

Research on Promoting Industry–education Integration in Vocational Education to Foster Skilled Talent Cultivation under the Background of Artificial Intelligence—Taking Hubei Open Vocational College as an Example

Yang Guoli

[**Abstract**] Against the backdrop of rapid development in artificial intelligence (AI) technology, skilled talent has become the core driving force for promoting high-quality economic and social development in China. As the primary front for cultivating skilled talent, vocational education deepens its integration with industry through industry–education integration, thereby enhancing the pertinence of skilled talent cultivation. Based on the context of AI development, this paper systematically reviews the current status of industry–education integration in China’s vocational education for promoting skilled talent cultivation, conducts an in–depth analysis of the problems and deficiencies existing in the current reform of industry–education integration in vocational education, and, in consideration of the characteristics of vocational education, proposes targeted countermeasures and suggestions.

[**Key words**] artificial intelligence; vocational education; industry–education integration; skilled talent

[**About the author**] Yang Guoli, female, associate professor at Hubei Open Vocational College. Research interests: editing and publishing, higher vocational education.

[**DOI**] <https://doi.org/10.62662/kxwxy0304003>

[**Website**] www.oacj.net

At present, AI has been deeply integrated into various fields such as manufacturing, services, and information technology, driving the upgrading of industrial structures, giving rise to new business forms such as intelligent manufacturing, smart services, and digital economy, and simultaneously restructuring the demands of the labor market. This has placed entirely new requirements on the knowledge structure, skill levels, and innovation capabilities of skilled talent. Vocational education, with the cultivation of skilled talent as its core objective, serves as a critical nexus connecting education and industry, as well as talent and job positions. Its core mission is to supply industries with high-quality skilled talent possessing practical operational abilities and meeting job position requirements. As the core pathway of vocational education, industry–education integration—through collaborative cultivation between vocational colleges and enterprises—fully incorporates industrial demands and job position standards into the entire talent cultivation process. This holds significant theoretical importance and practical value for promoting the in–depth development of industry–education integration in vocational education, enhancing the quality of skilled talent cultivation, and supporting the digital transformation of industries.

1 Current status of skilled talent cultivation in China

In recent years, the state has attached great importance to industry–education integration in vocational education and the cultivation of skilled talent. A series of policy documents have been successively issued, including the *Implementation Plan for National Vocational Education Reform*, the *Action Plan for “AI + Education”*, and the *Opinions on Strengthening the Construction of High-skilled Talent Teams in the New Era*, explicitly proposing to enhance the alignment between talent cultivation and industrial demands. Under the guidance of policies and the impetus of industry, phased achievements have been made in the reform of industry–education integration in China’s vocational education, with the quality of skilled talent cultivation steadily improving and effectively supporting industrial development.

1.1 A collaborative education framework for vocational education has initially taken shape

At present, China has gradually established a talent cultivation mechanism covering the entire chain of vocational education industry – education integration, school – enterprise cooperation, skills assessment, and incentive guarantees. The responsibilities of the government, vocational colleges, enterprises, and industry associations have been clearly defined, providing a solid policy guarantee for the reform of industry – education integration in vocational education. In line with regional industrial characteristics, various localities have continuously advanced the construction of industry–education integration, fostering a number of industry–education integration–oriented enterprises, industrial colleges, and practical training bases, and promoting deep alignment between vocational education and local industries. For instance, Taicang in Jiangsu Province upgraded the Sino–German Intelligent Manufacturing Municipal Industry–education Consortium, focusing on vocational skills talent cultivation, and established Sino – German Dual System Vocational Education Industrial Park Education Development (Jiangsu) Co. , Ltd to be responsible for market–oriented operations, achieving precise docking between vocational colleges and enterprises. Wenzhou Polytechnic deeply engaged in educational operations within industrial agglomeration zones, integrating park resources to create a “highly adaptive, strongly elemental” high–skilled talent cultivation hub.

