

Research on the Value, Risks, and Responses of DeepSeek Empowering Vocational Education

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Abstract

With the rapid development of artificial intelligence technology, the application of DeepSeek big model in higher vocational education is becoming increasingly widespread, promoting the digital transformation of education. In terms of value, DeepSeek technology empowers teaching management, helps improve teaching levels, empowers learning planning, helps improve student learning efficiency, empowers teaching coaching, helps improve teacher teaching quality, empowers educational resources, and facilitates the integration of different educational resources. Reflecting on current developments, the modernization of higher vocational education in the DeepSeek era is facing threats to personal privacy and data security, risks of moral alienation among students, challenges to traditional authority of teachers, and the potential exacerbation of the digital divide in education. To achieve the leapfrog development of modernization of higher vocational education from "latecomer" to "advanced" with the help of artificial intelligence technologies such as DeepSeek, it is necessary to strengthen the supervision and regulation of the application of DeepSeek technology, implement the fundamental task of moral education to achieve comprehensive human development, cultivate "smart" teachers to demonstrate the unique value of "human teachers", optimize the allocation of digital education resources to promote educational equity, deepen the integration of intelligent technology and higher vocational education, and ensure that DeepSeek technology becomes an important support for promoting high-quality development of higher vocational education and cultivating high-quality technical and skilled talents.

Keyword: *DeepSeek; Empowerment; Vocational education; Artificial intelligence; Risk response*

Introduction

With the rapid advancement of Artificial Intelligence (AI) technology, the application potential of large models such as DeepSeek in the educational domain has increasingly come to the fore, particularly within higher vocational education (HVE). The intelligent, personalized, and efficient advantages of DeepSeek can provide crucial support for the innovation of teaching models, the optimization of talent cultivation, and the enhancement of vocational skills. The integration of DeepSeek into HVE not only elevates teaching quality but also refines curriculum design, facilitates personalized learning, and aids in the precise alignment of vocational skills with industry demands. This integration propels higher vocational colleges towards a smart education paradigm, thereby contributing to the high-quality development of the modern vocational education system. In August 2017, the "Guiding Opinions on Accelerating Scenario Innovation to Promote High-Quality Economic Development through Advanced Applications of Artificial Intelligence," jointly issued by six ministries including the Ministry of Science and Technology, the Ministry of Education, and the Ministry of Industry and Information Technology, highlighted the exploration of various scenarios in the education sector, such as online classrooms, virtual classrooms, virtual simulation training, virtual teaching and research offices, new-generation teaching materials, teaching resource construction, and smart campuses (Ministry of Science and Technology, Ministry of Education, Ministry of Industry and Information Technology, 2017). As a representative of the new generation of advanced AI, research on the effective incorporation of DeepSeek into the application scenarios of China's HVE is a proactive response to the aforementioned top-level design.

Currently, academic research on AI-enabled HVE predominantly focuses on its positive impacts, risks, and countermeasures across different disciplines and user groups. In terms of vocational education content, Gong Xuan has proposed that AI technologies, exemplified by ChatGPT, can facilitate the acquisition of broader

professional knowledge and cutting-edge technologies in vocational teaching, thereby cultivating essential core competencies among students in the digital age (Gong Xuan, 2023). Regarding vocational education methodologies, Yan Xiang and Wu Qinghua argue that ChatGPT technology can assist students in vocational colleges in achieving conversational learning and personalized adaptive learning (Yan Xiang & Wu Qinghua, 2023). In the realm of vocational education resources, Yang Shuping and Zhu Xingchen point out that ChatGPT technology enables the effective integration of diverse educational resources within the vocational education sector, encompassing traditional, modern, and internet-based educational resources (Yang Shuping & Zhu Xingchen, 2023). In the context of vocational education evaluation, Zhang Xuebing advocates for a reduction in the reliance on simple professional knowledge assessments, instead proposing an evaluation system that combines professional knowledge with practical skills and real-world vocational scenarios, thereby forming an evaluation framework with distinct vocational education characteristics (Zhang Xuebing, 2023). In summary, existing research underscores the positive role of AI in driving the digital transformation of vocational education. However, there is currently a relative dearth of research on the application of DeepSeek technology in HVE, particularly regarding theoretically grounded, endogenous, and systematic studies that are problem-oriented and practice-driven in empowering HVE through DeepSeek technology.

Against this backdrop, this paper delves into the value, risks, and countermeasures associated with the empowerment of HVE through DeepSeek technology. It explores its positive contributions to teaching reform, talent cultivation, and skill enhancement, while concurrently conducting an in-depth analysis of potential risks and challenges. Corresponding countermeasures are proposed to offer valuable insights for the intelligent development of HVE and to provide theoretical underpinnings and practical guidance for the construction of a more scientific, efficient, and equitable smart vocational education system.

1. The Value of DeepSeek Empowering Higher Vocational Education

The application of large models like DeepSeek in higher vocational education (HVE) offers new possibilities for the innovation of teaching models, the optimization of talent cultivation, and the enhancement of vocational skills.

1.1 DeepSeek Technology Empowers Teaching Management, Facilitating the Improvement of Teaching Quality

The application of DeepSeek's large model in the teaching management of HVE can optimize teaching processes, enhance teaching quality, and drive the modernization of educational management models through intelligent means. Furthermore, the integration of DeepSeek technology in vocational education can assist students in better learning and mastering skills, laying a solid foundation for their future career development.

