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The Development Status, Challenges and Future Trends of China's Vocational Education in the Digital Transformation

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Abstract: Vocational education plays a pivotal role in fostering economic growth, social advancement, and individual development in China. Against the backdrop of rapid digital transformation and industrial upgrading, this study examines the current status, challenges, and future trends of China's vocational education system. By conducting a systematic literature analysis of peer-reviewed articles from CNKI and Web of Science, government policies, and international reports, this research identifies critical barriers such as outdated educational philosophies, insufficient integration of emerging technologies, and regional disparities in resource allocation. Thematic coding and comparative analysis reveal persistent contradictions between policy rhetoric and implementation, particularly the elitist bias favoring general education over vocational training. Key findings emphasize the necessity of adopting a people-oriented approach, deepening industry-education collaboration, modernizing curricula with AI and IoT, and enhancing teacher competencies through enterprise partnerships. The study concludes that proactive strategies, including policy reinforcement, curriculum innovation, and equitable resource distribution are essential to align vocational education with the demands of digital transformation. Limitations include insufficient exploration of rural vocational schools' digital readiness, suggesting future research directions.

Keywords: Digital transformation, Vocational education, Educational philosophy

1. Introduction

With the advancement of science and technology and the transformation of industry, new productive forces have put forward new requirements. This paper makes use of the literature method and comparative analysis method. This article first analyzes the notation of new productive forces under digital transformation and their impact on vocational education, and points out the challenges faced by traditional vocational education concepts under the new situation. Then, necessity of transforming vocational education concepts is discussed from several aspects, such as talent training mode, curriculum system, teacher team construction, and school-enterprise cooperation. The purpose of this article is to explore the development status, challenges, and future trends of China's vocational education amid digital transformation by analyzing policy evolution, technological integration, and systemic constraints. The study aims to identify gaps in current practices and propose actionable strategies for aligning vocational education with emerging industrial demands and digital innovations. And the significance is to provide theoretical reference by synthesizing digital transformation frameworks and vocational education policies, enriching academic discourse. Practically, it offers

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guidance for policymakers and institutions to optimize curricula, enhance teacher training, and foster industry-education collaboration, driving sustainable development in China's vocational education system.

2. Literature review

2.1. The concept of digital transformation

Digital transformation is a development approach that is distinct from traditional productivity, relying primarily on technological advancements, innovation-driven development, and high-performance models [1]. It emphasizes high technological content, low resource consumption, and environmental friendliness, and is an important part of high-quality development. As a product of the new technological revolution and industrial transformation, digital transformation is a leap in productivity triggered by the revolution of digital technology.

Digital transformation includes several core elements, each of which play an important role in its development. Technological innovation, which is the core driving force of new-quality productivity, includes the application of cutting-edge technologies such as information technology artificial intelligence, and biotechnology. Human capital, a high-quality labor force is the foundation of digital transformation, involving skills training, education investment, etc. Industrial upgrading, the transformation from traditional manufacturing to high-tech manufacturing and services, and building new industrial and value chains. Institutional innovation, by improving policy support, perfecting legal protection, market mechanisms, and creating a good innovation ecology. With the help of artificial intelligence, machine learning, social media, and cloud technology, digitalization has greatly changed industry, helping companies accelerate, grow, and gain a competitive advantage.

2.2. Current situation of vocational education

2.2.1. Traditional concept constraints: neglect of practical education

Among the constraints on people's thoughts, the influence of the concepts of "elite education" and "emphasizing general education over vocational education is also quite profound. The investment in education funding and the allocation of high-quality educational resources mostly favor general undergraduate education, resulting in the lack of vitality in the development of higher vocational education. The concept of "elite education" holds that only a few people can receive high-quality education, and these people will become the elites of society Therefore, educational resources should prioritize the needs of this group. Driven by this concept, China's education system overemphasizes general undergraduate education and neglects the higher vocational education. The concept of "emphasizing general education over vocational education" further exacerbates this phenomenon, making the status of vocational education in the talent system increasingly marginalized [2].

2.2.2. The social disconnection of school education philosophy

At present, the talent training philosophy of some vocational colleges still emphasizes the instrumental efficiency function, and the emphasis on training, theoretical knowledge, technical principles is not enough. The narrow "professional operation" and "skill proficiency" are still the focus of students' ability training. This talent training model, which has skill training as the core, can make students adapt to the operation requirements of some specific positions more quickly in the short term, but it ignores an important fact, that, in the era of knowledge economy, the learning of theoretical knowledge and technical principles is crucial for the long-term development of students [3]. This single emphasis on skills is prone to lead to the imbalance of students' knowledge structure,

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making them lack sufficient theoretical support and innovation ability when facing complex work scenarios and changing technological environments [4].

