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Intelligent Technology-Enabled Development Path for Vocational Education Teachers in the Construction of an Education Powerhouse: A Study Based on DeepSeek Large Model

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Abstract: *In the process of building up an Education Powerhouse, the high-quality development of vocational education teachers is crucial. This paper delves into the objectives and challenges of vocational education teacher development, combining the current research landscape with the characteristics of DeepSeek, and finally proposes a framework for intelligent technology-empowered development of vocational education teachers. This framework contains three aspects: social system support for teacher development, enhancement of teachers' intelligent technology application capability, and collaborative optimization of human-technology-organization. Subsequently, a case study approach is employed to investigate the intelligent technology-enabled development pathways for vocational education teachers, with DeepSeek serving as a representative technological model. The study finally points out the bottlenecks inherent in DeepSeek-empowered vocational education teacher development and offers directions for further research.*

Keywords: *Education Powerhouse, Intelligent Technology, DeepSeek, Vocational Education Teachers, Development Path*

1. Introduction

In 2023, UNESCO issued the first global guidance on the use of generative artificial intelligence in education and research[1]. In 2025, the Central Committee of the Communist Party of China and the State Council issued the "Education Powerhouse Construction Plan Outline (2024-2035)" (hereinafter referred to as the "Outline"), emphasizing the use of educational digitization to open new tracks for development and shape new advantages, requiring the promotion of artificial intelligence to assist educational transformation[2]. Under the grand blueprint of national "Education Powerhouse" construction, vocational education, as an important lever for achieving high-quality development, faces opportunities and challenges of digitization and intelligence. With the rise of AI technology, its application in the vocational education field has witnessed a remarkable expansion, bringing revolutionary impacts. Vocational education teachers, as the primary resource of vocational education, are the key force supporting the national vocational education reform in the new era[3].

(1) Objectives and Significance of Vocational Education Teacher Development

According to the content of the "Outline", the development objectives for vocational education teachers can be summarized as follows: First, strengthen the construction of teacher ethics and professional conduct, adhere to the primary standard of teacher ethics and conduct, improve the long-term mechanism for building teacher ethics, promote the integration of the spirit of educators into the entire process of teacher training, and guide teachers to strengthen their ideals and beliefs, cultivate moral sentiments, nurture solid knowledge, and diligently cultivate benevolence[4]. Secondly, it is imperative to enhance professional competence, improve the teacher education system, and elevate the quality of teacher training institutions. By strengthening comprehensive teacher training with a tiered research and training system, teachers would better adapt to the needs of vocational education, thereby improving teaching quality and educational standards. Furthermore, efforts should be made to optimize the structure of the teaching workforce. This involves improving the training and enterprise practice system for high-level vocational education teachers, enhancing the development level of "dual-qualified" teachers,

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promoting the construction of teacher teaching innovation teams, so as to cultivate vocational education teachers with high-quality, profession, and innovation.

In the new era, the development of vocational education teachers is of great significance. Exploring the professional development model of teachers in this age helps improve teachers' ability to use AI technology in teaching, cultivate more high-quality skilled talents that meet the needs of industrial upgrading, thereby enhancing the attractiveness and competitiveness of vocational education, and serving the high-quality development of the national economy.

(2) Challenges Facing Vocational Education Teacher Growth

In the intelligent era, vocational education teachers face numerous challenges in their professional growth, mainly manifested in the following aspects. Firstly, the impact on teaching philosophy holds paramount significance. With the development of AI, society's demand for talents has changed significantly. Jobs requiring only simple memory and mechanical operations are being replaced by AI. Teachers need to promptly transform their teaching concepts and understand society's new requirements for technical talents. For example, in manufacturing, traditional assembly line workers are likely to be replaced by intelligent robots, while the demand for programming and maintenance skills for these robots is increasing. Teachers need to adjust teaching content and methods accordingly to cultivate these abilities in students. The application of AI in education is changing the traditional role of teachers[5]. Teachers are no longer merely knowledge transmitters but also need to become guides and assistants in students' learning processes. However, some teachers may struggle to adapt to their new roles, lacking proficiency in using new technologies.