During the empowerment process, AI technologies represented by DeepSeek serve as a pivotal driving force. By leveraging the complementary strengths of humans and machines to accelerate the application and implementation of resources, the sharing and optimization of HVE resources across regions and even nationwide can be comprehensively promoted. Specifically:

Intelligent Curriculum Planning and Optimization: DeepSeek can intelligently analyze the curriculum system and optimize teaching content based on industry development trends, job demand data, and students' learning situations, ensuring that courses better align with market needs. For instance, through big data analysis, DeepSeek can dynamically adjust curriculum modules to ensure that students acquire skills in line with cutting-edge industry technologies, thereby enhancing the relevance and practicality of talent cultivation.

Precise Teaching Evaluation and Intelligent Feedback: Traditional teaching evaluation modes mainly rely on examinations and teachers' subjective assessments. In contrast,

DeepSeek can form comprehensive personalized learning profiles and generate intelligent evaluation reports by analyzing students' learning behaviors, classroom interactions, and homework completion through big data. Teachers can adjust teaching strategies precisely based on these data to improve the effectiveness of classroom teaching, while also helping students identify their weaknesses promptly and optimize their learning paths (Chu Hongqi, 2013).

Intelligent Recommendation and Sharing of Teaching Resources: DeepSeek can automatically recommend the most suitable teaching materials, courseware, case analyses, and practical training resources based on teachers' teaching content and students' learning needs, improving the utilization efficiency of teaching resources. Additionally, this technology can establish cross-institutional and cross-regional resource-sharing platforms to realize the co-construction and sharing of high-quality educational resources, addressing the imbalance in teaching resources among different institutions.

Intelligent Course Scheduling and Teacher Workload Optimization: Through DeepSeek's automated data analysis and optimization capabilities, higher vocational colleges can achieve intelligent course scheduling, improving the utilization efficiency of classrooms, laboratories, and other resources, while avoiding time conflicts in courses (Luo Lizhang, 2015). Moreover, DeepSeek can assist teachers in course preparation, homework grading, and teaching data analysis, reducing their workload and allowing them more time to focus on teaching research and student cultivation.

Promoting Smart Campus Construction: DeepSeek can facilitate the construction of smart campuses and drive the information-based upgrade of teaching management. For instance, through intelligent learning platforms, AI teaching assistant systems, intelligent attendance, and classroom analysis, it can realize the digitization and intelligence of teaching management, enhancing the overall educational service capabilities of schools (Song Zhenchao & Huang Jie, 2015). Meanwhile, through data

analysis, it can predict potential issues in teaching management and assist decision-makers in optimizing educational policies and management models.

In summary, the empowerment of DeepSeek technology makes the teaching management of HVE more intelligent, efficient, and precise, improving the overall teaching level. By optimizing the curriculum system, precise teaching evaluation, intelligent resource recommendation, automated teaching management, and smart campus construction, this technology can effectively address many pain points in traditional teaching management and provide strong support for talent cultivation in higher vocational colleges.

1.2 DeepSeek Technology Empowers Learning Planning, Facilitating the Improvement of Students' Learning Efficiency

The introduction of DeepSeek technology not only optimizes teaching management but also precisely empowers students' learning planning, making the learning process more personalized, intelligent, and efficient. Through data analysis, intelligent recommendations, and interactive learning support, DeepSeek can assist higher vocational students in optimizing their learning paths and improving learning efficiency and outcomes.

Additionally, the application of DeepSeek technology in learning planning can not only enhance the efficiency and quality of teaching but also bring more convenient and personalized teaching service experiences to both teachers and students, mainly reflected in:

Personalized Learning Path Recommendation: Higher vocational students have diverse learning foundations and career development orientations, making it difficult for the traditional "one-size-fits-all" teaching model to meet each student's needs. DeepSeek can generate personalized learning paths based on students' interests, learning habits, course mastery, and career goals. For instance, it can provide hierarchical teaching schemes for students with weaker foundations, recommending

suitable introductory courses and practice tasks. For students with stronger learning abilities, it can push advanced courses and practical training projects to stimulate their learning potential. It can also recommend specialized courses aligned with students' personal career development orientations based on industry demands, helping them precisely enhance their employability.

Intelligent Learning Assistant and Real-Time Q&A for Knowledge Problem-Solving: DeepSeek can serve as students' intelligent learning assistant, providing 24/7 online Q&A support (Liang Yu & Zheng Yiping, 2021). When students encounter problems during learning, they can ask questions to the AI teaching assistant at any time and receive immediate answers. Additionally, DeepSeek can combine students' historical learning records to provide personalized explanations of knowledge points, helping them efficiently understand and master key and difficult points and enhance their autonomous learning abilities.

Learning Data Analysis and Dynamic Feedback: DeepSeek can track students' learning behaviors in real-time, including learning time, homework completion, accuracy rates, and knowledge point mastery, and generate personalized learning reports through data analysis. These reports can help students identify their weaknesses and receive targeted learning suggestions; understand their learning progress and reasonably adjust learning strategies; and compare their learning situations with peers to stimulate learning motivation. Additionally, teachers can also utilize these data to optimize teaching methods and provide more precise guidance to students.

AI-Driven Intelligent Assessment and Learning Consolidation: DeepSeek can intelligently generate personalized assessment questions based on students' learning progress and knowledge mastery and automatically adjust the difficulty during exams or daily practices to ensure that students receive the most suitable practice content. Meanwhile, it can recommend targeted consolidation exercises based on assessment

results to help students efficiently identify and fill knowledge gaps and improve learning effects.

Interactive Learning Experience and Immersive Teaching: DeepSeek can combine virtual reality (VR), augmented reality (AR), and AI technologies to provide immersive interactive learning experiences for higher vocational students. For instance, in majors with strong practical components like automotive maintenance, nursing, and CNC machining, DeepSeek can enable students to conduct operational training in virtual environments through intelligent simulation systems, reducing practical costs and improving learning effects (Gao Qiqi & Yan Wenfeng, 2023).

