

Adaptation Mechanism and Countermeasures for Digital Transformation and Upgrading of Vocational Higher Education Enabling Industry

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Abstract: The digital economy, characterized by the breakthrough and popularization of information technology such as Internet plus, big data and artificial intelligence, is becoming a new driving force for China's economic growth and industrial development, and has a profound impact on the national economic production mode, industrial structure adjustment, employment demand orientation and labor quality requirements. Through the analysis of the dilemma of the Digital transformation of the industry in the service area of vocational higher education, this paper puts forward the "should be" logic from four dimensions, namely, the logic of industrial transformation, the logic of job form, the logic of professional groups, and the logic of ability advancement. It also puts forward improvement strategies from six aspects, namely, training objectives, curriculum system, teaching mode, teacher resources, training resources, and evaluation and assessment.

Keywords: vocational higher education; Industrial Digital transformation and upgrading; Adaptation mechanism

INTRODUCTION

The wide application of new technologies such as big data, blockchain, artificial intelligence, the Internet of Things, cloud computing, virtual reality (VR) and 5G, as well as the strong rise of the new economy driven by the information technological revolution and high-tech industries, have brought human society into the digital era, and prompted profound changes in the field of education. Vocational education has inevitably ushered in the wave of Digital transformation. In the face of the general trend and proposition of the Digital transformation of the world economy, as a vocational education with the purpose of serving the economic and social development, the orientation of adapting to the needs of industrial upgrading, and the supply of technical and skilled talents, we should actively comply with the trend and requirements of the digital economy, make full use of the "digital dividend", and effectively enhance the adaptability and innovation of vocational education[Xu Guoqing *et al.*, 2016].

NECESSITY OF DIGITAL TRANSFORMATION AND UPGRADING OF REGIONAL INDUSTRIES ENABLED BY VOCATIONAL HIGHER EDUCATION

In 2023, the country proposed to accelerate the construction of a strong online country and a digital China. The "Overall Layout Plan for the Construction of Digital China" proposes the overall strategy for the construction of digital China in the new era. Building a "digital China" has become an important engine to

promote Chinese path to modernization in the digital era. To promote the Digital transformation and upgrading of the industry, a large number of digital skilled talents with good information skills, adapting to social progress and creative thinking are urgently needed to create new advantages for development and form new impetus for development.

The need to promote the digital upgrading of industries and enhance the adaptability of vocational education

The country has repeatedly proposed to enhance the adaptability of vocational and technical education and vigorously cultivate technical and skilled talents. This not only highlights the characteristics of "vocational education" type education, but also emphasizes the core soul of "vocational education". Currently, the rapid development of the digital economy is driving the transformation and upgrading of global economic and social development. Against the backdrop of accelerating the development of China's digital economy to promote digital industrialization, industrial digitization, and digital governance, economic and social development and industrial adjustment and upgrading have put forward new historical missions for the professional upgrading and digital transformation of vocational education.

The urgent need to fill the gap between labor supply and demand and solve practical difficulties

The rapid development of the digital economy is constantly giving birth to new products, models, formats, and industries. The types of positions

available are diverse, and the demand for talent continues to grow [Zhu Dequan *et al.*, 2019]. Digitalization has brought significant impacts on the employment ecosystem. In 2022, the scale of China's digital economy reached 45.5 trillion yuan, accounting for 39.8% of GDP, with an average annual growth rate of 15.9%, significantly higher than the average GDP growth rate of the same period. The average penetration rate of the digital economy in the entire industry has increased from 24.7 to 38.3, and the digital economy has become a key force supporting high-quality economic development. The rapid development of industrial digitization is constantly giving birth to new products, models, and formats. Various industries have new requirements for the comprehensive quality and connotation of technical and skilled talents, and the talent gap is rapidly expanding. In terms of quantity, the effective supply of digital skilled talents is insufficient, especially in cutting-edge digital fields such as big data, artificial intelligence, and blockchain, which are far lower than the demand for talents in the tens of millions; In terms of quality, the digital skills of the labor force are generally lacking, and there is still a certain degree of mismatch between the standards and models of vocational education talent cultivation and the actual requirements of industrial positions, especially the scarcity of cross industry experience and skills required for most digital positions, the inadequate social training system, and the insufficient integration of information technology and intelligent technology into the entire process of education, teaching, and management services, Directly constraining the overall progress of the construction of "Digital China".

