

Research on the Coupling Logic and Practical Path of New Quality Productivity and Digital Transformation of Vocational Education

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ABSTRACT

In the wave of global industrial transformation and rapid technological development, new quality productivity is gradually becoming the core force that reshapes the economic pattern and promotes social progress. Vocational education, as a type of education closely linked to industrial development, plays a crucial role in the development process of new quality productivity. With the acceleration of industrial digitization and intelligent transformation, vocational education is facing unprecedented opportunities and challenges. The digital transformation of vocational education has become an important task for the reform and development of vocational education in China in the new era. This research conducts in-depth analysis of the inherent connection between new quality productivity and digital transformation of vocational education, revealing its coupling logic, analyzes the many challenges and development opportunities faced by current digital transformation of vocational education, and proposes targeted and operable practical paths combined with practical cases, providing theoretical support and practical guidance for the digital transformation of vocational education.

Keywords: *New quality productivity, Vocational education, Digital transformation, Coupling logic, Practical path.*

1. INTRODUCTION

Currently, there are still many issues of inconsistency and mismatch between the digital transformation of vocational education and the development of new quality productivity. The relatively backward construction of digital infrastructure in vocational education, the shortage of digital teaching resources, the insufficient digital teaching ability of teachers, and the low degree of digitalization in the integration of industry and education seriously restrict the role of vocational education in the development of new quality productivity. Therefore, it is of great theoretical and practical significance to explore the coupling logic between digital transformation of vocational education and new quality productivity, and to explore effective practical paths.

2. THE COUPLING THEORY OF NEW QUALITY PRODUCTIVITY AND DIGITAL TRANSFORMATION OF VOCATIONAL EDUCATION

2.1 *The Connotation Evolution and Characteristic Analysis of New Quality Productivity*

New quality productivity, as an advanced form of productivity driven by technological innovation, plays a crucial role in today's era. It takes the significant improvement of total factor productivity as its core goal, emphasizing the coordinated progress between technological breakthroughs, industrial upgrading, and human capital optimization, and jointly promoting the development of the social economy. Nowadays, with the rapid development of digital and intelligent technologies, new quality productivity has emerged

and become a key force in promoting high-quality economic development. The dynamic characteristics of new quality productivity are particularly significant, as it deeply reconstructs traditional production factors. In the past, labor, land, capital, and other factors were the main production factors, but now, new elements such as data and artificial intelligence are gradually emerging and becoming the core driving force of new quality productivity. The emergence of these new elements not only changes the way and process of production, but also promotes a profound transformation of the industry towards high-end, green, and intelligent directions.

Vocational education, as a type of education closely linked to industrial demand, faces unprecedented opportunities and challenges in the context of the development of new quality productivity. Its digital transformation is imperative, requiring precise alignment with the technological iteration speed and talent capability standards of new quality productivity.[1] With the continuous development of new quality productivity, the demand for talents in industries is also undergoing profound changes. It not only requires talents to have solid professional knowledge and skills, but also comprehensive qualities such as digital literacy, innovation ability, and cross-border integration thinking.[2] Therefore, vocational education must accelerate the pace of digital transformation, optimize professional settings and course content by introducing advanced digital technologies and teaching methods, strengthen practical teaching and school enterprise cooperation, and cultivate high-quality technical and skilled talents that meet the needs of the development of new quality productivity.

2.2 The Adaptation Logic of Digital Transformation in Vocational Education

Vocational education reconstructs the talent training system through digital means, forming a close two-way empowerment relationship with new quality productivity. On the one hand, the rapid development of new quality productivity has put forward comprehensive digital upgrading requirements for vocational education. In terms of professional settings, vocational education needs to closely track the industrial changes and emerging vocational demands brought about by the development of new quality productivity, adjust and optimize the professional layout in a timely

manner, open emerging majors related to digital economy, intelligent manufacturing, green energy, etc., and eliminate traditional majors that are disconnected from market demand. Incorporating the latest digital technologies and industry knowledge into the course content enables students to master the most cutting-edge technologies and skills. On the other hand, the digital transformation of vocational education also provides strong strategic support for the formation of new quality productivity. By improving the quality of human capital and cultivating a large number of composite talents with digital literacy and innovation capabilities, a continuous stream of power has been injected into the development of new quality productivity, so as to play an important role in various fields of new quality productivity, promote technological innovation, industrial upgrading, and economic development.[3]

This bidirectional empowerment relationship forms a virtuous cycle, namely a closed loop of "technological change educational innovation productivity leap". The technological transformation of new quality productivity has prompted innovation in vocational education, which in turn has cultivated talents who can adapt to the development needs of new quality productivity. These talents further promote the leap of new quality productivity and achieve sustainable economic and social development.