It is evident that DeepSeek technology empowers students' learning planning in HVE, making learning methods more intelligent, personalized, and efficient. Through personalized learning path recommendations, intelligent learning assistants, data analysis and dynamic feedback, intelligent assessments, and interactive learning experiences, DeepSeek not only enhances students' learning efficiency but also strengthens their autonomous learning abilities, laying a solid foundation for their future career development.

1.3 DeepSeek Technology Empowers Teaching Tutoring, Facilitating the Improvement of Teachers' Teaching Quality

DeepSeek technology empowers teaching tutoring for teachers in vocational colleges by providing rich teaching resources and innovative content, making teaching more aligned with the forefront of vocational education.

Furthermore, the application of DeepSeek technology in HVE not only enhances teaching management and students' learning efficiency but also provides intelligent support for teachers in the teaching tutoring (here referring to the process of providing guidance and support during teaching), optimizing teaching methods and improving teaching quality. Its main functions are reflected in the following aspects:

Intelligent Lesson Preparation and Teaching Resource Recommendation: DeepSeek can automatically generate personalized teaching schemes based on course outlines, industry standards, and student needs, helping teachers optimize course content. Specifically, it can intelligently optimize course content by recommending the latest teaching cases, experimental projects, and industry practical experiences based on industry trends and the latest skill demands, aligning teaching content with market needs. It can also intelligently recommend relevant teaching videos, e-textbooks, interactive courseware, and practical training materials to improve teachers' lesson preparation efficiency. Additionally, it can support diverse teaching modes by suggesting different teaching methods according to students' learning styles, such as inquiry-based learning, project-based learning, and situational simulation, to enhance classroom interactivity and teaching effects.

AI Teaching Assistant System Enhances Teaching Efficiency: DeepSeek can serve as teachers' intelligent assistant, undertaking some repetitive teaching tasks and allowing teachers to focus on teaching innovation and student cultivation. For instance, DeepSeek can automatically grade objective questions and use natural language processing technology to assess subjective questions, reducing teachers' workload. It can also analyze students' learning situations to help teachers precisely understand students' knowledge mastery levels and adjust teaching rhythms accordingly, achieving personalized teaching. Moreover, it can assist teachers in answering student questions through intelligent Q&A systems, improving classroom interaction effects and enhancing students' learning experiences (Lu Peizhu, 2021).

Teaching Feedback and Personalized Tutoring Support: DeepSeek can provide precise teaching feedback based on students' learning data to help teachers optimize tutoring strategies. By analyzing students' homework, exam results, and classroom participation, DeepSeek can help teachers identify students' knowledge weaknesses and provide targeted teaching suggestions. It can also assist teachers in formulating hierarchical teaching schemes, matching suitable learning resources and tutoring

methods for students of different ability levels to achieve hierarchical teaching. Meanwhile, teachers can also utilize the intelligent learning reports provided by DeepSeek to customize personalized tutoring plans for students, improving the pertinence and effectiveness of teaching.

Promoting Teachers' Professional Development and Teaching Innovation: DeepSeek can not only enhance teachers' daily teaching quality but also drive their professional growth and teaching innovation. On this basis, it can also provide teachers with the latest educational research papers, industry trends, and teaching methods to help them continuously improve their professional literacy. In particular, teachers can utilize DeepSeek to explore AI-based intelligent teaching modes, such as flipped classrooms, blended learning, and AI+ virtual simulation training, to enhance their teaching innovation abilities.

In general, the empowerment of DeepSeek technology makes teachers' teaching tutoring in HVE more efficient, precise, and intelligent. Through intelligent lesson preparation, AI teaching assistants, precise teaching feedback, and teaching innovation support, DeepSeek not only improves teachers' teaching quality but also promotes the modernization transformation of teaching modes, providing strong technical support for the sustainable development of HVE.

1.4 DeepSeek Technology Empowers Educational Resources, Facilitating the Integration of Different Educational Resources

DeepSeek technology can not only improve the utilization efficiency of educational resources but also enhance the richness of educational content and the flexibility of teaching methods, providing strong technical support for the resource integration and innovative development of vocational education.

Meanwhile, the application of DeepSeek technology not only optimizes teaching management, learning planning, and teaching tutoring but also plays an important role in educational resource integration. The characteristics of HVE determine its high

dependence on practical and applicable resources, while DeepSeek can break down resource barriers through intelligent means, achieving efficient integration of diverse educational resources and improving teaching quality and talent cultivation levels.

Specifically:

Breaking Down School-Enterprise Boundaries and Promoting Industry-Education Integration: In teaching practice, DeepSeek can analyze industry job demands and precisely recommend courses and practical training resources that meet enterprise needs, making teaching content more aligned with actual work scenarios. Meanwhile, through DeepSeek's intelligent matching capabilities, higher vocational colleges can more efficiently dock with enterprise practical training bases, integrating learning resources from real production environments and allowing students to acquire enterprise-level skill training during their school years. Additionally, DeepSeek can also promote in-depth cooperation between schools and enterprises, supporting models like "order-based cultivation" and "project-based learning" to achieve seamless docking between talent cultivation and enterprise demands.

Building a Smart Education Resource-Sharing Platform (Zhong Xiangming & Fang Xingdong, 2022): DeepSeek can integrate teaching resources from different institutions and build an open smart education platform, allowing high-quality courses, textbooks, case libraries, experimental projects, etc., to be shared among multiple institutions, alleviating the imbalance in educational resources. To achieve intelligent course recommendations and resource optimization, DeepSeek can also intelligently recommend suitable courses and learning resources based on the professional characteristics and student needs of different institutions, optimizing teaching content and improving the utilization rate of educational resources. On this basis, DeepSeek can also support the integration of diverse teaching resources like texts, videos, simulation software, and virtual reality (VR), making HVE resources more abundant and diversified and enhancing the interactivity and practicality of teaching.

