2026 World Journal of Innovation and Modern Technology, Vol. 9, Issue 6 (Jun)
ISSN 2682-5910
DOI: 10.66069/ojspub.26820603

Research on Pathways for Optimising Talent Development Models through Industry-Education Integration in Higher Vocational Colleges Against the Backdrop of Digital and Intelligent Transformation

Youqin Ke

Economics and Management of Education, School of Education, Xihua Normal University, Nanchong 637009, Sichuan, China

Abstract: ***Against the backdrop of digital and intelligent technologies profoundly transforming the industrial ecosystem, these technologies have injected new momentum into industry-education integration. However, talent development in higher vocational colleges currently faces structural challenges, including loose mechanisms for school-enterprise collaboration, lagging digital literacy among teaching staff, and an imbalance in the allocation of teaching resources. Based on the theoretical framework of industry-education integration, this paper systematically analyses the multidimensional challenges faced by higher vocational colleges during their digital and intelligent transformation, and proposes three optimisation pathways: innovating digital and intelligent education paradigms, reshaping teachers' digital capabilities, and constructing a smart resource ecosystem. The study aims to promote the transition of industry-education integration from a 'mechanical combination' to an 'organic symbiosis' through technological empowerment, resource reorganisation and institutional innovation, thereby providing a practical paradigm for the high-quality development of vocational education.***

Keywords: Digitalisation and intelligentisation; Industry-education integration; Talent development models; Vocational education.

1. INTRODUCTION

The report of the 20th National Congress of the Communist Party of China explicitly called for "advancing the digitalisation of education and building a learning society and a learning nation characterised by lifelong learning for all", whilst emphasising the optimisation of the positioning of vocational education through "collaborative innovation across the three sectors of education" and the "promotion of the three integrations" (integration of vocational and general education, industry-education integration, and the convergence of science and education). Policies such as the 'National Implementation Plan for Vocational Education Reform' and the 'Action Plan for Improving the Quality and Excellence of Vocational Education (2020–2023)' further call for deepening the integration of industry and education and the digital transformation of vocational education. In 2023, during his inspection tour of Heilongjiang, General Secretary Xi Jinping first proposed the concept of 'new-quality productive forces', the core of which lies in using digital technology to drive a leap in productive forces towards informatisation, intelligentisation and greening. Against this backdrop, digital and intelligent technologies are reshaping the educational ecosystem, placing higher demands on technical and skilled personnel. As the core entities of industry-education integration, higher vocational colleges face systemic challenges in their traditional talent cultivation models, including inefficient school-enterprise collaboration, lagging digital literacy and imbalances in resource allocation. From the perspective of digital and intelligent transformation, this study focuses on the practical difficulties of industry-education integration and explores pathways for optimising talent cultivation models in higher vocational colleges, thereby providing a theoretical framework and practical paradigm for achieving the 'New Double High' objectives of 'high-level institutional capacity' and 'high-quality industry-education integration'.

2. THE VALUE IMPLICATIONS OF INDUSTRY-EDUCATION INTEGRATION TALENT DEVELOPMENT MODELS IN THE CONTEXT OF DIGITAL AND INTELLIGENT TRANSFORMATION

Driven by the new round of the "Double High Programme" policies—which encompass "high-level institutional capacity" and "high-quality industry-education integration"—industry-education integration has become a hotly debated topic. Against the backdrop of digital and intelligent transformation, interpreting the value implications of talent development models for industry-education integration in higher vocational colleges holds significant theoretical significance.