3. THE REALISTIC CHALLENGE OF DIGITAL TRANSFORMATION OF VOCATIONAL EDUCATION DRIVEN BY NEW QUALITY PRODUCTIVITY

3.1 The Dilemma of Deep Integration Between Technological Applications and Educational Scenarios

In the process of digital transformation of vocational education, the deep integration of technology applications and educational scenarios faces many challenges. Among them, the issue of surface level technology application is particularly prominent. Although advanced technologies such as virtual simulation training and intelligent teaching systems have gradually been introduced into the field of vocational education, these technologies have not yet been fully integrated into the entire teaching process in actual teaching, often only serving as auxiliary means and failing to fully play their due role. Some colleges and universities,

in the process of digital transformation, place too much emphasis on the procurement and updating of hardware equipment, while neglecting the development and utilization of software resources. The lack of data collection and analysis capabilities results in a lack of precise basis for teaching decisions. In the teaching process, although a large amount of data is generated, due to the lack of effective data collection and analysis tools, these data cannot be converted into valuable information. Teachers find it difficult to provide personalized teaching guidance based on students' learning situations, which affects the quality of teaching and students' learning outcomes.[4]

The disconnect between digital technology and industrial scenarios is also an urgent problem that needs to be solved. With the rapid development of new quality productivity, industrial scenarios are constantly evolving, and the demand for talent is also increasing. However, the current digital technology teaching content in vocational education often lags behind the development of industrial scenarios, and the content that students are exposed to in practical training cannot be in line with the cutting-edge technology in actual work. This makes it difficult for them to quickly adapt to the needs of job positions after graduation, affecting the adaptability of talent cultivation. For example, in the field of artificial intelligence, advanced technologies such as deep learning and natural language processing have been widely applied in the industry. However, the teaching content of some vocational colleges still remains at the basic stage of artificial intelligence theory, and students lack practical experience in actual projects, which cannot meet the demand of enterprises for artificial intelligence talents.

3.2 Obstacles to the Digital Reconstruction of the Integration Mechanism Between Industry and Education

The insufficient matching between the digital transformation needs of enterprises and vocational education curriculum reform is also a major obstacle to the digital reconstruction of the integration mechanism of industry and education. With the acceleration of enterprise digital transformation, higher requirements have been put forward for the digital skills and innovation ability of talents. However, the curriculum reform of vocational education is relatively lagging behind and cannot meet the needs of enterprises in a timely manner. On the one hand, the course content is not

updated in a timely manner, lacking attention and integration into new technologies and industries; On the other hand, the curriculum system is not well-designed, lacks systematicity and coherence, and cannot cultivate students' comprehensive vocational abilities. In addition, the data sharing mechanism between schools and enterprises is not yet sound, making it difficult to achieve dynamic alignment between talent cultivation and industry demand. In the digital age, data is one of the key elements for achieving the integration of industry and education. By analyzing the production data of enterprises and the learning data of students, it is possible to accurately understand the industry demand and the learning situation of students, thereby achieving precise positioning and personalized teaching for talent cultivation. However, there are currently many obstacles to data sharing between schools and enterprises, such as data security issues and inconsistent data standards, which make it difficult for both parties to achieve effective data sharing and utilization.

The lagging digital teaching ability of teachers compared to technological development is also an important factor affecting the digital reconstruction of the integration mechanism between industry and education. Some teachers' application of intelligent teaching tools remains at the formal level, failing to effectively stimulate students' innovative potential.[5] In the process of digital teaching, teachers not only need to master advanced teaching techniques, but also need to possess innovative teaching concepts and methods. However, currently some teachers lack training and practical experience in digital teaching, and are unable to organically integrate intelligent teaching tools with teaching content, unable to fully leverage the advantages of intelligent teaching tools, thereby affecting the cultivation of students' learning enthusiasm and innovation ability.

4. THE PRACTICAL PATH OF ENERGIZING VOCATIONAL EDUCATION DIGITAL TRANSFORMATION WITH NEW QUALITY PRODUCTIVITY

Vocational education provides strong support for the development of new quality productivity by cultivating high-quality skilled talents, promoting technological innovation and application, and facilitating industrial upgrading and transformation. To achieve high-quality development of vocational education, in terms of innovative talent cultivation

models, there is a must to construct a capability oriented talent cultivation model, strengthen the practical teaching links, and promote industry university research cooperation; In terms of optimizing the professional and curriculum systems, it is necessary to closely align with the demand for new quality productivity, dynamically adjust the professional settings, and develop a curriculum system that integrates new technologies and processes; In terms of teacher team construction, it is a must to strengthen the construction of the "dual teacher" teacher team and improve the teacher evaluation and incentive mechanism; In terms of deepening the integration of industry and education, there is a necessity to improve the policy support system for the integration of industry and education, and build a community for the integration of industry and education.[6] In order to improve the quality of talent cultivation in vocational education, it is quite necessary to enhance the adaptability of vocational education to new quality productivity, and promote the sustainable development of vocational education in the context of new quality productivity.