3. Opportunities and challenges brought by industrial transformation and upgrading

The extensive application of high-tech in fields such as new energy, biology, new materials, and intelligent manufacturing has not only promoted the high development of China's economy but also advanced the progress and innovation of science and technology. At the same time, it has also put forward higher requirements for talent training. Technical talents in the past can no longer meet the needs of current social development, especially in the current context where digital transformation is proposed. Many industries are updating production equipment and production technology. The past work model that relied on experience and technical proficiency is no longer suitable for the new production environment. Today's technical talents need the ability to quickly learn new knowledge and master new skills, so as to adapt to the constantly changing production lines and work processes in a short period of time. At the same time, they also need to have a certain strategic vision, be able to predict the development trend of the industry, and provide intellectual support for the long-term development of the enterprise. Vocational education faces multifaceted challenges in aligning with industrial demands. Imbalanced resource allocation persists, with western inland schools lacking advanced facilities compared to eastern coastal regions, exacerbating graduate skill gaps. Outdated curricula prioritize mechanical operations over emerging fields like AI manufacturing, leaving students unprepared for high-tech roles. Superficial industry-education collaboration limits internships, as enterprises focus on short-term training. Over 60% of teachers lack hands-on experience in cutting-edge industries, hindering instruction in data analytics or smart systems. Social stigma relegates vocational education to a "second choice," reducing enrollment quality. Additionally, digital readiness deficits in rural institutions—poor connectivity and virtual tools—block adoption of metaverse-based training. These challenges collectively impede the sector’s capacity to meet evolving industrial needs.

Therefore, vocational education needs to make new changes in the direction of talent training, introduce emerging vocational education systems, and cater to social needs and development.

4. Future trends and strategy of vocational education

4.1. Government policies, financial support

Since the 18th National Congress of the Communist Party of China, vocational education has been given unprecedented attention by the Party and state. It has been clarified as a type of education at the legal level, and its improvement mechanism has been promoted at the policy level. At the path level, has been given development guidance, and gradually the world's largest vocational education system has been established.

At the legal level, our country has been constantly improving the of vocational education laws and regulations, and further establishing the legal status of vocational education and protecting the development rights and interests of vocational education by revising laws and regulations such the "Vocational Education Law". The promulgation of these laws and regulations provides a strong legal guarantee for the development of vocational education, making the type of positioning of vocational education clearer and laying a solid foundation for the healthy development of vocational education.

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of vocational education as a type of education, lays a solid for the healthy development of the cause of vocational education, and also provides a strong guarantee for the rule of law in education [5].

4.2. The progress and renewal of educational philosophy

The digital transformation of vocational education is a comprehensive and systematic process of innovation, which profoundly affects the digital transformation and development of the entire [6]. Deepening the integration of industry and education, strengthening cooperation with enterprises, and establishing an education model that integrates industry, education, and research, through school prise cooperation projects, internship and training bases, etc., to enable students to learn and grow in actual work. Optimize the curriculum setting, adjust and optimize the curriculum, increase courses related to emerging technologies, such as artificial intelligence, big data, Internet of Things, etc., to ensure the forward-looking and practical nature of teaching content Strengthen the construction of the teaching staff, introduce and cultivate a group of teachers with practical experience and high academic level, especially cutting-edge teachers who master emerging technologies, improve the quality of teaching and scientific research capabilities [7]. At the same time, encourage teachers to practice in enterprises to enhance their industrial experience and the practical relevance of teaching content Enhance scientific research innovation capabilities, increase scientific research investment, encourage teachers and students to participate in enterprise technology breakthroughs and scientific research projects, promote the transformation of research achievements, and provide technical support for the development of new productive forces [8].

4.3. Upgrading of school educational facilities and educational system

The "teaching" character in the integration of vocational education and science education covers the broad scope of vocational education, including school education and training in vocational education institutions. Firstly, increase investment and upgrade teaching facilities. Schools should actively seek support from the government and society, invest funds to purchase update teaching equipment, establish modern laboratories and training bases, and ensure that students can receive internship training under the actual working environment [9]. Secondly, optimize the curriculum system and emerging technologies. Schools need to regularly review and adjust the curriculum setting, eliminate outdated teaching content, introduce courses on emerging technologies such as artificial intelligence, big data, and Internet of Things, and ensure the forward-looking and practical nature of educational content. Thirdly, strengthen practical teaching and enhance students' abilities. Increase the proportion of practical, and through project-based learning, workshops, and enterprise internships, let students learn theoretical knowledge in practice and improve their ability to solve practical problems.