2.1 The Core Essence of Digital and Intelligent Transformation

With advances in science and technology, emerging digital and intelligent technologies such as artificial intelligence and big data have experienced rapid development in recent years. This trend is propelling human society towards a digital and intelligent era. Digitalisation and intelligentisation influence the design of reform practices for talent cultivation models through industry-education integration across multiple disciplines. The 'Knowledge Capital Consortium' research team at Peking University posits that digitalisation and intelligentisation constitute a synthesis of digital intelligence and intelligent digitalisation. By building bridges, they facilitate deep dialogue between humans and intelligent technologies, forming a new ecological landscape characterised by human-machine integration, intelligent collaboration, and the convergence of virtual and physical realms [1]. Li Wanxiang argues that digital intelligence enhances consumers' product experience through the engaging and interactive nature of digital-intelligent technologies. Amid new market trends, innovation in digital-intelligent scenarios offers fresh opportunities for the recovery of industrial development [2]. Zhang Xinwei contends that the core of digital-intelligent services lies in a dynamic model of extensive multi-stakeholder interaction [3]. Wang Bing defines digital intelligence as the process whereby individuals possessing digital intelligence utilise digital technologies to acquire and generate data intelligence, thereby providing the foundational support for the realisation of digital intelligence [4]. Digital intelligence (Digital Intelligence) refers to the organic integration of digitalisation and intelligentisation. Digitalisation is the process of transforming traditional business, manufacturing, management and operational activities into digital forms using digital technology; whilst intelligence involves, building upon the achievements of digitalisation, utilising artificial intelligence technology to conduct in-depth analysis of data, uncover latent value and process it. Both contribute to enhancing production efficiency.

2.2 Three-Dimensional Analysis of Industry-Education Integration

In 2017, the State Council issued the policy document 'Several Opinions of the General Office of the State Council on Deepening Industry-Education Integration', which emphasised the need to deepen industry-education integration, advance reforms in talent cultivation through such integration, and promote the high-quality development of vocational education. The concept of industry-education integration can be understood from three distinct dimensions: macro, meso and micro. At the macro level, industry-education integration constitutes a collaborative mechanism between the vocational education system and the industrial economy. The cross-sectoral integration and restructuring of vocational education, alongside the integration of demands for connecting industry and education, represent the functional positioning and social value of vocational education's survival and development [5]. At the meso level, industry-education integration takes the form of active participation by various stakeholders in the talent cultivation process at vocational institutions [6]. In the talent development process, higher vocational colleges engage in exchanges and cooperation with enterprises and industries; programme offerings must align with industrial needs, course content must meet occupational standards, and the teaching process must replicate real-world production scenarios as closely as possible. At the micro level, industry-education integration constitutes a teaching methodology whereby students undertake work placements in enterprises, thereby subtly enhancing their awareness, mindset and practical skills through hands-on experience, and cultivating high-calibre technical and skilled personnel. Academic circles have also engaged in discussions regarding the industry-education integration talent development model. Various scholars have examined the content, influencing factors, and cooperative mechanisms of industry-education integration in promoting talent development from perspectives such as the Triple Helix, transaction costs, and symbiosis theory [7], or have explored specific models of industry-education integration from the perspective of the educational orientations of different types of higher education institutions [8]. However, issues such as imperfect school-enterprise coordination mechanisms, mismatches between programme offerings and industrial needs, and low levels of

industry engagement persist in practical implementation. [9] An analysis of relevant literature reveals that the concept of industry-education integration manifests primarily in two aspects: firstly, the roles of relevant stakeholders are becoming increasingly diverse; and secondly, the relationships between these stakeholders are undergoing a process of evolution, progressing from superficial to deeper levels, transitioning from loose structures to close interconnections, and shifting from single-mode collaboration to comprehensive and in-depth integration. Industry-education integration concerns the collaborative operation of schools and industrial value chains, constituting a systemic project involving the coordinated participation of multiple stakeholders.

2.3 Model Innovation through Digital and Intelligent Empowerment

In the field of education, digital and intelligent transformation represents not merely the expanded application of technological tools, but a systemic transformation manifesting across multiple dimensions, including educational philosophy, teaching models, management processes and evaluation systems. A talent development model refers to the approach adopted by institutions to design and ensure the smooth operation of the entire training process in practice, with a view to achieving predetermined educational objectives.

