qualities ^[4]. The fundamental purpose of enterprise participation in school-enterprise cooperation is to meet their own production labor demands and enhance their economic efficiency, with greater emphasis placed on short-term production productivity. In practical collaborations, enterprises treat students primarily as basic on-the-job workers, requiring only that students master fundamental operational skills, while seldom providing education on professional ethics or the spirit of craftsmanship. A common phenomenon among enterprises is merely employing graduates without actively cultivating them; consequently, the development of craftsmanship literacy is largely driven unilaterally by schools, making it difficult to effectively implement a collaborative talent cultivation mechanism between both parties.

3.2. There is a disconnect between competency cultivation and professional teaching, resulting in an overall cultivation approach that is relatively fragmented

Currently, education focused on the craftsman spirit largely remains confined to public ideological and political courses and thematic educational activities; its content primarily emphasizes theoretical exposition, exhibits a weak correlation with students' future practical work, and fails to resonate with them. In core professional courses and practical training sessions, instructors typically devote their efforts mainly to the transmission of skills and the practice of specific tasks, while rarely integrating elements of craftsmanship literacy—such as quality awareness, standard compliance, innovative spirit, and sense of responsibility—into course design. There are relatively few literacy-oriented teaching resources jointly developed by universities and enterprises, and there is a lack of case-based teaching materials aligned with actual industrial production environments. This results in a disconnect between skill training and literacy cultivation, leading to fragmented and non-systematic educational content.

3.3. The dual-teacher collaborative education mechanism is not well-established, resulting in limited effectiveness in preserving and cultivating craftsmanship traditions

The shortage of qualified teaching staff represents a major bottleneck in the cultivation of craftsmanship literacy. Currently, some full-time faculty members at schools lack practical work experience from enterprises and possess limited knowledge regarding the latest production processes, quality control standards, and corporate culture within their respective industries. As a result, during practical training sessions, these teachers can only impart basic operational techniques but are unable to guide students in developing their professional competence in alignment with actual job requirements. While technical artisans from enterprises possess extensive practical experience, they often lack systematic pedagogical skills. Furthermore, schools have not established a regular mechanism for enterprise artisans to deliver lectures on campus; consequently, their involvement in school-based education typically consists of one-off lectures or short-term exchanges, rather than long-term participation in the daily practical training guidance of students. As a result, the

advantages of the master-apprentice educational model cannot be fully realized.

3.4. The assessment and evaluation system is relatively simplistic, lacking quantitative standards for competencies

Currently, the student evaluation system in higher vocational colleges remains largely traditional, relying primarily on theoretical examination scores, practical training outcomes, and the acquisition of skill certificates to assess students. This evaluation approach suffers from several drawbacks, including a singular evaluative subject and an incomplete set of evaluation dimensions. Craftsmanship literacy constitutes the implicit dimension of professional qualities; it encompasses various aspects such as professional attitude, work style, innovative mindset, and sense of responsibility—elements that cannot be measured using traditional assessment methods, nor have schools established corresponding quantitative evaluation criteria. Evaluations of workplace internships often merely involve a cursory assessment of the internship certification, lacking follow-up throughout the internship process and detailed scoring standards. Since craftsmanship literacy is not incorporated into the assessment framework, students generally focus solely on academic grades while neglecting the development of their professional qualities, resulting in low motivation for students to proactively enhance their professional competencies.

4. Analysis of the root causes of existing issues in the cultivation of vocational students' craftsmanship literacy within the context of industry-education integration

The current challenges in cultivating craftsmanship literacy stem from a combination of factors across various dimensions, including the talent cultivation mechanism, educational philosophy, institutional framework, and evaluation system.

4.1. The absence of a school-enterprise interest synergy mechanism results in insufficient motivation for enterprises to engage in talent cultivation

For enterprises to participate in industry-education integration for talent cultivation, they must incur costs in terms of human, material, and time resources; cultivating craftsmanship competencies requires a relatively long period, with results manifesting gradually and unable to directly generate economic benefits for the enterprise. Although the state has introduced supportive policies such as tax reductions and special subsidies, the application process for these policies is quite complex, their implementation faces significant challenges, and their coverage is limited, preventing most small and medium-sized enterprises from benefiting from them. Under dual pressures of production demands and cost constraints, enterprises place greater emphasis on fulfilling their production tasks and lack the willingness to proactively engage in the cultivation of students' competencies.