4.1 Enhancing Top-level Design and Policy Support

The government plays a key leading and driving role in the digital transformation of vocational education. From a strategic perspective, there is a must to strengthen the top-level design of digital transformation in vocational education. By conducting in-depth research on industry development trends, enterprise talent needs, and the current status of vocational education, a scientifically reasonable and forward-looking digital transformation strategic plan should be formulated, clarifying the goals, tasks, key areas, and implementation steps of the transformation. At the same time, based on relevant laws and regulations, combined with the characteristics and needs of digital development in vocational education, a series of targeted policies and regulations should be formulated to provide solid legal protection and policy basis for digital transformation. These policies and regulations should cover the construction of digital teaching resources, the improvement of digital capabilities of teaching staff, and digital cooperation between schools and enterprises, clarify the rights and obligations of all parties, and regulate various activities of digital transformation.

Increasing capital investment is an important guarantee for promoting the digital transformation of vocational education. The government should establish a special fund to support projects such as digital infrastructure construction, teaching resource development, and teacher training in vocational colleges. Through policy measures such as fiscal subsidies and tax incentives, there is a necessity to encourage enterprises, social organizations, and individuals to participate in the digital construction of vocational education, broaden funding sources, and form a diversified investment mechanism.[7] It is necessary to establish a sound quality evaluation and monitoring system, develop scientific and reasonable evaluation indicators and standards, regularly conduct comprehensive and objective evaluations of the digital transformation work of vocational colleges, timely discover problems and deficiencies in the transformation process, and propose targeted improvement measures to guide vocational colleges to promote digital transformation in a scientific and standardized manner, ensuring the effectiveness of the transformation work.

4.2 Improving Infrastructure and Technology Platform Construction

Vocational colleges should prioritize the construction of digital infrastructure and increase funding investment. They should comprehensively upgrade the campus network, improve network bandwidth and stability, so as to meet the network needs of teaching, management, and scientific research. The colleges should also strengthen the updating and maintenance of information technology equipment, equip advanced multimedia teaching equipment, intelligent teaching terminals, etc., and provide a good digital learning and working environment for teachers and students.

Actively developing and applying digital teaching resource platforms is the key to achieving high-quality educational resource sharing. Vocational colleges should integrate various high-quality educational resources, including online courses, virtual simulation experiments, teaching cases, electronic textbooks, etc., and establish a rich and diverse digital teaching resource library with complete functions. By utilizing technologies such as cloud computing and big data, centralized storage, management, and distribution of teaching resources can be achieved, making it convenient for teachers and students to access and use them anytime and anywhere. It is necessary to strengthen

the construction of interactive communication functions on resource platforms, promote communication and cooperation between teachers and students, and between universities, and jointly promote the optimization and innovation of teaching resources.[8] At the same time, schools should encourage teachers to actively participate in the development and construction of teaching resources, transform their teaching experience and achievements into digital resources, and enrich the content of the resource library. By collaborating with enterprises, industry associations, and other organizations, the schools can introduce actual projects, cases, and technical standards from enterprises to make teaching resources more closely aligned with practical work needs, and improve the pertinence and practicality of teaching.

4.3 Deepening Educational Reform and Curriculum System Reconstruction

There is a must to closely align with the development needs of new quality productivity, update course content in a timely manner, and integrate cutting-edge technologies and industry standards. The colleges should establish a dynamic update mechanism for course content, regularly evaluate and revise courses, and ensure the timeliness and practicality of course content. At the same time, the teaching should adopt a combination of online and offline teaching methods to break the limitations of time and space and improve teaching effectiveness. Teachers can design online and offline teaching activities based on the characteristics of the course and teaching objectives, combining the advantages of traditional classroom teaching with the flexibility of online teaching. In online teaching, teachers can use teaching videos, online discussions, virtual experiments and other resources to guide students to learn and think independently; In offline teaching activities, teachers can organize students to participate in group discussions, project practices, on-site demonstrations, and other activities to strengthen teacher-student interaction and cooperation among students. Teachers can utilize the data analysis function of online teaching platforms to understand students' learning situation and needs, adjust teaching strategies in a timely manner, and achieve personalized teaching.

They can utilize big data and artificial intelligence technology to provide personalized learning plans for students, meeting the learning needs of different students. By collecting and

analyzing students' learning data, including their interests, habits, and grades, teachers can understand students' learning characteristics and needs, and develop personalized learning plans and recommend learning resources for each student. By utilizing intelligent teaching systems, teaching content and difficulty can be automatically adjusted based on students' learning situation and progress, achieving adaptive learning. For example, when students encounter difficulties in a certain knowledge point, the intelligent teaching system can automatically push relevant learning materials and exercises to help students consolidate their knowledge; After students master a certain knowledge point, the system can automatically push more advanced learning content to meet their learning needs. Personalized learning support and services can also be provided to students through online learning communities, intelligent tutoring tools, etc., promoting their self-directed learning and development.