AI-Driven Online-Offline Blended Teaching: DeepSeek can support intelligent remote teaching by providing students with high-quality online courses, personalized learning paths, and real-time interactive Q&A through intelligent recommendation systems, improving the teaching quality of remote education. In smart classroom environments, DeepSeek can analyze classroom interaction data in real-time to help teachers optimize online-offline teaching methods and improve teaching efficiency and classroom participation. In HVE majors like medicine, machinery, and architecture, DeepSeek can provide virtual simulation training by combining VR/AR technologies, allowing students to conduct highly simulated practical operations in safe and controllable environments and make up for the deficiencies of traditional practical training resources.

Promoting the Construction of a Lifelong Learning System: On one hand, DeepSeek can intelligently recommend career development paths based on personal interests, learning trajectories, and industry trends to help students and in-service personnel formulate personalized learning plans and support the continuous improvement of vocational skills. On the other hand, it can also intelligently assess learning outcomes, generate personalized skill profiles, and align with industry standards to provide data support for vocational skill certification and talent recommendation. Meanwhile, with the help of DeepSeek's intelligent learning platform, higher vocational colleges can provide open learning resources to society, supporting vocational education, skill training, adult education, etc., and promoting lifelong learning for all.

In summary, the empowerment of DeepSeek technology makes the integration of HVE resources more efficient, diversified, and open. By promoting school-enterprise cooperation, building smart education resource-sharing platforms, facilitating online-offline integration, and supporting the construction of a lifelong learning system, DeepSeek not only optimizes the utilization methods of educational resources but also drives HVE towards a more intelligent, precise, and personalized direction, providing strong guarantees for cultivating high-quality technical and skilled talents.

2.Potential Risks of DeepSeek Empowering Higher Vocational Education

While DeepSeek presents a promising opportunity for the modernization of vocational education, it is still in an immature stage of development. Influenced by social transformations and the inherent characteristics of artificial intelligence itself, there is a lack of adaptability between DeepSeek and the modernization of vocational education. While DeepSeek plays a positive role in profoundly transforming and shaping individuals and society, it also spawns its own antithesis, becoming a new external and alienating force (Wang Xingyu, 2023).

2.1 Threats to Personal Privacy and Data Security

Although DeepSeek technology demonstrates numerous advantages in higher vocational education (HVE), its application also poses challenges to personal privacy and data security. When extensively applying AI technologies, higher vocational colleges need to pay particular attention to the data security of students, teachers, and other relevant personnel to prevent information leakage, misuse, or unauthorized access.

Specifically, as DeepSeek requires substantial data for training and generation, this may involve students' personal information and privacy. The collection and use of such data may pose potential risks to students, primarily manifested in the following aspects:

Risks of Student Personal Data Collection and Misuse: DeepSeek relies on extensive data to provide intelligent learning and teaching services, including students' learning records, classroom performance, exam results, and career planning preferences. If this data is not managed properly, it may be misused, leading to risks such as:

Unauthorized Data Collection: Some AI systems may collect personal data beyond necessary scopes without fully informing students.

Over-Analysis of Data: DeepSeek may conduct excessive personalized recommendations or predictions based on students' learning behaviors, potentially even influencing their future learning paths and career choices, thereby restricting students' freedom of choice.

Commercial Misuse: Some educational platforms may utilize student data for commercial promotions or even share it with third-party institutions, infringing upon students' privacy rights.

Data Security Risks for Teachers and Administrators: DeepSeek technology not only analyzes student data but may also involve information about teachers' teaching styles, course content, and assessment methods. If this data is illegally obtained or misused, it may affect teachers' career development and even trigger unfair competition. Additionally, if data from school administrators (such as administrative decisions and research projects) is hacked or leaked, it may also have severe consequences.

Security Risks in Data Storage and Transmission: The DeepSeek systems in higher vocational colleges typically involve cloud storage, local databases, and cross-platform data interactions, which may present the following security risks during data storage and transmission:

Data Leakage: Sensitive information of students and teachers may be leaked due to hacker attacks, internal management vulnerabilities, or system flaws.

Data Tampering: Unauthorized access may lead to malicious tampering with exam results, course records, and other data, affecting educational fairness.

Data Abuse and Tracking: DeepSeek may store user behavior data over the long term, leading to prolonged tracking of users and increasing the risk of data abuse.

Algorithmic Discrimination and Data Misuse: DeepSeek relies on large-scale data for intelligent decision-making. However, if the training data contains biases or privacy

issues, it may lead to algorithmic biases. For instance, if the dataset is imbalanced, DeepSeek may produce unfair assessments or recommendations for certain groups (such as students from different majors, genders, or regions), affecting career development opportunities (Wang Yufei & He Zhen, 2022). Additionally, there may be data misuse and inappropriate predictions. DeepSeek might make excessive predictions about students based on historical data, such as "certain types of students are more prone to failure" or "certain careers are more suitable for certain types of students," thereby influencing students' confidence and career choices.

2.2 Risks of Alienation in Students' Moral Values

The widespread application of DeepSeek technology in HVE, while enhancing learning efficiency and teaching quality, may also pose risks of alienation in students' moral values. The high degree of AI involvement may affect students' values, behavioral habits, and even weaken their independent thinking and social responsibility.

Over-Reliance on DeepSeek Weakening Students' Moral Responsibility: Excessive reliance on DeepSeek for learning may significantly weaken students' autonomous thinking abilities. As DeepSeek can automatically generate learning plans, recommend answers, and even complete some assignments, it may lead some students to develop a dependency mentality, reducing their autonomous thinking and exploratory spirit, and affecting the cultivation of critical thinking. Moreover, when DeepSeek becomes a core learning tool, students may be more inclined to attribute errors to technology rather than their own efforts, thereby lowering their sense of responsibility for learning outcomes. For example, students may shift blame for "incorrect answers recommended by AI" instead of actively verifying and reflecting.