4.2. The educational philosophies of some institutions exhibit a utilitarian bias

Under the influence of institutional evaluation systems, some higher vocational colleges place greater emphasis on readily observable outcomes—such as employment rates, the number of awards won in skills competitions, and certificate pass rates—while treating skills cultivation as a crucial component of talent development. The cultivation of craftsmanship literacy, however, represents an educational outcome that

is not easily observable directly; it involves a lengthy cultivation period, makes it difficult to quantify using specific numerical metrics, and poses challenges in visually demonstrating its impact on education. Consequently, the cultivation of craftsmanship literacy is often marginalized or overlooked in daily teaching arrangements and the design of talent development programs, remaining on the periphery for an extended period.

4.3. The management mechanism for industry–education integration remains inadequate, and collaborative talent cultivation lacks proper constraints

Currently, school-enterprise cooperation at most higher vocational colleges is initiated and promoted by individual secondary departments or schools themselves; at the institutional level, there is no unified planning or standardized management mechanism. The content of school-enterprise cooperation agreements is generally quite simple, often limited to basic aspects such as internships and safety management, without specifying concrete requirements for the cultivation of craftsmanship literacy, nor clearly defining the rights and obligations of both the school and the enterprise, the educational standards, or the assessment methods. Due to the absence of institutional guarantees, collaboration between the school and the enterprise in the process of collaborative education remains relatively loose, preventing the establishment of a long-term and stable cooperative education system.

4.4. The absence of an evaluation system that assesses craftsmanship literacy makes performance evaluations difficult to implement

Craftsmanship literacy is an abstract concept that is difficult to perceive and requires long-term cultivation; it cannot be evaluated using a uniform score. Currently, research and practice regarding the evaluation of craftsmanship literacy in higher vocational colleges in China remain limited, with a lack of mature, practical, and operable evaluation indicators and tools. As a result, teachers find it challenging to implement routine, process-oriented assessments of this literacy, often resorting instead to traditional outcome-based assessment methods, which has led to a persistent gap in the evaluation of craftsmanship literacy.

5. Measures to enhance the cultivation of craftsmanship competencies among higher vocational students through industry–education integration

Regarding the existing challenges and underlying causes in the cultivation of craftsmanship literacy among students, higher vocational colleges should fully leverage the advantages of industry-education integration, collaborate with enterprises to establish a comprehensive talent cultivation system, thereby enhancing the effectiveness of craftsmanship literacy development for students across all dimensions.

5.1. Strengthening the school-enterprise collaborative education mechanism and clarifying the educational responsibilities of both parties

The government should continuously refine support policies for industry-education integration, simplify policy implementation procedures, and effectively reduce the costs incurred by enterprises in talent cultivation, thereby stimulating enterprises' enthusiasm for participating in talent development. Higher vocational colleges should work with partner enterprises to further define cooperation details, sign specialized talent cultivation agreements, and clarify the specific responsibilities of both the college and

the enterprise in cultivating craftsmanship competencies. The college shall focus on imparting theoretical knowledge regarding professional values, professional ethics, and the spirit of craftsmanship; meanwhile, the enterprise shall utilize real production positions to cultivate students' abilities in areas such as professional norms, quality awareness, and professional attitude, thereby preventing work placements from devolving into assembly-line operations or mere repetitive tasks.

5.2. Promoting curriculum and teaching reform to integrate competencies with skills

The university and industry partners shall jointly revise the talent cultivation program and curriculum standards, fully integrating the objectives for cultivating craftsmanship literacy into the professional teaching system. By leveraging authentic production cases from enterprises, process improvement examples, and quality control experiences, they will develop flexible, project-based teaching resources to enrich the content of literacy-oriented instruction. The comprehensive implementation of “Ideological and Political Education in Curriculum” will enable a thorough exploration of the elements conducive to literacy cultivation embedded within both specialized courses and practical training courses. Through hands-on activities such as equipment operation, product processing, quality inspection, and process improvement, students will gradually develop professional qualities—including a commitment to excellence, rigorous adherence to standards, and courage to innovate—thereby effectively addressing the issue of the disconnect between skill-based instruction and literacy cultivation.