4.4 Strengthening the Construction and Training of the Teaching Staff

interdisciplinary talents who understand both professional knowledge and digital technology are the key force driving the digital transformation of vocational education. Vocational colleges should formulate preferential policies and broaden channels for talent introduction. In addition to traditional recruitment methods, they can also invite enterprise technical personnel and industry experts to regularly give lectures, guide practical teaching, and conduct technical training at the school through part-time jobs, special appointments, and other means to enrich the teaching staff.[9] At the same time, through online training platforms, teachers should receive training on digital teaching skills and information technology application abilities. The training content should cover digital teaching design, online teaching organization and management, educational technology application, curriculum development, and other aspects. Hierarchical and classified training courses should be designed based on the different needs and levels of teachers to meet their personalized learning needs. Through practical exercises such as online teaching competitions and sharing of teaching cases, teachers' digital teaching abilities can be improved. It is necessary to utilize online learning communities and communication platforms to promote communication and collaboration among teachers, and jointly solve problems encountered in digital teaching.

The teacher incentive mechanism should be established to encourage teachers to actively participate in digital teaching reform and innovation. The mechanism should incorporate teachers' digital teaching abilities and teaching achievements into the performance evaluation system, link them with professional title evaluation, job promotion, and excellence evaluation, and commend and reward teachers who have outstanding performance in digital transformation. It is also necessary to establish a special reward fund for digital teaching to provide material rewards to teachers who have made significant achievements in the development of digital teaching resources, innovation of teaching modes, and reform of teaching methods. Colleges can organize and carry out digital teaching achievement display and promotion activities, publicize and promote excellent digital teaching cases and achievements, and stimulate teachers' enthusiasm and creativity in participating in digital teaching reform.

4.5 Deepening the Production-Education Integration and School-Enterprise Cooperation

It is of great significance to establish a cooperation mechanism between the government, enterprises, and vocational colleges to jointly develop talent training programs and curriculum standards. The government should play a leading role, build cooperation platforms, and promote communication and coordination among all parties. By organizing events such as industry education integration docking meetings and school-enterprise cooperation negotiation meetings, it can provide opportunities for communication and cooperation between enterprises and vocational colleges. Enterprises should be encouraged to participate in the entire process of talent cultivation in vocational colleges, from professional settings, curriculum development, teaching implementation to internship employment, fully listening to the opinions and suggestions of enterprises, and closely integrating talent cultivation with enterprise needs. For example, the government can guide enterprises and vocational colleges to jointly establish a professional construction guidance committee, in which enterprise experts and school teachers participate in the formulation of professional talent training programs and the development of curriculum standards, ensuring that talent training goals match the job requirements of enterprises.

There is a must to strengthen cooperation between industry organizations and educational institutions to jointly carry out vocational skills training and certification work. Industry organizations can develop vocational skills training standards and certification systems based on industry development needs, while educational institutions are responsible for conducting training and teaching work in accordance with the standards.[10] By collaborating on vocational skills training and certification, students and enterprise employees can obtain industry recognized vocational qualification certificates, enhancing their employment competitiveness and professional competence. In addition, enterprises and vocational colleges jointly establish training bases. Enterprises can provide technical support, equipment maintenance, and internship guidance services for the training bases, while schools are responsible for the daily management and teaching organization of the training bases. By jointly building training bases, it can achieve resource sharing and complementary advantages between enterprises and schools, providing students with a good practical platform. Students can participate in practical projects and production activities of enterprises in the training base, understand the production process and management mode of enterprises, master practical operational skills, improve their ability to solve practical problems, and be able to quickly adapt to job positions in enterprises after graduation.

5. CONCLUSION

Vocational education, as the most closely related type of education to economic and social development, plays a crucial role in the development of new quality productivity. On the one hand, vocational education bears the responsibility of cultivating high-quality technical and skilled talents for society, and is an important bridge for transforming scientific and technological achievements into practical productivity. With the development of new quality productivity and the continuous optimization and upgrading of industrial structure, the demand for technical and skilled talents has also undergone profound changes. It not only requires talents to have solid professional skills, but also innovation ability, digital literacy, and interdisciplinary comprehensive literacy. On the other hand, the digital transformation of vocational education itself is also an inevitable choice to keep up with the trend of the times. The application of digital technology has brought new teaching modes, teaching resources, and teaching

evaluation methods to vocational education, which helps to break the time and space limitations of traditional education, improve the quality and efficiency of education and teaching, and achieve personalized and precise talent cultivation.

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