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Exploring Cultivation Paths for "Digital Craftsmen" in Higher Vocational Colleges from the Perspective of New Quality Productive Forces

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ABSTRACT
The development of new quality productive forces has spurred industrial upgrading and transformation, fundamentally shifting the demand for talent. Consequently, this shift places new demands and challenges on the cultivation of "Digital craftsmen" in higher vocational education, compelling institutions to update their educational philosophies and talent development models, and driving reforms in curriculum and teaching contents. By analyzing the current state and challenges in cultivating "Digital craftsmen" within higher vocational education, this article explores pathways for nurturing "Digital craftsmen" that align with the development of new quality productive forces. It further clarifies the positioning and objectives of higher vocational education in talent cultivation against the backdrop of new quality productive forces, thereby contributing to the establishment of a Higher vocational education theoretical framework uniquely rooted in Chinese characteristics.

KEYWORDS
New quality productive forces; Digital craftsmen; Higher vocational colleges; pathways for nurturing

1 Introduction

Fueled by the burgeoning new wave of scientific and technological revolution and the industrial revolution, cutting-edge technologies such as Artificial intelligence, Internet of things, Big data, and Cloud computing are rapidly emerging and being deployed. This is driving industries towards accelerated digitalization, intelligentization, and green transition. Higher vocational education, intrinsically linked to industrial development, plays a crucial role in the evolving landscape of new quality productive forces by fulfilling its vital mission of cultivating High-quality technical and skilled talents [1]. However, current higher vocational education faces challenges in aligning talent development with the demands of these new quality productive forces. For one, the traditional higher vocational education training model overemphasizes skills training while neglecting the development of students' comprehensive quality and innovation ability. This leaves students ill-prepared to navigate industrial upgrading and technological innovation. Furthermore, curriculum setting and teaching content are slow to adapt to the rapid pace of industrial advancement, failing to adequately incorporate the latest new technologies and new business forms. Consequently, the knowledge and skills students acquire are disconnected from real-world industry needs, negatively impacting their employment competitiveness and career development Potential. Against this backdrop, cultivating "Digital craftsmen" to meet the evolving demands of new quality productive forces has become a pressing priority for the reform and development of higher vocational education.

2 Essence of "Digital Craftsmen"

"Digital craftsmen" are new High-quality technical and skilled talents that have emerged in the digital economy era. They not only possess superb skills and a deep Craftsmanship Spirit, but more importantly, they have mastered modern digital technology and are able to use digital tools and methods for production, innovation, and service. In February 2024, the Office of the Central Cyberspace Affairs Commission and four other divisions issued the "Key Points for Improving National Digital Literacy and Skills in 2024", explicitly proposing to "cultivate high-level Digital craftsmen"[2]. Therefore, in the New Quality Productive Forces background, "Digital craftsmen" should not only have the general traits of traditional craftsmen, but also possess the following qualities required to keep up with the times.

2.1 Digital Skills

"Digital craftsmen" should possess solid digital technology knowledge and proficient operational skills, enabling them to conduct Data Processing, System Development, Intelligent Devices Operation and Maintenance and other tasks, providing technical support for industrial digital transformation.

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2.2 Craftsmanship Spirit

The craftsmanship spirit of a "Digital craftsmen" is embodied in their passion and sense of responsibility towards their work, focusing on the elevation of technology and the tuning of product quality, emphasizing details, and pursuing perfection. When facing difficulties and challenges, they persevere, dare to explore, and constantly pursue technological innovation and breakthroughs.

2.3 Innovation Ability

"Digital craftsmen" should possess strong Innovative awareness and innovation ability, enabling them to conduct innovative practice based on digital technology application, combined with industry development needs and market changes, propose innovative solutions, and promote Innovative development of industry.

2.4 Teamwork Ability

In the digital era, industrial development often involves multiple realms and disciplines, requiring "Digital craftsmen" to possess good teamwork ability, be able to conduct valid communication and collaboration with personnel from different backgrounds, and jointly finish project task.

2.5 Lifelong Learning Ability

Digital technology is developing rapidly, and the industrial revolution is changing with each passing day. "Digital craftsmen" need to possess lifelong learning ability, constantly update their knowledge and skill, adapt to the development changes of technology and industry, actively engage in active learning of new knowledge and new technologies, and achieve elevation of their comprehensive quality and ability level.