1.2 The effectiveness of vocational education talent cultivation is gradually emerging

Practical models of industry–education integration in vocational education are continuously innovating, and initial results have been achieved in skilled talent cultivation. First, the industrial college model. Vocational colleges and enterprises jointly build industrial colleges, introducing enterprises’ production workshops and R&D centers into campuses, enabling students to enhance practical skills in authentic production scenarios. Second, the order–based cultivation model. Enterprises, based on job position demands, jointly formulate talent cultivation plans with vocational colleges and participate in the entire teaching process. Students essentially meet enterprise requirements upon graduation and can be directly employed by enterprises, achieving “employment upon enrollment”. Third, the virtual simulation practical training model. Leveraging AI technology, virtual simulation practical training platforms are built to simulate enterprises’ authentic production scenarios, overcoming the pain points of high cost, high risk, and difficulty in repetition in traditional vocational education practical training, effectively enhancing students’ practical operational skills.

1.3 The “dual–teacher” faculty team in vocational education is gradually strengthening

Currently, vocational colleges generally attach importance to faculty team construction, and through industry–education integration, they focus on building “dual–teacher” faculty teams, providing a strong guarantee for skilled talent cultivation. First, conducting teacher training. Organizing vocational college teachers to participate in relevant industry seminars and enterprise on–the–job practice, and learn cutting–edge technologies and teaching methods, thus enhancing their practical teaching capabilities. Second, recruiting technical backbone personnel from enterprises. Engaging front–line technical personnel and industry experts from enterprises as part–time teachers, enriching vocational education teaching teams, undertaking practical teaching and practical training guidance tasks, and compensating for the shortcomings of vocational college teachers in practical teaching.

2 Problems existing in skilled talent cultivation in China

Although certain achievements have been made in the reform of industry–education integration in China’s vocational education, and the quality of skilled talent cultivation has steadily improved, there remain some problems when assessed against the demands of industrial development in the AI era and the cultivation objectives of skilled talent in vocational education.

2.1 Insufficient depth of industry–education collaboration

Currently, a deep collaborative cultivation mechanism between most vocational colleges and enterprises has not yet been fully established, exhibiting the problem of “emphasizing form over substance”. First, the level of cooperation is relatively low. Most school–enterprise cooperation is limited to superficial content such as student

internships, enterprise equipment donations, and expert lectures. Effective cooperation mechanisms have not yet been formed in core areas such as the joint formulation of talent cultivation plans, co-construction of core courses, and co-management of practical training bases. Second, enterprise participation lacks motivation. Enterprises pursue short-to-medium-term profit maximization and have limited willingness to invest in skilled talent cultivation, which involves long cultivation cycles and complex processes. The situation of “schools being enthusiastic, enterprises being indifferent” has not been fundamentally reversed. Third, the collaborative docking mechanism is incomplete. There is a lack of a normalized communication and coordination mechanism between vocational colleges and enterprises, resulting in poor connectivity in aspects such as teaching arrangements, practical training management, teacher exchanges, and student employment.

2.2 Disconnection between the talent cultivation system and industrial demands

The curriculum system is the core of skilled talent cultivation in vocational education. Currently, the curriculum systems of some vocational colleges in China still have many aspects that are incompatible with the industrial demands of the AI era. First, curriculum design is lagging. Some vocational college curricula still follow traditional teaching content, with program offerings lagging behind the pace of industrial adjustment and technological upgrading, failing to timely incorporate AI cutting-edge technologies and new enterprise job position demands. Second, the proportion of practical courses is relatively low. The curriculum system is still dominated by theoretical teaching, making it difficult for students to integrate theoretical knowledge with practical operations. Students have insufficient practical operational ability and problem-solving capabilities, making it difficult to adapt to the demands of front-line enterprise positions in the AI era.

2.3 Imbalance in the competency structure of the faculty team

Under the background of AI, the cultivation of skilled talent through industry-education integration in vocational education requires composite faculty who “understand the profession, are proficient in AI, and excel in practice”. However, the current competency structure of faculty teams in China’s vocational colleges finds it difficult to meet this demand, becoming a major bottleneck restricting the quality of industry-education integrated cultivation. First, the quality of “dual-teacher” faculty still needs improvement. Many “dual-teacher” faculty members only possess basic professional practical operational ability, lacking AI technology application capabilities and front-line enterprise practical experience, and cannot meet the demands of “AI + profession” integrated teaching. Second, the part-time teacher team is unstable. The enterprise technical backbone personnel and industry experts employed by vocational colleges have limited time to participate in teaching due to busy work schedules and relatively low remuneration, making it difficult for them to systematically undertake course teaching and practical training guidance tasks.