The Value Pursuit of Building a Dynamic Mechanism of Supply and Demand and Improving the Effectiveness of Industry Education Integration

Establishing and improving the supply and demand mechanism for skilled talents is the internal mechanism for achieving industrial digital and intelligent transformation. Analyzing the supply scale of skilled talents from aspects such as education level, school scale, and regional layout, analyzing their supply structure from aspects such as vocational education system, professional settings, and service capabilities, and analyzing their supply quality from talent specifications, industry education integration, and teaching models can effectively propose scientific, reasonable, and scientific countermeasures and suggestions for the integrated development of industry education, promoting vocational education to better empower regional economic transformation and development[Jiao Jianli *et al.*, 2011].

ANALYSIS ON THE DILEMMA OF DIGITAL TRANSFORMATION OF REGIONAL INDUSTRY SERVED BY VOCATIONAL HIGHER EDUCATION

The level of education is generally low, and the comprehensive development needs cannot be met

The current economic and social requirements for talents place equal emphasis on knowledge and practice, as well as education and skills. At the same time, people also pursue comprehensive development. Through the accumulation of skills and knowledge, people will have a higher pursuit of production labor and professional knowledge, including the need to transform subject knowledge into production labor, as well as the need to continuously summarize and improve subject cognition from the process of production labor. At present, the level of vocational education is only secondary and vocational education, and vocational undergraduate education is still in the exploratory stage[Liu Changli *et al.*, 2008]. The coordinated development model of vocational education, general higher education, and continuing education is not yet mature, and there are problems of imbalanced and insufficient education systems and resources. On the one hand, the low level of education and insufficient educational resources have led to the stagnation of vocational education in "craftsmanship" education. Students graduating from vocational colleges have limited opportunities for further education, and their development after employment is generally limited, and their comprehensive personal development needs cannot be met; On the other hand, due to the lack of high-level and systematic education, students have no skills and lack the ability to summarize and refine their majors, while ordinary higher education lacks practical teaching, resulting in a phenomenon of "disconnection" between practice and theory in education, which is not conducive to professional development and inevitably affects economic and social progress.

Delayed professional dynamic adjustment and insufficient supply of high-quality talents

On the one hand, the professional settings of vocational colleges do not match the needs of regional industries. For example, students majoring in light textile and chemical engineering, mechanical manufacturing, and other majors are in short supply. However, after graduation, students majoring in accounting, business management, and other fields face problems such as low employment levels, low salary levels, or "switching" to employment. On the other hand, in the context of the new era, the social and economic development of Binzhou has shown new and fast development characteristics. Previously, it was often said that "vocational education should keep up with the development needs of the times",

but now, simply "keeping up" is far from meeting the needs of regional economic development. What the current market needs is cutting-edge professional settings, which are the talent supply that leads industrial development. However, there is still a lag problem in the professional settings of vocational education in Binzhou City. When students choose majors for enrollment, they are still popular, and upon graduation, they may become majors that are about to be eliminated. If the construction of vocational education majors still adheres to a market-oriented and adaptive development path, it will lead to a mismatch between students' professional abilities and the needs of enterprises, Create a dilemma of difficult employment and recruitment.

The curriculum planning is outdated, and innovation and entrepreneurship education is on paper

On the one hand, in terms of curriculum design, there is a tendency towards theoretical teaching, with a low proportion of practical education courses and a single format. Many teachers often replace practice with problem-solving, resulting in a small cross disciplinary range between majors and inability to adapt to the diverse needs of enterprises; Most vocational colleges in Binzhou City have not yet established a comprehensive mechanism for innovation and entrepreneurship education, and the cultivation of students' innovation and entrepreneurship abilities is mostly accomplished through hard tasks, which is not sufficiently oriented in daily teaching. On the other hand, the teaching capacity of vocational colleges is uneven, especially in recent years, most of the teachers recruited in Binzhou are fresh graduates. Teachers enter the education industry immediately after graduation, although they have solid theoretical knowledge, they lack enterprise work experience and accumulation, and lack practical teaching ability and innovation and entrepreneurship teaching ability.