Improper Intervention of DeepSeek Affecting Academic Integrity and Fostering Negative Learning Behaviors: In practical learning, the intelligent problem-solving and automatic answer-generation functions of DeepSeek may be abused, leading

some students to use AI to complete assignments, papers, or even exams, thereby reducing academic integrity. If students become accustomed to relying on DeepSeek for answers rather than mastering knowledge through thinking and practice, they may show less respect for knowledge and weaken the depth and rigor of their learning. In particular, students may unconsciously use DeepSeek for plagiarism, tampering with data, or fabricating research results, and may even be unable to accurately distinguish which behaviors constitute academic misconduct.

Information Cocoon Effect Leading to Monotony of Values: Through data analysis and algorithmic recommendations, DeepSeek provides personalized learning paths and content to students. However, this "customization" may also lead to the following problems:

Convergence of Values and Lack of Diverse Perspectives: DeepSeek may recommend specific learning resources based on students' interests and historical behaviors, causing students to be exposed to for a long time in similar information environments, reducing their opportunities to encounter different values, and weakening their independent thinking and critical spirit.

Exacerbation of Fixed Thinking: If DeepSeek only recommends learning content based on historical behaviors, students may become increasingly confined to specific fields and lack interdisciplinary perspectives, affecting the cultivation of comprehensive literacy.

Virtual Interactions Replacing Real-Life Socializing, Affecting Students' Moral Development: DeepSeek can provide functions such as AI teaching assistants and intelligent Q&A, which may lead students to prefer virtual interactions over real-life communication with teachers and classmates, affecting their interpersonal communication and teamwork abilities. Additionally, excessive reliance on DeepSeek for learning may cause students to lack empathy and responsibility in interpersonal relationships. For example, in teamwork tasks, students may be more inclined to rely

on DeepSeek for task division rather than taking initiative to assume responsibilities, affecting the cultivation of cooperative spirit.

2.3 Challenges to Teachers' Traditional Authority

Although the application of DeepSeek technology enhances the teaching management, learning efficiency, and resource integration capabilities of HVE, it also poses challenges to teachers' traditional authority. With the deep involvement of AI in teaching, assessment, tutoring, and other aspects, teachers' dominant positions in the classroom are gradually weakened, and they even face the risk of being partially replaced.

DeepSeek's Intelligent Teaching Weakening Teachers' Knowledge Authority: On one hand, DeepSeek can provide students with precise knowledge explanations, personalized learning paths, and instant Q&A services through intelligent teaching systems, partially substituting for teachers' teaching functions and reducing students' reliance on teachers. On the other hand, DeepSeek can instantly provide standardized, data-driven answers that are rapidly updated. Some students may prefer to trust DeepSeek's answers rather than teachers' viewpoints, thereby weakening teachers' authority in knowledge transmission. Moreover, DeepSeek can quickly integrate the latest industry trends and research findings. If teachers cannot promptly update their knowledge systems, they may be questioned by students about their professional competence, affecting their classroom influence.

DeepSeek's Personalized Learning Weakening Teachers' Teaching Dominance: Specifically, DeepSeek can provide personalized learning plans based on students' individual differences, which may lead students to prefer independent learning rather than following teachers' unified teaching rhythms, thereby affecting teachers' classroom control. Guided by DeepSeek's recommendation systems, students may actively choose different learning contents and methods rather than relying entirely on teachers' arrangements, which to some extent weakens teachers' curriculum design

rights (Wu Lv & Yang Lei, 2023). Additionally, the involvement of DeepSeek transforms teachers from "knowledge transmitters" to "learning guides," but this role change may make some teachers feel a decline in authority and even experience a sense of professional crisis.

DeepSeek's Assessment System Affecting Teachers' Educational Decision-Making Authority: As DeepSeek can analyze students' learning performances through big data and automatically generate grade assessments and learning reports, students and parents may become more reliant on DeepSeek's assessment results rather than teachers' subjective evaluations. If DeepSeek can precisely analyze students' learning progress and provide optimization suggestions, teachers' classroom feedback may be perceived as "subjective" or "lacking data support," thereby affecting teachers' professional authority. Furthermore, in the intelligent education environment, teachers' teaching methods, curriculum arrangements, and exam assessments may increasingly rely on DeepSeek's data analysis, leading to a partial replacement of teachers' educational decision-making authority.

Changes in Classroom Interaction Methods Weakening Teachers' Classroom Authority: In the classroom, DeepSeek can answer students' questions and provide learning suggestions through intelligent assistant systems, reducing opportunities for direct teacher-student communication and affecting teachers' discourse power in the classroom. Meanwhile, DeepSeek's learning analysis systems can monitor students' classroom performances in real-time and even provide feedback on teachers' teaching qualities to the management through data. This data-driven management approach may weaken teachers' autonomous management rights and subject them to stricter quantitative evaluations. When DeepSeek can provide more precise and comprehensive learning guidance, students may raise more questions about teachers' teaching methods and assessment standards, affecting teachers' authority and classroom control.

2.4 Potential Widening of the Educational Digital Divide

Although DeepSeek technology enhances the level of intelligent teaching in HVE, its widespread application may also exacerbate the educational digital divide. Due to differences in technological foundations, digital literacy, and resource access among different regions, institutions, teachers, and student groups, the deep involvement of DeepSeek may further highlight issues of educational equity.