Secondly, there is an urgent need to update teaching content. Teachers are supposed to constantly update teaching content to face new situations and challenges[6]. Some vocational colleges still rely on outdated textbooks, which fail to incorporate the latest industry technologies and enterprise job requirements. This leads to a disconnect between the in-school education and real-world enterprises' needs. For example, in the field of automotive repair, some textbooks predominantly focus on traditional repair techniques, neglecting the emerging electric vehicle repair technologies and intelligent diagnostic tools.

Furthermore, the diversification of teaching methods poses a notable challenge. Teachers are expected to master new teaching methods and flexibly apply them in the classroom, especially providing personalized teaching, with a particular emphasis on students' diverse learning situations. So teachers are required to hold a deeper understanding of students' learning characteristics and preferences and design suitable teaching plans and content for each student[7]. Nevertheless, the large student - to - teacher ratio and complex teaching tasks often hinder teachers from implementing effective personalized instruction.

Additionally, the negative impact of work pressure serves as a catalyst. The rapid development of intelligent technology has instilled concerns among some teachers about potential job replacement by intelligent machines. This sentiment may lead to decreased job satisfaction and motivation, also affecting their professional development. In the intelligent era, the escalating requirements for teachers' professional competence demand continuous knowledge and skill updates, active participation in diverse training and learning activities, and acquisition of relevant professional qualifications and certifications. The demand for continuous professional development may impose psychological pressure on teachers.

2. Research Status

(1) Review of Research on Intelligent Technology Assisting Vocational Education Teacher Development

This study selected the China National Knowledge Infrastructure database and the Web of Science database from the Institute for Scientific Information for review, with the time span set from 2010 to 2024. First, we used "vocational education teacher" + "intelligent technology" as keywords for retrieval in the CNKI database, returning 93 results. Then, we set the search scope to "Peking University Core" and "CSSCI" journals, returning 12 results. Combining citation data, these 12 articles were selected as key Chinese literature for analysis. They come from core Chinese journals such as "Chinese Vocational and Technical Education" and "Vocational and Technical Education." Next, using "Vocational education teacher" + "Intelligent" as keywords in WOS, we retrieved 50 results. Based on topic relevance and citation count, 12 articles were similarly selected for analysis. They come from JCR Q2 journals such as "LEARNING CULTURE AND SOCIAL INTERACTION" and "FRONTIERS IN PSYCHOLOGY." The research can be roughly divided into five themes.

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Vocational Education Transformation & Teacher Development: Industry 4.0 raises talent quality demands, exposing limitations in traditional vocational education (lagging concepts, insufficient teacher practice, low efficiency, poor feedback). Modernizing the system to cultivate high-skilled talent is urgent. AI challenges teachers to enhance core competencies, teaching leadership, innovation, and emotional influence, requiring redefined roles and "new craftsmanship spirit". "Made in China 2025" necessitates teacher role shifts toward curriculum innovation and technology ethics.

Teacher Competency Enhancement: Integrating Multiple Intelligences (e.g., linguistic, interpersonal) improves vocational teachers' professional qualities. Accelerating teachers' digital-intelligence literacy is critical, yet standards lack vocational focus. A specialized "Vocational Education Teacher Digital-Intelligence Literacy Indicator System" addresses this gap by emphasizing AI literacy. Teacher core competency evaluation faces challenges: absent unified standards cause a "digital-intelligence divide," hindering modernization. An evidence-based evaluation system (disciplinary, innovation, information, moral, collaborative literacy) enables comprehensive assessment .

Intelligent Education Collaborative Structure: AI-driven education evolves into a "machine intelligence + human" collaborative structure, pushing teachers toward high-value roles and new professional forms. AIGC-enabled smart learning spaces overcome traditional limitations, supporting teacher development and vocational education digitization. Big data refines teacher training (precision needs identification, targeted design, timely feedback). "Internet Plus Education" requires teachers to become facilitators, innovators, and lifelong learners.