School enterprise cooperation is just a formality, making it difficult to implement a dual education system

For the special educational goal of vocational colleges to cultivate composite high skilled talents, school enterprise cooperation is an effective way to improve the quality of education. However, currently, most vocational college school enterprise cooperation is only limited to contractual cooperative education. On the one hand, most enterprises mainly cooperate with schools for the purpose of recruitment, and do not invest too much in school teaching. They basically do not participate in the formulation and revision of talent cultivation plans, resulting in talent cultivation goals not being in line with the actual needs of enterprises; On the other hand, highly skilled talents from enterprises are limited in imparting

practical experience and knowledge to students on campus. Schools do not attach importance to teaching opinions and advanced technical concepts from enterprises, and communication between schools and enterprises is not smooth, resulting in low enthusiasm for enterprises. In addition, school enterprise cooperation lacks long-term consideration, and many enterprises focus on short-term benefits. If they cannot obtain profits within a year, they will terminate the cooperation, seriously affecting the long-term benefits of school enterprise cooperation.

Insufficient advancement in technological innovation and difficulty in improving social service capabilities

Serving local economic and social development is the fundamental task of vocational education, and technological innovation is the driving force behind social services provided by vocational colleges. Compared to ordinary higher education institutions, vocational colleges have less investment and resources in scientific and technological innovation, and the proportion of scientific and technological achievements transformation is not high; Some vocational colleges prioritize teaching over scientific research, with little effort put into the formation and cultivation of research teams, and limited funding policy support; Teachers often consider scientific research as a way to promote their professional titles, and their enthusiasm for scientific research itself is not high, and their awareness of social service is not strong; The lack of in-depth cooperation with enterprises, the low enthusiasm of enterprises to provide a scientific research environment for teachers, the lack of advanced scientific and technological innovation in vocational colleges, and the lack of cutting-edge innovative achievements, leading to a lack of predictive and guiding power for social and economic development, resulting in low social service capabilities[Zhao Huijuan *et al.*, 2020].

THE LOGIC OF DIGITAL TRANSFORMATION AND UPGRADING OF REGIONAL INDUSTRIES EMPOWERED BY VOCATIONAL HIGHER EDUCATION

Follow the logic of industrial transformation and clarify the positioning of service orientation.

Closely focusing on the direction of national industrial development and the development trend of the "Top Ten" industries in Shandong Province, we will classify and analyze traditional industries represented by high-end chemical industry, modern efficient agriculture, cultural and creative industries, boutique tourism industry, modern financial services, and emerging industries represented by high-end equipment, new energy and new materials, modern ocean, and medical and health care, The

transformation and development of three types of industries, including the digital industry represented by the new generation of information technology, require the construction of vocational majors and talent cultivation, and clarify the direction and focus of vocational major upgrading and digital transformation.

Follow the logic of job form and clarify the positioning of training objectives.

In the context of Digital transformation, the characteristics of each job will change significantly. The transformation of job form from single and partial to comprehensive and composite requires adapting to the multidimensional nature of job links and enhancing the cultivation of job competence; The position advantage shifts from basic knowledge and skills to technological advantages and value creation, requiring adaptation to the technical nature of the job, improvement of digital technology application ability, digital network coordination ability, and agile response ability in intelligent manufacturing modular production. The cultivation of composite abilities is also comprehensively included in professional teaching standards and talent cultivation plans.

Follow the logic of professional grouping and clarify the positioning of professional characteristics.

The construction of professional groups is the main lever for vocational colleges to serve regional economic development. The logic of group formation is based on the logical relationship between industries and the internal logical relationship of subject knowledge, and follows the prominent positioning and characteristics of the school. The industry foundation, subject foundation, and job group are similar, and the main and auxiliary relationships within the group are established through logical relationships. Through the aggregation of advantageous resources from various majors, efficiency, scale, and diffusion effects are stimulated, effectively achieving the most cost-effective Pareto optimality for maximizing benefits.