3 Countermeasures and suggestions for promoting industry-education integration in vocational education to foster skilled talent cultivation under the background of AI

In light of the existing problems in promoting skilled talent cultivation through industry-education integration in vocational education, and based on the demands of industrial development in the AI era, efforts should be made to deepen industry-education collaboration, optimize the curriculum system, strengthen faculty construction, improve practical training guarantees, and innovate evaluation and incentive mechanisms, thereby promoting the deep integration of industry and education in vocational education and enhancing the quality of skilled talent cultivation.

3.1 Deepening industry-education collaboration

Breaking the pattern of shallow cooperation between vocational colleges and enterprises, a deep collaborative cultivation mechanism “guided by the government, led by colleges, with enterprises as the main body, and coordinated by industries” should be established, promoting the transformation of industry-education integration in vocational education from “formal integration” to “substantive integration”, in line with the characteristics of vocational education. First, improve the school-enterprise collaborative governance mechanism. Led by the

government and jointly organized by vocational colleges, enterprises, and industry associations, overall planning should be conducted for skilled talent cultivation, curriculum development, and practical training base construction. Second, innovate school-enterprise cooperation models. Deepen “order-based cultivation” and the “modern apprenticeship system”, promote the joint construction of industrial colleges, practical training bases, and technology R&D centers by vocational colleges and enterprises, and incorporate enterprises’ authentic projects, production processes, and technical standards into the entire process of skilled talent cultivation. Third, improve the interest linkage mechanism. Explore cooperation models featuring joint construction and sharing, as well as outcome-based profit sharing, encouraging enterprises to invest funds, equipment, technology, and other resources in participating in industry-education integration in vocational education. Vocational colleges should provide enterprises with services such as talent supply, technical training, and scientific research support, achieving mutual benefit and win-win outcomes for both schools and enterprises. For example, Hubei Open Vocational College has positioned industry-education integration as the core engine of its “One Core, Two Wings” development strategy (with academic degree education as the core, and cooperative training and industrial incubation as the two wings). Rooted in the Optics Valley and oriented toward Hubei Province, the college serves regional industrial clusters such as intelligent manufacturing, new-generation information technology, new energy, and smart transportation. It implements a school-enterprise community of shared destiny model featuring “joint program construction, joint talent cultivation, joint faculty training, joint process management, joint employment responsibility, and joint outcome sharing”. Cooperation has evolved from “single-point” to “systematic”, implementing “one enterprise, one policy; one college, one brand”, with each college focusing on one industrial direction and customizing cooperation plans with leading enterprises.

3.2 Optimizing the curriculum system

Guided by enterprise job position demands and based on the educational characteristics of vocational education, the curriculum system should be restructured to promote the deep integration of AI technology and vocational education professional courses, enhancing the practicality and pertinence of courses, and achieving precise alignment between skilled talent cultivation and industrial demands. First, precisely position talent cultivation objectives. In combination with the industrial demands and job skill requirements of the AI era, clarify the cultivation specifications for skilled talent in each vocational profession, highlighting the cultivation of AI application capabilities, practical operational abilities, and innovation capabilities. Second, construct an “AI + Vocational Profession” modular curriculum system. Break traditional curriculum boundaries, offer relevant AI basic knowledge courses, and focus on the integrated application of AI and vocational professions. Third, dynamically update course content. Establish a dynamic updating mechanism for course content, timely updating course content in accordance with AI technology iterations and changes in enterprise job position demands, integrating AI cutting-edge technologies and authentic enterprise cases into course teaching. For example, Hubei Open Vocational College implements a four-dimensional linkage mechanism: constructing a closed loop of “job demands—curriculum system—skills competitions—vocational certification”. This case was selected as a 2024 National Typical Case of Industry-education Integration in Electronic Information (China Electronics Standardization Association). The college jointly develops industry-education integration loose-leaf teaching materials and project-based courses with enterprises, embedding enterprise authentic cases and technical standards into teaching content. Through industry-education integration, the college has achieved a 100% award rate in national competitions, winning second prize in the 2024 World Robot Contest, third prize in the China University Intelligent Robot Creative Contest, and multiple awards in the Huawei ICT Competition, the BRICS International Competition, and others. The college has also achieved certificate integration, where students can obtain 1+X vocational skill level certificates and industry certifications (such as Huawei certification) while at school, enabling them to work with certifications upon graduation.