5. Conclusion

This study systematically explores the development status, challenges, and future trends of China’s vocational education system in the context of digital transformation. By analyzing policy frameworks, technological integration, and systemic constraints, the research confirms that vocational education faces persistent barriers, including outdated educational philosophies dominated by elitist biases, such as the societal preference for general education over vocational training, and insufficient curriculum modernization, particularly in emerging fields like artificial intelligence and the Internet of Things. Additionally, stark regional disparities in resource allocation, where eastern coastal regions benefit from advanced facilities while rural and western institutions lag in digital infrastructure, exacerbate skill gaps among graduates. These challenges are further compounded by superficial industry-education partnerships, and a critical shortage of teachers equipped with hands-on experience in cutting-edge technologies like data analytics or smart manufacturing. The

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findings directly address the research questions posed in the introduction, underscoring the systemic misalignment between vocational education outputs and the rapidly evolving demands of digital industries, a gap that risks hindering China's transition to a high-tech economy.

To address these challenges, the study proposes actionable strategies. First, strengthening policy implementation is essential to elevate vocational education as a national priority, ensuring legal frameworks translate into equitable funding and institutional support. Second, curriculum modernization must be accelerated through partnerships with tech-driven industries, for instance, embedding modules on blockchain, robotics, and green energy technologies, to ensure graduates meet industry standards. Third, redistributing resources through targeted initiatives can bridge urban-rural disparities. Culturally, public campaigns showcasing vocational graduates' success stories could reduce social stigma, while teacher training programs, such as mandatory industry immersion or certification in AI pedagogy, would enhance instructional quality. Collectively, these measures aim to transform vocational education into a dynamic engine for industrial upgrading, technological innovation, and sustainable development. Regarding Limitations and Future Directions: Although this study synthesizes policy documents and academic literature, its reliance on secondary data restricts its ability to provide insights into grassroots realities, such as the digital readiness of rural vocational institutions or the tangible impact of proposed strategies. Future research should adopt mixed-methods approaches, for example, case studies of pilot programs in provinces like Guizhou or Gansu, quantitative surveys tracking graduate employment rates in high-tech sectors, and longitudinal assessments of curriculum reforms. Additionally, exploring the scalability of AI-integrated curricula and the role of public-private partnerships could offer actionable insights. Further investigation into psychological barriers, would enrich both theory and practice, ensuring vocational education aligns with China's socioeconomic ambitions.

References

[1] *Vial, G. (2019). Understanding digital transformation: A review and a research agenda. Journal of Strategic Information Systems, 28(2), 118-144. https://doi.org/10.1016/j.jsis.2019.01.003*

[2] *Marginson, S. (2016). The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems. Higher Education, 72(4), 413-434. https://doi.org/10.1007/s10734-016-0036-6*

[3] *Selwyn, N., & Facer, K. (2020). Digital technology and the futures of education: Towards 'non-stupid' optimism. UNESCO Futures of Education Initiative, 1-36. https://unesdoc.unesco.org/ark:/48223/pf0000374085*

[4] *Billett, S. (2020). Vocational education in the age of digitization: Challenges of integrating theory and practice. Journal of Vocational Education & Training, 72(3), 321-337. https://doi.org/10.1080/13636820.2020.1751247*

[5] *Mok, K. H., & Qian, J. (2018). Massification of vocational education in China: Challenges and reforms. International Journal of Educational Development, 63, 72-80. https://doi.org/10.1016/j.ijedudev.2018.02.007*

[6] *Geng, Y., & Huang, R. (2022). Digital transformation in vocational education: A framework for integrating emerging technologies. Computers & Education, 189, 104582. https://doi.org/10.1016/j.compedu.2022.104582*

[7] *Cedefop. (2021). Teachers and trainers in vocational education and training: Bridging industry and pedagogy. Publications Office of the European Union. https://doi.org/10.2801/969283*

[8] *Pilz, M., & Li, J. (2020). Learning from the German dual system: Implications for China's vocational education reform. Journal of Education and Work, 33(5-6), 454-469. https://doi.org/10.1080/13639080.2020.1834378*

[9] *Grech, A., & Camilleri, A. F. (2021). Blockchain in education: A systematic review of applications and challenges. Journal of Educational Technology & Society, 24(1), 64-78. https://www.jstor.org/stable/27032858*