Traditional talent development models often struggle to meet industry demands for talent and support students' diversified development. In contrast, digital and intelligent technologies are driving a fundamental transformation in these models, centred on utilising such technologies to reconstruct data across four key areas: student capabilities, teaching practices, the depth of industry-education integration, and industry needs. Firstly, a 'competency-based' approach centred on students. Digital and intelligent education requires students not only to have a solid grasp of specialist knowledge but also to integrate digital thinking, interdisciplinary integration skills and the ability to collaborate with artificial intelligence, thereby placing higher demands on students. Secondly, the transformation of teaching models. Moving away from a one-way, teacher-centred model, classrooms are gradually shifting towards learner-centred 'adaptive learning'. Leveraging large AI models to construct personalised learning pathways for students, teachers pose thought-provoking questions to guide students towards deeper reflection, whilst data platforms analyse learning progress in real time to optimise teaching strategies. Thirdly, the depth and breadth of industry-education integration are being enhanced. The digital and intelligent era demands that schools and enterprises integrate deeply across dimensions such as technological R&D, joint curriculum development and data sharing, forming a closed-loop 'education chain–industrial chain–innovation chain'. Fourthly, industrial demands are deeply embedded throughout the entire talent development process via data, whilst educational outcomes feed back into industrial upgrading through industry-education consortia. The combination of these two drives education to make the leap from 'adapting to industry' to 'leading industry', cultivating 'knowledge-embedded' talent for the digital and intelligent era who possess both technical hard power and innovative soft power.

3. DEVELOPMENTAL CHALLENGES IN DIGITAL AND INTELLIGENT INDUSTRY-EDUCATION INTEGRATION

The current state of talent development models for industry-education integration in the context of digitalisation and intelligentisation is characterised by an interplay of technological drivers and institutional innovation. Whilst demonstrating practical breakthroughs in multidimensional integration, it also faces deep-seated structural contradictions.

3.1 Fragmentation of School-Enterprise Collaboration Mechanisms

At present, industry-education integration between vocational colleges and enterprises remains at a superficial level, whilst school-enterprise cooperation is mired in a situation where 'schools are enthusiastic but enterprises are lukewarm'. Since the release of the 'National Vocational Education Reform Implementation Plan', various regions have introduced policies exploring reforms to vocational education's operational models and training methods; however, school-enterprise cooperation remains superficial, ad hoc, loose and of a low standard. The fundamental flaw in the school-enterprise coordination mechanism lies in the absence of a robust framework to underpin the relationship between higher vocational colleges and enterprises. This results in a lack of in-depth understanding of each other's needs and poor information flow, thereby preventing the sustainable development of school-enterprise partnerships [9]. The reasons for this lie, firstly, in the misalignment of development objectives between schools and enterprises, resulting in insufficient intrinsic motivation on both sides. Vocational institutions aim to cultivate students into talents capable of making technical and skilled contributions to social development, whilst school-enterprise cooperation focuses on arranging internship placements and recommending employment

for students, placing greater emphasis on the students' 'social benefits'; enterprises, however, participate in such partnerships primarily to reduce recruitment costs, integrate students into production processes for their own benefit, and maximise profits through collaboration with institutions, prioritising 'economic benefits'. Due to these divergent objectives and values regarding talent development, school-enterprise collaboration remains superficial, encountering obstacles in data sharing and process coordination, and failing to establish an efficient ecosystem for industry-education integration. Secondly, information barriers between enterprises and schools result in inadequate communication mechanisms. Enterprises fail to provide timely feedback to schools regarding the industry's evolving talent requirements. As industry demands change rapidly, coupled with the inherent lag in school education—which adheres to traditional curricula—even adjustments to specialised programmes require an adaptation period. Consequently, the talent produced fails to meet corporate needs, leading to misalignment in the transmission of supply and demand information. Thirdly, the blurring of rights and responsibilities during the collaboration process has led to a lack of clarity regarding the respective roles, obligations and benefits of enterprises and schools, resulting in weak compatibility of interests. The government lacks a robust institutional mechanism to safeguard school-enterprise cooperation, and neither enterprises nor schools are willing to bear significant risks associated with outcomes, making it difficult to mobilise the enthusiasm of both parties.