Teaching Evaluation & Enhancement: Intelligent algorithms optimize teaching methods, resource allocation, and effectiveness amid growing student numbers. Teacher and parent support boosts vocational student achievement via self-regulated learning and goal orientation. "Smart robotics" pedagogy shifts teachers toward student-centered, interdisciplinary practices. Robust teaching evaluation systems improve human resource quality and regional development.

Teacher Attitude & Management: Emotional skills training enhances vocational teachers' wellbeing and job satisfaction. "5G+Education" integration demands a people-centered approach for talent cultivation. Collaboration strengthens teacher professionalism and adoption of learner-centered methods. Acceptance models guide blended learning quality in vocational schools.

In the field of vocational education research both domestically and internationally, scholars have focused on multiple dimensions such as teacher professional competence, intelligent teaching evaluation, physical education teaching, and mental health assessment, achieving significant progress. Foreign research primarily focuses on teacher professional attitude management, online vocational education practice under emergencies, blended learning acceptance, intelligent teaching evaluation, and enhancement strategies, revealing the relationship between subjective wellbeing, emotional intelligence, and work attitudes, as well as the application of AI technology in education. Domestic research focuses on vocational education transformation and development, teacher competency enhancement from a multiple intelligences perspective, intelligent education collaborative structure, etc., exploring the impact of Industry 4.0 on vocational education, teacher development paths in the AI era, and teacher core competency evaluation. These research results provide theoretical support and practical guidance for the reform and development of vocational education, but unresolved issues remain.

First, Lagging Transformation Models: Although current research on the transformation and development of vocational education teachers focuses on cutting-edge areas such as Industry 4.0 and the AI era, the lag in transformation models is evident. On the one hand, talent cultivation concepts fail to keep pace with the times. Traditional models suffer from insufficient teacher practical experience, low teaching efficiency, and a lack of evaluation and feedback mechanisms, resulting in an inability to meet the talent quality requirements of Industry 4.0 for HVE. On the other hand, although research on teacher development paths in the AI era proposes improvements in core competencies and teaching leadership, it lacks systematic optimization of teacher transformation models and fails to effectively address the challenges posed by AI.

Second, Incomplete Competency Evaluation: Although research on teacher competency enhancement from a multiple intelligences perspective emphasizes the application of MI in art teacher education, competency evaluation remains incomplete. On the one hand, problems in constructing evaluation indicator systems are prominent. For example, the industry standard "Teacher Digital Literacy" lacks specificity in the vocational education field and fails to effectively reflect vocational education characteristics and AI literacy requirements. On the other hand, teacher core competency evaluation faces obstacles such as the absence of evaluation standards, resulting in a huge "digital-intelligence divide" among teachers regarding information technology application capabilities and

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intelligent teaching, which hinders the ability to meet the new demands of talent cultivation in the intelligent era for teacher professional development.

Third, Collaborative Structure Needs Optimization: Although research on intelligent education collaborative structure focuses on human-machine collaboration in the AI era, the collaborative structure needs optimization. On the one hand, teacher professional form transformation remains incomplete, and the transformation of teacher professional abilities and the development of smart education still face challenges. On the other hand, although research on teacher smart learning space design under the AIGC background proposes effective solutions to traditional learning space problems, the practical difficulties in vocational education have not been fundamentally solved. The application of big data and educational informatization in vocational education teacher training and professional development still requires further exploration and improvement.

(2) Characteristics and Research Status of DeepSeek

DeepSeek is an intelligent product independently developed by Hangzhou DeepSeek Artificial Intelligence Basic Technology Research Co., Ltd. (hereinafter referred to as "DeepSeek"). Tracing its development process: it was established in July 2023, on January 5, 2024, it launched its first large language model, DeepSeek LLM, followed by the release of DeepSeek Coder, DeepSeek Math, DeepSeek VL, etc., on December 26, 2024, it open-sourced DeepSeekV3, symbolizing the maturity of its technology, on January 31, 2025, the DeepSeek-R1 model landed on NVIDIA NIM, accessed by Amazon and Microsoft, on February 5, DeepSeek-R1, V3, Coder, and other models landed on the National Supercomputing Internet Platform. Its rapid growth demonstrates China's fast development momentum in related fields.