Differences in Technological Foundations Exacerbating Educational Imbalances

Among Regions and Institutions: As DeepSeek relies on high-speed internet, cloud computing, and intelligent terminal devices, higher vocational colleges in economically underdeveloped regions may have deficiencies in network coverage, hardware equipment, and server performance, making it difficult to support large-scale DeepSeek teaching applications. Meanwhile, key higher vocational colleges often possess more advanced educational informatization foundations and can more quickly access DeepSeek systems, while ordinary or private higher vocational colleges may be at a disadvantage in the transformation towards intelligent education due to insufficient funds, faculty, and technical support, further widening inter-institutional gaps. Additionally, DeepSeek can provide personalized learning resources, but if institutions in underdeveloped regions have difficulty accessing high-quality DeepSeek educational platforms, students will not be able to enjoy the same intelligent learning experiences, leading to an expansion of the educational divide between urban and rural areas or among different regions.

Differences in Digital Literacy Among Teachers and Students Affecting the

Application Effects of DeepSeek: It should be noted that the effective application of DeepSeek requires teachers to possess certain data analysis abilities and operational skills in intelligent teaching tools. However, some older teachers or those in majors dominated by traditional teaching modes may be unfamiliar with DeepSeek teaching tools, leading to a decline in their competitiveness in the intelligent teaching environment and affecting teaching quality. Moreover, based on DeepSeek's emphasis on personalized learning and autonomous exploration, some students, especially those

from economically disadvantaged families or with limited digital environments, may lack the necessary information retrieval, data analysis, and DeepSeek tool usage abilities, putting them at a disadvantage in the intelligent learning environment. Importantly, the student population in higher vocational colleges is diverse, with some students more accustomed to traditional teaching modes and 不适应 (unaccustomed to) DeepSeek-driven personalized learning methods, which may lead to polarization in learning outcomes.

Uneven Resource Allocation of DeepSeek May Impair Educational Equity: The DeepSeek system may optimize learning paths based on data-driven approaches, but if the data mainly originates from economically developed regions, key institutions, or outstanding students, the AI-recommended learning resources and paths may be more suitable for these groups and unable to meet the needs of institutions or ordinary students with poorer educational resources, resulting in a Matthew effect in educational resources (the rich get richer, and the poor get poorer) (Zhuang Xizhen, 2022). Meanwhile, DeepSeek may conduct personalized recommendations based on students' historical learning performances, but if students with weaker early learning performances cannot obtain high-quality recommendations, their learning paths may become "solidified," making it difficult for them to break through original learning dilemmas and leading to exacerbated educational stratification. Additionally, some high-quality higher vocational colleges can cooperate with leading DeepSeek enterprises to obtain more advanced customized applications of DeepSeek, while ordinary institutions may only be able to use basic versions, leading to further tilting in the allocation of educational resources.

Educational Burdens on Low-Income Students May Increase: Although DeepSeek can provide free basic educational resources, some advanced intelligent learning functions (such as advanced learning reports and personalized tutoring) may require additional fees, making it difficult for students from economically disadvantaged backgrounds to afford them, thereby affecting their learning experiences. Moreover,

some applications of DeepSeek require high-performance computers, tablets, or VR devices, but for students from economically disadvantaged families, obtaining these devices may pose an additional burden, affecting their access to intelligent learning resources. Furthermore, in the employment process, DeepSeek can precisely match job positions through big data analysis, but if certain students fail to fully utilize DeepSeek resources during their learning process, they may be at a disadvantage in internship and job opportunity recommendations, affecting their career development.

3.Risk Response Strategies for DeepSeek Empowering Higher Vocational Education

The application of large model technologies such as DeepSeek in higher vocational education (HVE) may bring numerous advantages, including intelligent teaching, personalized learning, and enhancement of vocational skills. However, it also entails certain risks. Therefore, in the face of these risks and challenges, effective measures need to be taken to fully leverage the strengths of DeepSeek while mitigating its weaknesses, adapting to changes in the educational environment and students' needs, and enabling students to obtain the best educational experiences in an AI-driven environment.

Similar to other fields, education also requires relevant regulations and norms to guide the application of AI technologies like DeepSeek. This not only necessitates the involvement of governments and regulatory bodies but also requires broad social participation and the joint efforts of educators to ensure the safety, reliability, and fairness of DeepSeek technology. In particular, the introduction of large model technologies such as DeepSeek into HVE necessitates the establishment of a sound regulatory mechanism to ensure their rational, safe, and efficient service to teaching and management.

3.1 Formulate Application Norms for DeepSeek Technology:

Define the scope of DeepSeek's application in teaching, assessment, vocational training, and other areas to prevent misuse or over-reliance. Establish a review process by teachers or experts for teaching materials and Q&A content generated by DeepSeek to ensure accuracy and scientific rigor.

Develop ethical guidelines for DeepSeek-assisted learning to prevent students from excessively relying on AI to complete assignments or cheating in exams.

3.2 Strengthen Data Security Management:

In HVE, ensure that the data processed by DeepSeek complies with national cybersecurity and personal information protection laws and regulations, such as the Data Security Law and the Personal Information Protection Law (Zhu Zhiting & Hu Jiao, 2022). In particular, desensitize or anonymize data involving the privacy of teachers and students to reduce the risk of data leakage.

Implement hierarchical access control for DeepSeek's usage permissions to ensure that only authorized personnel can use relevant functions.

3.3 Establish Supervision and Evaluation Mechanisms:

Establish an evaluation mechanism for DeepSeek's teaching effectiveness, collecting feedback from teachers and students to continuously optimize its application. Simultaneously, set up a specialized DeepSeek Ethics Committee to supervise whether the use of the technology conforms to standards of educational equity and professional ethics.

Develop contingency plans for potential issues such as content bias, system failures, and data breaches caused by DeepSeek to ensure rapid response and adjustment in emergencies. Through these regulatory and normative measures, ensure that the

application of large model technologies like DeepSeek in HVE can fully leverage their advantages while avoiding potential risks.