3.3 Strengthening faculty construction

With the enhancement of teachers' AI literacy and practical ability as the core, and in combination with the characteristics of faculty team construction in vocational education, multiple measures should be taken simultaneously to strengthen faculty team construction, creating a composite "dual-teacher" faculty team that "understands the profession, is proficient in AI, and excels in practice". First, conduct customized teacher training. Formulate tiered and classified training plans, offer "AI + Vocational Skills" customized training courses, and focus on enhancing teachers' AI application capabilities, teaching design capabilities, and enterprise practical capabilities. Second, optimize faculty recruitment and cultivation. Intensify the recruitment of composite teachers, focusing on recruiting high-level talents and enterprise technical backbone personnel who understand both vocational professional knowledge and AI technology. For example, Hubei Open Vocational College implements two-way co-cultivation of faculty, with 100% of professional teachers engaging in on-the-job practice in enterprises, participating in project R&D and technical problem-solving, and executives and technical backbone personnel from enterprises serve as part-time lecturers, acting as deans of industrial colleges or major leaders.

3.4 Improving practical training guarantees

Increase investment in practical training resources, optimize the allocation of practical training resources, and in combination with the practical teaching demands of vocational education, construct an intelligent practical training system to meet the needs of practical teaching in vocational education under the AI background, enhancing the practical abilities of skilled talents. First, upgrade on-campus practical training bases. Increase investment, update practical training equipment, focus on adding AI-related practical training equipment and platforms, and create "AI + Vocational Profession" intelligent practical training bases. Second, expand stable off-campus practical training bases. Deepen cooperation with partner enterprises, jointly build a number of stable off-campus practical training bases, clearly define practical training content, duration, and assessment standards, introduce enterprise authentic production scenarios and project resources into practical training teaching, and allow students to participate in enterprise authentic projects, enhancing practical operational abilities. For example, Hubei Open Vocational College focuses on constructing four major industry-education integration practical training centers: intelligent manufacturing, artificial intelligence, new energy vehicles, and live-streaming e-commerce. School-enterprise co-constructed bases include: the Wuhan Intelligent Manufacturing Equipment Research Institute Intelligent Manufacturing Practical Training Base (industrial robots, intelligent production lines), the Huawei Cloud Academy AI Center (AI computing power, algorithm practical training), the New Energy Vehicle Inspection and Maintenance Practical Training Center (complete vehicles, three-electric systems), and the New Media E-commerce Live-streaming Practical Training Center (real-scene live-streaming studio, AI live-streaming technology).

References:

- [1] State Council of the PRC. *Implementation Plan for National Vocational Education Reform*[Z]. 2019.
- [2] Ministry of Education, et al. *Action Plan for "Artificial Intelligence + Education"*[Z]. 2022.
- [3] State Council of the PRC. *Opinions on Strengthening the Construction of High-skilled Talent Teams in the New Era*[Z]. 2022.
- [4] Standing Committee of the National People's Congress. *Law on Promoting Industry-education Integration in Vocational Education*[Z]. 2022.
- [5] National Industrial Information Security Development Research Center. *Report on the Development of China's Artificial Intelligence Industry (2023)*[R]. 2024.
- [6] Zhang Qiwu. Research on the Reform Path of Industry-education Integration in Higher Vocational Colleges under the Background of Artificial Intelligence[J]. *Vocational and Technical Education*, 2023(14): 38-42.