It has three significant characteristics:

The first is Local Lightweight Deployment, which allows it to train dedicated models using local data, flexibly adapting to the needs of various industries, with outstanding advantages in medical scenarios. For example, local deployment at Chongqing University Three Gorges Hospital ensures medical data security while avoiding cloud service latency, enabling functions like condition analysis and report interpretation to return in seconds. Customized models optimize analysis and treatment plan recommendations, seamlessly integrating with Electronic Medical Record systems for convenient use by medical staff.

The second focuses on Algorithm Focus. Its model architecture is advanced. For instance, DeepSeek-V3 adopts a Mixture-of-Experts architecture, significantly improving computational efficiency and performance, Multi-head Latent Attention accelerates inference and reduces training costs, Multi-token Prediction technology enhances contextual understanding and training efficiency, 8-bit floating-point mixed-precision training optimizes memory and computation. DeepSeekR1-Zero adopts Population-Based Relative Policy Optimization for Reinforcement Learning, skipping traditional Supervised Fine-Tuning and Reinforcement Learning from Human Feedback stages, enhancing reasoning and self-learning capabilities. These algorithmic innovations make it an industry benchmark in performance, efficiency, and cost control.

The third is Open Source and Sharing. Its code, data, and algorithms are publicly available, facilitating technical analysis and secondary development, enhancing model transparency and social trust, promoting technological innovation dissemination and industry transparency, making it convenient for developers to optimize models, allowing the public to clearly understand their performance, and enabling regulatory bodies to conduct in-depth reviews to ensure model safety and compliance.

Although DeepSeek is a relatively new development, scholars have keenly perceived its strategic value and paid close attention to it. Zhang Huimin focused on technological breakthroughs and industrial applications, believing that DeepSeek's innovations like the MoE architecture and Dynamic Sparse Routing optimize model performance, shifting it from hardware-dependent to programming-dependent, adding new momentum to the AI industry's development[8]. Deng Jianpeng et al. analyzed the regulatory challenges arising from DeepSeek's innovations in Knowledge Distillation, Chain-of-Thought technology, and open-source models from regulatory and ethical perspectives, clarifying key directions for Generative AI regulation[9]. Ling Xiaoxiong explored DeepSeek's profound impact on cross-cultural computing and global digital-intelligence governance from the perspective of technological civilization and global governance, suggesting that DeepSeek's "localized innovation" model offers new perspectives and practical examples for global digital-intelligence governance and civilizational symbiosis[10]. Liu Qicheng pointed out from the dimension of global technological competition that the success of DeepSeek not only demonstrates China's independent innovation capabilities in the AI field but also

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breaks Western technological hegemony, winning China more say in global technological competition[11]. Currently, research on DeepSeek mainly focuses on technological breakthroughs, industrial applications, and global technological competition. In the practical exploration phase of educational applications, we hope to refine DeepSeek's application scenarios to the level of vocational education teacher development, exploring specific implementation pathways by constructing an application system framework.

3. Framework for Intelligent Technology Assisting Vocational Education Teacher Development

Currently, intelligent technology is profoundly changing all aspects of the education field. Vocational education, as an important pathway for cultivating technical and skilled talents,vocational education relies on the professional development of teachers to improve education quality and meet the needs of socio - economic development. The Sociotechnical Systems Theory is introduced here, providing a unique perspective and analytical framework for the application of intelligent technology in vocational education teacher development. This theory emphasizes the interrelationships and synergy between human, technological, and organizational factors, arguing that an effective system is jointly constituted by social and technological factors, which are interdependent and mutually influential. In the vocational education field, teachers, as the core social factor, and intelligent technology, as an important component of the technological factor, their organic integration is essential for improving teaching effectiveness and professional development. This theory emphasizes achieving overall system optimization and efficient operation by optimizing the two subsystems of society and technology and their interrelationships, as shown in Figure 1. Intelligent technology represented by DeepSeek provides teachers with support in knowledge graphs, intelligent retrieval, personalized recommendation, multimodal data processing, etc., offering new opportunities for their development.