3.4 Implement the Fundamental Task of Cultivating Virtue and Talent for All-Round Development:

In the process of DeepSeek empowering HVE, implementing the fundamental task of cultivating virtue and talent and promoting students' all-round development is one of the key goals. The application of AI in education should not only focus on skill enhancement and teaching efficiency but also ensure that it contributes to shaping students' correct values, social responsibility, and innovative spirit.

Simultaneously, while DeepSeek technology can assist education in achieving better results in certain aspects, there are also many areas that require the participation and intervention of human educators. The modernization of vocational education must implement the fundamental task of cultivating virtue and talent to achieve students' all-round development.

Strengthen the Value Orientation of DeepSeek Education to Ensure Alignment with the Goal of Cultivating Virtue and Talent: Integrate ideological and political education into DeepSeek's teaching content and embed moral education elements into the process of vocational skill cultivation, such as guiding values through industry case studies. Develop DeepSeek-assisted moral education courses, such as occupational ethics, craftsmanship spirit, and social responsibility, to help students establish correct occupational and life outlooks. Combine DeepSeek's big data analysis to personally push exemplary deeds and social practice opportunities that match students' professional development, guiding them to learn from industry role models with both moral integrity and professional competence.

Ensure Human-Machine Collaborative Education to Prevent DeepSeek from Weakening Teacher-Student Interaction and Emotional Exchange: Relevant higher vocational colleges should emphasize to teachers and students the teaching model of

"DeepSeek assistance + teacher-led," ensuring that teachers remain the primary educators and DeepSeek only serves as a teaching auxiliary tool. Additionally, advocate that teachers guide students to think actively, engage in discussions, and not solely rely on AI for answers in the classroom, thereby enhancing critical thinking and communication skills. Based on DeepSeek's analysis results, teachers should conduct personalized tutoring, strengthen emotional care, and mental health education, allowing technology to promote in-depth interactions between teachers and students rather than replacing human connections.

Standardize DeepSeek Content Review to Prevent False Information or Value Bias: Establish a DeepSeek content review mechanism overseen by professional teachers and education experts to ensure that the knowledge content generated by DeepSeek conforms to national educational policies and professional ethics requirements (Luo Zubing & Han Xuotong, 2022). Actively construct a multi-level evaluation system, combining DeepSeek's intelligent analysis with teacher assessments to ensure that students are not misled by erroneous information while using AI. Teachers should also guide students to think critically, cultivating their ability to discern information and think independently when using DeepSeek for assisted learning, avoiding blind acceptance of content generated by DeepSeek.

Deepen Industry-Education Integration to Cultivate High-Quality Technical Talents with Both Moral Integrity and Technical Proficiency: Through DeepSeek + big data analysis, precisely align with industrial demands, carry out school-enterprise cooperation, and allow students to hone their professional qualities in real industrial environments. Combine DeepSeek's occupational simulation system to enable students to experience occupational scenarios in virtual environments and conduct training on occupational ethics and behavioral norms, such as customer service, engineering safety, and medical ethics. Furthermore, promote interdisciplinary learning, integrating humanistic literacy, legal awareness, environmental protection,

and other educational contents into vocational skill cultivation to drive the improvement of students' comprehensive qualities.

3.5 Cultivate "Wise" Teachers to Highlight the Unique Value of "Human Educators":

The introduction of large model technologies such as DeepSeek into HVE can not only enhance teaching efficiency but also potentially impact the roles of teachers. To effectively respond to risks, higher vocational colleges need to cultivate "wise" teachers, ensuring that technology and education complement each other and highlighting the unique value of teachers as "human educators."

In other words, in the era of AI, cultivating "wise" teachers and forming a modernized teaching force with "ideal beliefs, moral integrity, solid knowledge, and a caring heart" is the fundamental guarantee for realizing the modernization of Chinese-style vocational education.

Redefine Teacher Roles, Transitioning from "Knowledge Transmitters" to "Wisdom Guides": Although DeepSeek can quickly provide professional knowledge, answer questions, and even conduct personalized tutoring, it may lead to the replacement of some teachers' knowledge transmission functions, weakening their core status in teaching. To address this risk, teachers need to transition from "teaching knowledge" to "teaching thinking," cultivating students' critical thinking and problem-solving abilities rather than merely imparting knowledge. They can combine DeepSeek's case analysis to guide students to think about the advantages and disadvantages of different solutions rather than solely relying on DeepSeek for answers. Furthermore, emphasize the value of education; teachers are not only disseminators of knowledge but also shapers of students' professional ethics and social responsibility. DeepSeek should be used as an auxiliary tool rather than a substitute for the main body of teacher-student interaction. In teaching, utilize DeepSeek for data analysis and case mining,

encouraging students to conduct independent research and enabling teachers to become designers and guides of the learning process.

Enhance Teachers' "Wise" Literacy to Strengthen Collaboration with DeepSeek: On one hand, strengthen DeepSeek education and training, organizing teachers to learn basic knowledge of DeepSeek, such as its applications in vocational education and the use of data analysis tools. On the other hand, construct a teaching case library empowered by DeepSeek, encouraging teachers to develop DeepSeek-supported teaching resources by combining its advantages, forming high-quality educational content. Under this premise, actively cultivate teachers to master interdisciplinary knowledge related to DeepSeek, such as intelligent manufacturing and digital marketing, improving their application level of DeepSeek in professional teaching (Miao Fengchun, 2022).