3.2 Structural Deficiencies in Teachers' Digital Literacy

The national document *Action Plan for Improving the Quality and Excellence of Vocational Education (2020–2023)*, issued by the Ministry of Education in 2020, states that vocational colleges should proactively adapt to the demands of the technological and industrial revolutions, upgrading traditional disciplines through 'Information Technology Plus'; vocational schools should be encouraged to utilise modern information technology to drive reforms in talent cultivation models, meet students' diverse learning needs, vigorously promote new forms of 'Internet Plus' and 'Smart Plus' education, and foster innovation in teaching and learning. Teachers in vocational institutions must actively adapt to the demands of digital teaching, undertake training in information technology application skills, and implement smart classroom teaching. The promulgation of this document indirectly reflects the current reality of teachers' insufficient digital teaching capabilities, and the state is also taking a series of measures to strengthen the development of the "dual-qualified" teaching workforce. At present, the structural deficit in digital literacy among higher vocational teachers has become a core bottleneck constraining the digital transformation of education, which can be analysed from three specific aspects:

Firstly, there is a structural imbalance between teachers' digital capabilities and actual teaching requirements, manifesting as a skills gap. Within the higher vocational teaching workforce, there are significant disparities in the ability to utilise teaching resources and apply them in practice: some teachers demonstrate strong adaptability to emerging technologies and can skilfully integrate digital resources into their teaching; however, for older, more experienced teachers, their understanding of current digital technologies remains largely theoretical, and they continue to rely on traditional methods of resource acquisition, rendering them unable to effectively meet the demands of talent development. Furthermore, many teachers have been detached from actual workplace environments for a long time, lacking understanding of the latest industry technologies and trends, and failing to integrate industrial practice into classroom teaching. Secondly, teachers' digital awareness is weak, creating resistance to the transformation of teaching models. Some teachers lack a deep understanding of digitalisation, reducing digital teaching merely to online digital resources whilst overlooking the innovations in teaching content and methods brought about by emerging technologies, thereby failing to realise the true value of digital teaching; others cling to traditional notions and resist digital teaching, believing it requires time to learn and that the teaching process is complex, thereby increasing their teaching workload. Thirdly, there is a lack of internal and external motivation for teachers to participate actively, coupled with a lack of incentive mechanisms. The absence of targeted incentive measures means teachers lack external motivation. The improvement in teachers' pedagogical competence and the outcomes of their practical teaching skills have not received corresponding recognition or rewards from schools, which has weakened their motivation for self-directed learning. Consequently, teachers tend to devote their time and energy to areas more conducive to their personal development rather than to enhancing their digital teaching skills. The lack of professional development support resources limits teachers' intrinsic motivation to improve. Even if some teachers are willing to apply digital technology in their teaching, they may cease doing so due to a lack of appropriate support (such as training opportunities, time, or remuneration), which in turn affects their subsequent career development.

3.3 Imbalance in the Allocation of Digital Teaching Resources

The imbalance in the allocation of digital teaching resources within China's vocational education sector remains a

prominent issue, severely hampering the optimisation and development of talent cultivation models that integrate industry and education. Vocational education resources encompass multiple aspects, such as teaching infrastructure, teaching staff, curriculum design, and resources for school-enterprise cooperation.

There is a marked regional divide in the digital teaching resources of China's higher vocational colleges, primarily stemming from disparities in regional economic development and uneven information infrastructure. In economically developed regions, the government increases financial support for institutional development, providing ample funding and robust IT infrastructure. This enables the rapid introduction of advanced digital teaching equipment, such as cloud servers and smart all-in-one teaching terminals, as well as collaboration with leading enterprises to access high-quality resources—including rich industry case studies and virtual simulation experiments—for delivering targeted education and training to students. Conversely, vocational colleges in economically underdeveloped regions are constrained by funding shortages, lagging digital infrastructure, insufficient network bandwidth and outdated teaching software. These factors make it difficult to meet the demands of digital and intelligent teaching, hindering improvements in the quality of talent cultivation and further widening the gap in vocational education development between regions.