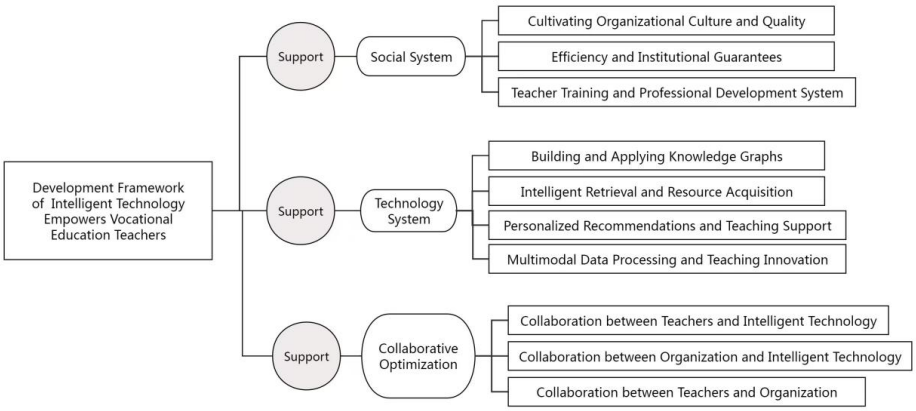

Figure 1: Framework for Intelligent Technology Assisting Vocational Education Teacher Development

(1) Social System Support for Teacher Development

The first is organizational culture and atmosphere building. Schools and educational institutions should foster an organizational culture that encourages innovation and supports teacher professional development, providing teachers with a good working environment and psychological support. By establishing teacher professional learning communities, promoting communication and cooperation among teachers, sharing teaching experiences and intelligent technology application insights, enhancing teachers' sense of belonging and team cohesion. Second is policy and institutional safeguards. Governments and educational authorities should formulate relevant policies and systems to provide policy support and safeguards for the application of intelligent technology in teacher development. This includes investment in teacher intelligent technology training, incentive mechanisms for innovation, regulations on data security and privacy protection, ensuring the application of intelligent technology complies with educational principles and teacher development needs. Furthermore, the teacher training and professional development system incorporates intelligent technology training. Utilizing a blended online-offline approach, it provides teachers with systematic instruction in intelligent technology knowledge and skills. This enables them to leverage the advantages of intelligent teaching tools and strategies, enhancing their overall intelligent literacy.

(2) Enhancing Teachers' Intelligent Technology Application Ability

Teachers use it to construct and integrate knowledge graphs, helping them better organize and

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understand teaching content. Teachers can use knowledge graphs for instructional design, course planning, and teaching evaluation, improving teaching effectiveness. Then, the intelligent retrieval function enables teachers to quickly access needed teaching resources and information, improving lesson preparation efficiency. Simultaneously, teachers can use the intelligent retrieval function for educational research and teaching innovation, enhancing teaching quality and educational research levels. More importantly, teachers use its personalized recommendation function to provide students with personalized learning paths and teaching resources, meeting the diverse learning needs of different students. Teachers can use the personalized recommendation function for teaching evaluation and feedback, improving teaching effectiveness. Teachers can use this function for image generation, speech recognition, cross-modal retrieval, etc., enriching teaching methods and approaches. Concurrently, teachers can leverage its multimodal data processing capabilities for educational research and teaching innovation.