Follow the logic of ability advancement and clarify the positioning of talent quality.

Adhere to skill improvement throughout the entire life cycle and career, and on the basis of in-depth integration with industry development and job requirements, follow the basic logic of subject skill acquisition and ability advancement. Carry out advanced talent cultivation in three stages: basic literacy cultivation, basic ability cultivation, and comprehensive ability cultivation. According to the order of stimulating interest, ability expansion, and composite innovation, incorporate corresponding content and methods into the professional teaching and curriculum system. The entire process of school

enterprise cooperation, teaching mode, skill training, evaluation and assessment.

COUNTERMEASURES AND SUGGESTIONS FOR DIGITAL TRANSFORMATION AND UPGRADING OF REGIONAL INDUSTRIES EMPOWERED BY VOCATIONAL HIGHER EDUCATION

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In terms of training objectives

embed digital concepts and cultivate composite technical skills talents with "political literacy+humanistic literacy+professional literacy+innovation and entrepreneurship literacy+digital literacy". With digital ability as the core, focus on cultivating digital application talents with good information skills, adapting to social progress, and creative thinking, and cultivate a group of proficient 3D technology, XR technology, virtual interaction technology Elite digital talents in AI artificial intelligence technology.

In the curriculum system

digital content is embedded to create an intelligent and interconnected structured curriculum system with two types of classrooms and five types of collaboration. The goal is to target digital positions, cultivate digital literacy, and enhance digital capabilities. Based on the intelligent transformation of the curriculum, high-quality online courses are used as the main channel, and course modularization is used as the carrier. The operating mechanisms of the first and second classrooms are improved, and the curriculum is restructured to clarify the type of curriculum. Create a curriculum spectrum of "public basic courses+professional basic courses+professional core courses+professional direction courses+professional elective courses" based on their nature, boundaries, positioning, hierarchical connections, sequence and group relationships.

In terms of teaching mode

digital means should be embedded, and real-time interactivity and virtual and real symbiosis should be innovated. Based on the intelligent and

interconnected structured curriculum system, it should adapt to the characteristics of vocational students, highlight the teaching characteristics of vocational education, and aim to comprehensively improve students' career development and abilities. With various digital and information teaching methods as the basis, flipped classrooms should be comprehensively carried out. Various forms of blended online and offline teaching, such as information-based teaching classrooms, are being implemented to deepen the classroom revolution.

Embed digital literacy in the teaching

staff to create a "diversified source, multi-channel cultivation, and multi-dimensional improvement" digital craftsman. By empowering vocational college teachers with modern information technology to cultivate digital literacy, digital empowering teachers with digital craftsmanship, empowering teachers to carry out multimodal teaching, empowering teachers to manage and evaluate classroom digitalization, empowering teachers to apply and develop digital resources, and creating a group of high-level teacher teams proficient in applying teaching technology, curriculum and teaching theory, information science, learning science and other theories and methods.

Embed digital resources in practical training resources

to create a high-quality resource sharing mechanism of "resource sharing, complementary advantages, and cooperative development". Expanding the curriculum and teaching resources of vocational colleges and forming a professional teaching resource library with massive data can not only meet the needs of teachers and students for high-quality, diversified, and personalized vocational education resources, but also provide a "good solution" to solve the problems of duplicate construction, uneven resource allocation, and incomplete supply mechanism of current vocational education resources.

In terms of evaluation and assessment

digital processes are embedded to achieve a unified evaluation and assessment system that combines objective evaluation, process evaluation, and subjective evaluation. Focusing on the entire process of quality construction for teachers, courses, and

students, optimizing the diagnosis and improvement mechanism for teachers, courses, and students, improving the platform functions of teacher professional development, course evaluation and feedback, and student growth and development, promoting the source collection of construction process data, real-time presentation of user images, and real-time release of dynamic warnings, achieving comprehensive evaluation based on data, effective improvement, and data-driven scientific decision-making.

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