5.3. Establish a dual-qualified teacher-coordinated education team and refine the mentorship-based educational model

Higher vocational colleges must strictly implement the faculty enterprise practice system by dispatching professional faculty members to work on the front lines of enterprises, thereby enabling them to gain industry experience and enhance their teaching proficiency and capabilities. Simultaneously, institutions should establish a comprehensive system for inviting skilled craftsmen and technical experts to teach at the college, while defining clear procedures for the recruitment, teaching responsibilities, performance evaluation, and compensation guarantees for part-time faculty members. Colleges should also invite key technical professionals from enterprises to provide internship guidance and mentorship programs for apprentices, adopting a “master-apprentice” model that helps students develop sound work habits through practical operations and fosters their professional awareness. Additionally, colleges should regularly organize school-enterprise collaborative research and teaching exchange activities to jointly explore and optimize pathways for cultivating skilled craftsmanship competencies.

5.4. Establishing a diversified process-oriented evaluation system to enable the quantifiable assessment of competencies

It is essential to establish a two-way evaluation system involving both schools and enterprises, by refining the evaluation indicators for craftsmanship literacy from various perspectives—including professional attitude, operational standard compliance, quality control, sense of responsibility, innovative practice, and teamwork. The practice of solely relying on final grades to assess students should be abandoned, while greater emphasis should be placed on process-based assessments. Regarding specific evaluators, school teachers are responsible for evaluating students' performance across all aspects in the classroom, whereas enterprise mentors provide an overall assessment of the students' internship experience. All key elements—such as

product qualification rate, process improvement outcomes, adherence to job discipline, and work attitude—should be incorporated into the comprehensive grade evaluation. A scientific evaluation mechanism should be employed to guide students toward consciously enhancing their craftsmanship literacy.

5.5. Foster a cultural atmosphere conducive to school-enterprise cooperation to achieve environment-based educational immersion

By integrating resources from both schools and enterprises, educators can establish an educational platform dedicated to fostering the craftsman spirit. This platform regularly organizes skill competitions, craftsmanship innovation evaluations, and exchange sessions for craftsmen's experiences—using competitions to stimulate students' learning and cultivate skilled artisans ^[5]. The enterprise management model should be fully implemented in school practical training facilities, incorporating the production culture of enterprises—characterized by a focus on detail and pursuit of excellence—into the campus environment. Students should be arranged to conduct field visits to enterprises, where they can observe the production processes, witness the working conditions of craftsmen, and experience the professional culture of the industry. Through prolonged exposure to such environments, students will gradually internalize and practice the craftsman spirit, thereby achieving comprehensive and profound educational outcomes.

Amid the broader context of industrial transformation and upgrading, cultivating high-quality technical and skilled professionals with a strong spirit of craftsmanship has become a crucial educational mission for higher vocational colleges in the new era ^[6]. The integration of industry and education serves as a bridge between education and industry, playing a pivotal role in fostering the spirit of craftsmanship. Currently, higher vocational colleges still face several challenges in cultivating this spirit among students, including discrepancies between the educational objectives of schools and enterprises, insufficient integration of curricula, inadequate faculty resources, and outdated evaluation mechanisms—issues that are influenced by factors such as the alignment of interests between schools and enterprises, institutional philosophies, and institutional frameworks. To address these challenges, it is essential to continuously strengthen the integration of industry and education, refine the collaborative education mechanism between schools and enterprises, establish a curriculum system that integrates technical skills with general competencies, build a faculty team comprising both full-time and part-time instructors, create a multi-dimensional and quantifiable evaluation system, and foster a robust educational environment conducive to nurturing the spirit of craftsmanship. By achieving this goal—integrating moral education with skill development—higher vocational colleges can cultivate new-generation craftsman-style technical and skilled professionals who are dedicated to their work, strive for excellence, and embrace innovation, thereby providing a strong talent foundation for the high-quality development of regional industries.

Disclosure statement

The author declares no conflict of interest.

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