Protect Teachers' Emotional Value to Avoid Over-Application of DeepSeek Weakening Teacher-Student Relationships: On one hand, enhance teacher-student interaction scenarios. Teachers can use the personalized learning data provided by DeepSeek to more accurately understand students' needs and provide targeted guidance in the classroom, enhancing emotional exchanges between teachers and students. On the other hand, actively construct an "AI + Emotional Education" model, combining DeepSeek's data analysis results with psychological care, paying attention to issues such as students' learning pressure and career development confusion, and making DeepSeek a tool to assist teachers in caring for students rather than an emotional barrier. In particular, avoid students solely relying on DeepSeek for knowledge acquisition. Teachers should organize teamwork tasks, debate-style teaching, etc., to increase opportunities for face-to-face communication and cultivate students' interpersonal skills.

Deepen Teachers' Leading Role in Vocational Education to Highlight the Cultivation Value of "Craftsmanship Spirit": Combine DeepSeek for occupational ethics education. Teachers can analyze occupational ethics issues using industry cases

provided by DeepSeek, such as engineering ethics and medical service norms, helping students establish correct occupational outlooks. Additionally, teachers play a key role in skill training. While DeepSeek can assist in simulated training, real practical experience needs to be imparted through teachers' hands-on guidance. In guiding students' career development planning, teachers should help them formulate personalized development paths based on occupational trends analyzed by DeepSeek, emphasizing the concept of "lifelong learning" to avoid blindly following DeepSeek's suggestions and losing initiative.

3.6 Optimize the Allocation of Digital Educational Resources to Promote Educational Equity:

In the field of HVE, the application of large model technologies such as DeepSeek can promote the sharing of high-quality digital educational resources, improve resource utilization efficiency, and narrow the learning gaps among regions, institutions, and students. However, without effective supervision and optimized allocation, it may exacerbate the uneven distribution of educational resources and affect educational equity. Therefore, scientific resource allocation strategies are needed to ensure the fairness and inclusiveness of DeepSeek empowering HVE.

The advent of the AI era has profoundly changed the face of education, with digital educational resources becoming an important component. The advantages of digital education lie in more widespread access to educational resources, more diverse educational methods, and fairer educational assessments.

Break the Imbalance in Regional Development and Achieve Sharing of High-Quality Resources: On one hand, promote the construction of a "DeepSeek-driven educational resource sharing" mechanism, such as building national and regional "DeepSeek + Education" resource platforms. Leverage DeepSeek technology to establish an open higher vocational education resource library, allowing students in remote areas to access high-quality digital courses, teaching cases, and practical training guidance.

Additionally, promote the "cloud classroom + remote practical training" model, utilizing DeepSeek-assisted remote teaching and virtual simulation practical training systems to enable students in rural and underdeveloped areas to enjoy the same courses and practical opportunities as those in urban institutions (Wang Tian'en, 2023). Furthermore, encourage high-quality higher vocational colleges to establish "DeepSeek shared classrooms" with weaker institutions, achieving curriculum co-construction and joint teaching by teachers through DeepSeek to 弥补 (make up for) shortcomings in educational resources.

Address Insufficient Supply of Personalized Learning Resources and Enhance Students' Autonomous Learning Abilities: If DeepSeek resources are unevenly allocated, some students may struggle to fully realize their potential due to a lack of personalized learning paths. In response, construct a "DeepSeek + Precision Teaching" model to enhance the level of personalized education. By utilizing DeepSeek to analyze students' learning data, recommend personalized courses, assignments, and learning paths based on their learning progress, interests, and abilities. Continuously adjust the allocation of teaching resources based on students' learning behaviors and feedback to achieve precision teaching and improve learning efficiency.

Promote the Inclusiveness of Higher Vocational Education Resources to Avoid Widening the Technological Divide: Facing the current "digital divide" in HVE, efforts should be made to promote the inclusiveness of DeepSeek technology to ensure that all students equally enjoy educational resources. Provide DeepSeek educational infrastructure, such as cloud computing resources and intelligent learning terminals, to higher vocational colleges in underdeveloped areas through financial support and corporate cooperation. Simultaneously, develop lightweight, low-cost DeepSeek teaching systems to enable all students to conveniently use DeepSeek teaching resources through mobile phones, tablets, and other terminal devices. Encourage social forces to support economically disadvantaged students by providing

subsidies for DeepSeek educational resources to ensure that every student has fair learning opportunities.

Ensure the Quality of DeepSeek Educational Resources to Prevent "Low-Quality Proliferation" from Affecting Fairness: In other words, establish a quality evaluation system for DeepSeek resources to ensure fair and high-quality educational supply. For example, expert teams can conduct quality audits on courses, question banks, and cases generated by DeepSeek to ensure content accuracy and scientific rigor (Fan Mingcheng & Chen Xiaojuan, 2023). Combine DeepSeek's self-inspection with manual review to ensure that educational resources generated by DeepSeek conform to HVE standards. Simultaneously, continuously improve DeepSeek's course content based on feedback from teachers and students, eliminating low-quality content and enhancing the overall level of educational resources.

4. Conclusion

The empowerment of large model technologies such as DeepSeek has brought unprecedented opportunities to HVE, along with challenges. Through in-depth research on its value, risks, and response strategies, a more comprehensive understanding of the application path of DeepSeek in HVE can be achieved, and reasonable implementation plans can be formulated to ensure that technology contributes to goodness and educational equity. With the continuous progress of DeepSeek technology, HVE will enter a new stage of intelligent and personalized development. In the future, it is necessary to explore more precise DeepSeek teaching models, more flexible allocation of learning resources, and more efficient teacher-student interaction methods to truly realize the deep empowerment of DeepSeek in vocational education. Only by finding a balance between technological innovation, educational equity, and talent cultivation can DeepSeek technology truly assist in the reform of HVE, cultivate high-quality technical and skilled talents who

meet the needs of future society, and promote the high-quality development of vocational education.

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