There is also a significant disparity in the internal structure of academic programmes within institutions, with markedly different approaches towards popular and less popular disciplines. Schools allocate more resources to popular programmes and key development programmes, building comprehensive teaching resource repositories that include high-quality online courses, digital textbooks and practical simulation software, thereby precisely matching corporate talent needs. For relatively less popular or traditional programmes, teaching still relies primarily on traditional paper-based textbooks and blackboard instruction. These programmes are unable to integrate digital and intelligent technologies into their teaching, making it difficult to cultivate versatile talent capable of adapting to industrial transformation. This, in turn, affects students' employability and career development.

4. PATHWAYS FOR OPTIMISING DIGITAL AND INTELLIGENT INDUSTRY-EDUCATION INTEGRATION

The approach adopted by higher vocational colleges to optimise talent cultivation models through industry-education integration aims to produce a large cohort of high-calibre technical and skilled professionals who meet industry needs. The advent of the digital and intelligent era presents an opportunity for the development of industry-education integration in higher vocational colleges. Talent cultivation in these institutions should focus on the following aspects:

4.1 Establishing a Four-Dimensional Collaborative Mechanism Involving Government, Colleges, Enterprises and Industry Associations

Relying on systematic support from multi-dimensional pathways, efforts should be made to effectively implement a four-dimensional collaborative mechanism involving government, colleges, enterprises and industry associations. Firstly, the government must strengthen top-level design and formulate a comprehensive policy framework. As the core institution responsible for managing social affairs, the government must fully leverage its crucial role in overall planning, policy formulation and resource integration whilst advancing the integration of industry and education. To begin with, talent development should be considered and analysed within the macroeconomic context of economic development; planning should be coordinated in accordance with the developmental patterns of both, thereby fostering a public environment conducive to collaborative talent development. Secondly, government departments should refine relevant laws and regulations to clarify the rights and obligations of stakeholders—including the government, schools, enterprises and industry bodies—and guide all parties towards collaborative cooperation. Through policy measures, they should mitigate the legal risks faced by enterprises and industries when participating in industry-education integration, whilst ensuring the effective implementation of tax relief and support policies for relevant enterprises. This will stimulate the enthusiasm of enterprises and industries to collaborate with higher vocational colleges in talent development, thereby forming a cohesive educational force. Finally, institutions are required to implement digital curriculum reforms, systematically refining a management framework underpinned by the quality of professional education and teaching, supported by a school-enterprise collaborative education system, and safeguarded by an evaluation reform mechanism. Efforts should focus on enhancing the scientific rigour and relevance of talent development programmes, thereby providing comprehensive services and safeguards for the high-quality development of industry-education integration.

Secondly, the institution is innovating its talent development platforms by establishing industry-specific colleges. Firstly, the institution must innovate its approach to talent cultivation, adhering to a student-centred, outcome-oriented educational philosophy. It will innovatively optimise teaching content in accordance with national professional standards and the practical demands of industry development, employing reverse thinking to design talent development programmes, thereby effectively avoiding homogenisation with the industry-education integration programmes of general undergraduate institutions. Secondly, the university must prioritise deepening university-enterprise collaboration, actively attracting renowned enterprises and research institutions onto campus. This will drive the development of platforms that integrate teaching, research and production, enhancing the level of synergy between these areas. Tailor-made talent development programmes should be designed for enterprises, inviting industry partners to participate in every stage of the process—from curriculum and textbook development, through instructional design and implementation, to practical training and high-quality employment—thereby fostering a sense of involvement and stimulating enthusiasm for collaboration. Thirdly, by jointly establishing 'industry-academia-research-application' learning platforms, the college and enterprises guide students to engage in technical R&D projects. This effectively enhances students' comprehensive practical abilities and innovative literacy, fostering innovative thinking. Finally, higher vocational colleges should base their efforts on industry trends, regional economies and the actual development of modern industrial systems. They should align precisely with pillar industries, emerging sectors and distinctive industrial chains within their regions. By combining the distinctive features of specialised education with the suitability of industrial chain job clusters, they can promote the dynamic integration of educational resource allocation, teaching processes and industrial chains. The deep integration of digital and intelligent technologies with vocational education can drive the collaborative development and mutual sharing of high-quality educational resources, whilst maximising the effectiveness of vocational education resources in an efficient manner.