(3) Collaborative Optimization of Human-Technology-Organization

Firstly, in teacher-technology collaboration, teachers learn and apply intelligent technology, integrate it with teaching practice, leverage the advantages of intelligent technology, and improve teaching effectiveness. Simultaneously, teachers should pay attention to the development trends of intelligent technology, continuously update teaching philosophies and methods, and adapt to the requirements of education and teaching in the intelligent era. Second is organization-technology collaboration. Schools and educational institutions should reasonably select and apply intelligent technology based on their teaching needs and the actual situation of teacher development, providing teachers with necessary technical support and safeguards. At the same time, attention should be paid to internal communication and coordination within the organization to ensure that the application of intelligent technology aligns with the organization's teaching goals and teacher development needs. Furthermore, in teacher-organization collaboration, teachers should actively participate in the school's education and teaching reforms and teacher professional development activities, jointly developing personal development plans with the school to clarify development goals and directions. Schools should pay attention to teachers' development needs, provide necessary support and assistance, and promote the common development of teachers and the organization.

4. Case Study of DeepSeek Assisting Vocational Education Teachers

In the wave of digital education, DeepSeek has brought new teaching and learning experiences to vocational school teachers. We adopted a case study method, conducting a one-month observation and interview with Teacher L, who teaches mechanical manufacturing at a secondary vocational school, collecting relevant data during Teacher L's use of DeepSeek, such as lesson plans, classroom recordings, and teaching reflection reports. As a senior teacher at the school, Teacher L actively embraces technologies like DeepSeek, integrating them into daily teaching and personal growth, which led to improvements in teaching quality.

During lesson preparation, Teacher L needed to supplement the latest professional knowledge and teaching methods. He used DeepSeek to quickly query disciplinary frontiers and educational theories. For example, when preparing the "Intelligent Manufacturing" course, by inputting keywords, he obtained a large amount of the latest research results and teaching cases in the field of intelligent manufacturing, effectively filling knowledge gaps. Simultaneously, Teacher L used it to generate knowledge graphs to systematically organize the subject framework. When teaching calculus-related knowledge, he input "Calculus Knowledge Graph" and obtained a clear logical relationship diagram of knowledge points, helping students better understand complex concepts. Furthermore, Teacher L used it to generate personalized teaching materials, such as cases, exercises, and experimental designs, saving significant lesson preparation time. For instance, when explaining mechanical part processing technology, it provided him with rich practical cases and exercises, making the teaching content more vivid and practical. Teacher L also used this LLM to analyze textbook content, obtain interdisciplinary correlation suggestions, and enrich classroom dimensions. When teaching a programming language course, he referred to the tool's suggestions for correlations with disciplines like mathematics and logic, integrating interdisciplinary knowledge into teaching and broadening students' horizons.

Regarding classroom management, Teacher L used it to simulate student questions or unexpected situations, rehearsing coping strategies in advance. Teacher L would upload classroom recordings or transcripts to it, letting the AI analyze his language, interaction frequency, and student participation, thereby obtaining improvement suggestions. After one experimental class, through tool analysis, he learned that students' participation during the experiment was not high enough, so he adjusted his

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teaching methods, adding more interactive sessions. Teacher L also regularly used it to generate teaching reflection reports, tracking his personal growth trajectory. These reports detailed his teaching highlights and shortcomings, providing him with clear directions for improvement and helping him continuously enhance teaching quality.

Outside class, Teacher L actively participates in educational research, and DeepSeek provides him with strong support. When writing a paper on "Vocational Education Reform," he used it to obtain a large amount of relevant literature review and suggestions for data analysis methods, making the paper content richer and more scientific. Simultaneously, Teacher L used the tool to generate survey questionnaires and experimental design templates, improving research efficiency. When conducting research on "Student Learning Motivation," it provided him with a professional survey questionnaire template, helping him quickly collect and analyze data. Furthermore, Teacher L would input teaching topics to obtain interdisciplinary integration cases, expanding innovative ideas. When preparing the "Environmental Protection Technology" unit, he obtained several interdisciplinary integration cases through it, combining environmental protection technology with knowledge from science, art, and other disciplines, stimulating students' learning interest and innovative thinking.