Thirdly, industry associations should proactively assume responsibility for establishing vocational qualification standards. Firstly, in the process of industry-education integration, industry associations should fully leverage their pivotal role as key stakeholders, The core members of industry associations involved in talent cultivation at vocational colleges consist of technical professionals, key personnel from enterprises and heads of research institutes within the sector. By making precise forecasts regarding the quantity and quality of talent required by the industry and enterprises, they can promptly provide schools with feedback on market talent demands. This assists schools in formulating talent cultivation objectives and developing specialised courses required by the industry. Furthermore, by implementing quality assessments in teaching practice, they can, to a certain extent, enhance the quality of talent cultivation, thereby better meeting the industry's talent needs. Secondly, the sense of responsibility among industry associations should be strengthened to stimulate active industry participation. The government should proactively establish communication platforms for industry associations, ensuring that both enterprises and higher vocational colleges are involved; Colleges should attach importance to the guidance provided by industry associations, whilst enterprises must also shift their mindset and support the initiatives of these associations. By adopting a philosophy of integrated development, the four stakeholders—government, colleges, enterprises and industry—can achieve a transformation of value, enabling industry associations to generate greater social benefits, proactively assume social responsibilities, and serve the entire talent development process of higher vocational colleges, ensuring that the technical talent produced aligns with market demands.

4.2 Forging a 'Digital Master Craftsman' Teaching Workforce

In the era of digital education, 'master craftsman' teachers play the roles of knowledge integrators, knowledge constructors, methodological leaders and competency assessors. In addition to possessing the fundamental knowledge and literacy required of traditional teachers, they must also adopt a digital mindset, proficiently utilise digital technologies in their teaching and educational work, and enhance the efficiency and quality of teaching.

Strengthening teachers' digital teaching philosophy. Firstly, teachers should proactively enhance their knowledge of digital teaching, expand their digital knowledge base, and actively participate in school-organised teaching skills training to gain a deep understanding of the logic and mechanisms underlying the development of a digital teaching mindset. Secondly, teachers must actively internalise and adapt the knowledge they have acquired to achieve a profound understanding of digital teaching, which they can then flexibly apply in the classroom. Finally, when conducting daily digital teaching activities, teachers should adopt a problem-oriented approach, proactively addressing challenges encountered during the teaching process, thereby driving the continuous refinement of their digital teaching philosophy. Enhancing digital teaching awareness not only deepens teachers' digital thinking but also motivates them to engage in subject research and teaching reform, leading to a comprehensive improvement in their digital instructional design capabilities.

Building a high-calibre team of 'dual-qualified' teachers. Firstly, the high-quality development of industry-education integration hinges on teachers' academic and practical capabilities. Professional teaching teams within institutions should establish long-term collaborative mechanisms with industry enterprises, focusing on enhancing the team's cross-disciplinary integration skills, industry-education coordination capabilities, practical innovation abilities, and technical R&D collaboration skills, thereby creating a framework where the education chain, industrial chain, innovation chain and talent chain are mutually interconnected. Secondly, higher vocational colleges can collaborate with industry-education integration enterprises to establish professional teacher development centres, creating a regularised mechanism for professional teachers to participate in industry-led technological collaboration and innovation, as well as enterprise product R&D processes and technological innovation; by establishing a paid system for full-time teachers to undertake periodic practical placements in enterprises, teachers can gain a dynamic understanding of cutting-edge technological advancements in the industry and adjust their teaching strategies in a timely manner; this will encourage teachers to actively adapt to the new paradigm of integrating information technology into education and teaching, laying a solid foundation for cultivating high-quality technical and skilled talent. Thirdly, systematic professional development programmes should be implemented, with a focus on targeted, institution-based training. Systematic professional development plays a crucial role in teachers' professional growth. Its core lies in leveraging the leading and exemplary role of key teachers, showcasing the practices of outstanding educators and exemplary case studies, and combining these with multi-dimensional, in-depth academic exchange activities. This approach encourages teachers to transform digital teaching knowledge into practical operational skills. By integrating digital knowledge with educational activities, it breaks down the barriers to the application of digital technology in teaching, ultimately forming a system where digital technology empowers teaching innovation.