Regarding professional development, based on his career goals, Teacher L used the LLM to recommend learning paths and resources. For example, when planning to improve his teaching skills, several suitable learning paths and resources would be recommaned, helping him learn more purposefully.Teacher L also used the tool to create daily learning plans and track completion progress. By inputting "Daily Learning Plan," detailed learning tasks would be created for him, he completed them on time and recorded progress, effectively managing learning time. Additionally, Teacher L used DeepSeek to filter high-quality educational communities, online seminars, and industry trends, expanding his professional network. He joined multiple educational communities, participated in online seminars, learned about the latest industry trends, exchanged experiences with peers, and continuously improved his professional level.

5. Bottlenecks in DeepSeek-Assisted Vocational Education Teacher Development

(1) Social System Support for Teacher Development

Firstly, policy support is insufficient. Currently, although there is an emphasis on intelligent transformation in the vocational education field, specific policies supporting the use of technologies like DeepSeek in vocational education teacher development are lacking. For example, vocational education schools have not issued relevant support policies, teachers encountering difficulties cannot get timely solutions, affecting application effectiveness. Secondly, resource distribution is uneven. Within the social system, resource allocation varies notably between regions and schools. For instance, schools in economically developed areas may have sufficient funds and equipment to support teachers using the latest full-featured DeepSeek, while schools in economically underdeveloped areas lack corresponding resources, preventing some teachers from fully utilizing this technology to enhance teaching levels. Furthermore, data security and privacy protection issues are becoming increasingly prominent. For example, research from Zhejiang University School of Education showed that students reasonably using AI assistance saw an increase in autonomous learning motivation index, but it also highlighted the need to strengthen data security and privacy protection mechanisms to ensure technology application complies with the essential laws of education.

(2) Enhancing Teachers' Intelligent Technology Application Ability

The first obstacle lies in the insufficient teacher technical training. Proficiency levels in applying intelligent technology among vocational educators vary widely. A significant portion of teachers not only lack a basic understanding of the technology, but also demonstrate a dearth of the spirit of active exploration and innovation, often showing reluctance to leverage DeepSeek for teaching innovation. Simultaneously, targeted teacher training is still not widespread. Secondly, the rapid pace of technological updates poses a formidable challenge. Technologies like DeepSeek are constantly being upgraded and improved, placing higher demands on the technical application capabilities of vocational education teachers. Constrained by time and energy limitations, many educators struggle to keep abreast of these technological advancements. Furthermore, the application of artificial intelligence technologies like DeepSeek in the education field is fraught with concerns regarding technical reliability and accuracy. For example, DeepSeek may generate errors or inaccuracies when generating teaching content or providing teaching suggestions. This requires teachers to possess certain technical discernment capabilities to ensure the accuracy of teaching content.

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(3) Collaborative Optimization of Human-Technology-Organization

Teacher role transition proves to be a daunting task. The application of AI technologies like DeepSeek requires teachers to transition from traditional knowledge transmitters to learning guides and facilitators. However, many teachers face difficulties in this role transition process. Teachers need to adapt to new teaching models, such as virtual classrooms, digital humans, and intelligent knowledge bases, which require time and effort to learn and adapt to. Second is difficulty in organizational structure adjustment, ineffective communication and collaboration mechanisms. The organizational structures and management methods of many vocational colleges still remain in traditional modes, unable to adapt to the changes brought by AI technology. When teachers use DeepSeek, cross-departmental collaboration is frequently required, but lagging adjustments and communication barriers of organizational structure severely impede collaborative efficiency.

6. Conclusion

Against the backdrop of Education Powerhouse construction, vocational colleges bear the responsibility of cultivating master craftsmen, skilled artisans, and highly-skilled talents for society. Therefore, the high-quality development of vocational education teachers is urgently needed. Based on the development goals and challenges of vocational education teachers, this study reviewed over 20 authoritative domestic and international studies, combined with the characteristics and research status of the DeepSeek large model, and proposed a framework for intelligent technology assisting vocational education teacher development. This framework includes three dimensions: social system support for teacher development, enhancement of teachers' intelligent technology application ability, and collaborative optimization of human-technology-organization. Through case study research, the study identified the bottlenecks existing in current AI technology assisting vocational education teacher development.

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