Revamp the digital evaluation criteria for teacher professional titles to enhance teaching quality. Firstly, higher vocational colleges should establish a tiered evaluation indicator system covering post allocation, performance appraisals and performance-related pay, formulating appropriate assessment criteria for different roles. Teaching capabilities should be enhanced through vocational training, industry placements or teaching skills competitions, whilst teaching standards should be elevated through teaching quality evaluations. In terms of teaching, higher vocational colleges may assess the innovation of teaching methods, student learning outcomes and the quality of awards won; in terms of research, they should focus on the quality of papers published by teachers, as well as the practical value and innovativeness of research projects; simultaneously, the practical achievements of teachers through in-depth engagement with enterprises must not be overlooked. In the evaluation of professional titles, the diversity of assessment should be strengthened, with teachers' capabilities being assessed from multiple perspectives. Secondly, a quantitative assessment mechanism for the industrialisation benefits of patented technologies should be established. This should not only evaluate the quantity and quality of patents but also focus on their actual application rates within partner enterprises, the economic benefits generated, and their role in driving the updating of teaching content. By incorporating technology transfer into the mandatory criteria for professional title promotion, a virtuous cycle aligned with industrial needs can be fostered. Finally, during the reform of the professional title evaluation process, the views and suggestions of teachers should be widely solicited, and teacher representatives should be organised to participate in discussions. This will ensure that the standards system is fair, reasonable and practicable, enabling teachers to understand their own strengths and weaknesses and providing effective guidance for their professional development.

4.3 Building a Digital and Intelligent Resource Ecosystem

Amidst the evolution of the information industrial revolution and the global wave of industrial digitalisation, the digital economy has become the core driving force and key growth engine for China's high-quality economic development. This transformation has given rise to new requirements regarding the quality, capabilities and skills of talent. The digital transformation of programme development in higher vocational colleges primarily encompasses two dimensions: on the one hand, the establishment of new programmes aligned with the needs of the digital economy; on the other hand, the digital restructuring of the existing programme system, comprehensively embedding digital technologies into key aspects of programme development—including conceptual frameworks, content systems, teaching methods, implementation approaches and resource development—to achieve synergy between technological empowerment and educational innovation.

Firstly, it is essential to deepen the digital dimension of programme development and establish a corresponding programme framework. In today's era, emerging technologies represented by big data, cloud computing, the Internet of Things and artificial intelligence are rapidly expanding into various industrial sectors, giving rise to a range of new professions such as internet marketing specialists and artificial intelligence analysts. Consequently,

vocational colleges should base their efforts on the upgrading of industrial demands, establishing a market-oriented mechanism for the development of programme content. They should focus on high-end industrial sectors to form a four-in-one development framework encompassing 'industry-occupation-job role-programme', closely aligning with new technical roles, emerging occupational forms, new business models, intelligent production processes, smart management, data-driven practice and digital skills requirements. In terms of programme design, institutions should introduce new digital-related programmes, utilise big data analysis to optimise the curriculum system, and form high-level clusters of programmes where traditional disciplines and emerging digital disciplines develop in synergy. This will help build a new ecosystem for education, teaching and talent development, laying the foundation for enhancing the adaptability of talent cultivation in higher vocational colleges.

Secondly, the supply model and structure of digital teaching resources must be adjusted to establish a systematic professional teaching resource system tailored to digital educational scenarios. Efforts should be made to strengthen the digital development of converged media teaching materials, clarify the development logic of digital textbooks, and integrate resources such as 'digital courses' and 'electronic teaching materials' to facilitate the transition of professional teaching content from static text to dynamic knowledge graphs; the construction of comprehensive digital teaching platforms, such as smart classrooms and virtual simulation experimental teaching centres, should be accelerated; comprehensively deepen the application of information technology on campus, establish special funds to strengthen financial support, introduce next-generation technologies such as 5G communications and edge computing, and create an intelligently interconnected smart campus environment; cultivate students' digital thinking and innovative capabilities, actively explore cloud-based teaching and blended online-offline teaching models, and achieve the co-construction and sharing of educational resources; promote the digital restructuring of the curriculum system and innovate students' learning paradigms, striving to cultivate high-level technical and skilled talent capable of meeting digital application needs, thereby fulfilling the requirements of educational development in the new era.

5. CONCLUSION

Amidst the wave of digitalisation and intelligent transformation, the optimisation of talent cultivation models through industry-education integration in higher vocational colleges must be guided by the need for the integrated development of the "education chain, industrial chain and innovation chain". This requires moving away from traditional teaching methods that "emphasise theory over practice" and "and the notion that 'those who excel in their studies will enter public service'—and, through a four-dimensional collaborative mechanism involving government, institutions, enterprises and industry associations, facilitate the alignment of educational specialisation clusters with industrial clusters. This will translate corporate technical standards into teaching objectives, achieving a deep integration between the curriculum and industrial needs; the government must refine policies, regulations and incentive mechanisms, whilst enterprises should engage deeply in the entire talent development process, whilst industry organisations must play a role in standard-setting and resource integration. Higher vocational colleges, for their part, need to strengthen the development of their own 'digital infrastructure', enhance their capacity to serve industrial innovation, stimulate the vitality of 'industry-academia-research-education-innovation' teaching, and promote the integration of digital and smart factories and laboratories into the field of vocational education research. This will optimise the ecosystem for cultivating technical and skilled talent, ultimately forming a dynamic equilibrium system of 'educational supply—industrial demand—innovation-driven development', thereby providing solid support for the cultivation of high-quality technical and skilled talent capable of adapting to the development of new-quality productive forces. To provide solid support for the cultivation of high-quality technical and skilled personnel capable of adapting to the development of the digital and intelligent era.

REFERENCES

[1] Liu Guobin, Qi Boyang. A Study on the Integrated Development of Digital Intelligence and Information Technology in County-level Towns [J]. Information Science, 2022, 40(3): 21–26.
[2] Li Wanxiang. Digital Intelligence Scenarios Drive Consumption Upgrading [N]. Economic Daily, 8 April 2023 (10).
[3] Zhang Xinwei. A Study on the Evolution of Innovation Models under the Digital Economy [J]. The Economist, 2019(7): 32–39.
[4] Wang Bing. What is Digital Intelligence? A Study on the Multiple Meanings of the Concept of Digital Intelligence [J]. Journal of Information Science, 2023, 42(7): 71–76.

[5] Jiang Dayuan. Cross-Boundary, Integration and Reconstruction: Three Major Characteristics of Vocational Education as a Type of Education — Reflections on Studying the 'Implementation Plan for the Reform of National Vocational Education' [J]. Chinese Vocational and Technical Education, 2019(7):9-12.
[6] Luo Ruzhen. A Study on the Mechanism of Industry-Education Integration in Higher Vocational Education under the Market Economy [J]. Education and Vocational Training, 2014(21):8-11.
[7] Zhang Zifa, Wang Yujie, Li Tuoyu, et al. Review and Outlook of Talent Development Policies for Industry-Education Integration in the New Era: A Textual Analysis Based on Policy Instruments [J]. Journal of Zhejiang University (Humanities and Social Sciences Edition), 2022,(12):104-113.
[8] Mou Yanlin, Li Kejun, Li Junjie. How Applied Undergraduate Universities Can Lead the Development of Disciplinary Clusters Through Industry-Education Integration [J]. Research on Higher Education, 2020, (3): 42–50.
[9] Xu Jiaqing. Strategies and Implementation Pathways for Deepening Industry-Education Integration in Applied Undergraduate Institutions [J]. Chinese University Teaching, 2018, (12): 79–81.
[10] Guo Yuanyuan, Wang Shuai. The Mechanisms of the School-Enterprise Divide and Pathways to its Resolution from a Field Perspective [J]. Adult Education, 2024(2): 53–61.