3 Current Situation of "Digital craftsmen" Cultivation in Higher Vocational Colleges

3.1 Policy Support and Guidance

In recent years, the state has placed great emphasis on the development of vocational education, issuing a series of policy documents that strongly support and ensure the cultivation of "Digital craftsmen" in higher vocational colleges. Documents such as the "National Implementation Plan for Vocational Education Reform" and the "Opinions on Promoting High-Quality Development of Modern Vocational Education" clearly state the need to align with trends in scientific and technological development and market demands, deepen the integration of industry and education as well as school-enterprise cooperation, establish a number of high-level practical training bases, foster industry-education integration enterprises, and cultivate more high-quality technical and skilled talents, skilled artisans, and master craftsmen [3]. Local governments have also actively responded to national policies by introducing supporting measures. These include establishing special financial funds to help higher vocational colleges build digital practical training bases, provide digital competence training for teachers, and attract digital talent from enterprises. They also guide enterprises to actively participate in higher vocational education talent cultivation through tax incentives and project support.

3.2 Practice and Exploration of Higher Vocational Colleges

Many higher vocational colleges have actively responded to national policies and proactively adapted to the demands of industrial digital transformation, undertaking valuable practical explorations in cultivating "Digital craftsmen". Regarding curriculum setting, higher vocational colleges have launched courses such as Big Data Analytics, Artificial Intelligence, and Cloud Computing, integrating digital technology into their professional curricula to foster students' digital skills. Concerning teaching methods, these colleges actively promote teaching reform by employing diverse approaches such as project-based learning, case-based studies, and blended online and offline instruction to enhance teaching effectiveness. Regarding School-enterprise cooperation, some higher vocational colleges collaborate with enterprises to establish Industry-education integration colleges, through which they jointly undertake initiatives such as talent cultivation, technology research and development, and social services. Some higher vocational colleges sign order-based training agreements with enterprises, customizing talent cultivation programs to meet their specific requirements and delivering qualified "Digital craftsmen" to them; others higher vocational colleges jointly establish internship and training bases with enterprises, offering students a real work environment and practical opportunities.

4 Problems in the Cultivation of "Digital craftsmen" in Higher Vocational Colleges

4.1 Disconnection Between Cultivation Objectives and Market Demands

On the one hand, the cultivation objectives are overly broad and lack specific focus, failing to clearly emphasize the development of digital technology skills and craftsmanship. This makes it difficult for graduates to meet the demands of employers seeking "Digital craftsmen". On the other hand, with the rapid advancement of new quality productive forces, digital technologies are constantly evolving, leading to changing industry needs for "Digital craftsmen". However, some higher vocational colleges still cling to traditional talent cultivation concepts. They fail to promptly integrate new digital technology and evolving industry needs into their training objectives, leaving students with knowledge and skills that are outdated and fail to meet current market demands.

4.2 Imperfect Curriculum System

Firstly, the curriculum content is outdated, failing to keep pace with the rapid advancements in digital technology and the evolving demands of the industry. Secondly, practical courses are not sufficiently integrated with theoretical courses. Consequently, students struggle to effectively apply and reinforce their theoretical knowledge in practical settings, hindering the development of their practical skills. Furthermore, there is a dearth of interdisciplinary courses. In the context of new quality productive forces, a "Digital craftsmen" requires interdisciplinary knowledge and skills to integrate and innovate by merging digital technology with other professional fields. However, the curriculum in some higher vocational colleges remains centered on traditional disciplines, lacking interdisciplinary offerings, which restricts students' knowledge expansion and the cultivation of innovation ability.

4.3 Insufficient Digital Competence of Teaching Staff

On the one hand, teachers lack digital skills. Many possess limited mastery of emerging digital technology, such as big data, artificial intelligence, and the Internet of Things, hindering their ability to effectively integrate these technologies into teaching. On the other hand, teachers often lack practical experience. The majority enter higher vocational colleges directly after graduating from universities, without prior experience in the front lines of enterprises. Consequently, their understanding of actual industry needs and the application scenarios of digital technology is limited. This prevents them from effectively sharing real-world cases and experiences with students, thereby affecting the practicality and relevance of their teaching.

4.4 Insufficient Depth of Industry-Education Integration

Firstly, the forms of school-enterprise cooperation are too simplistic. Most school-enterprise cooperation initiatives remain at a superficial level, such as student internships and guest lectures from industry professionals, lacking deeper collaborative projects and robust mechanisms. Secondly, cooperation mechanisms are often inadequate. A lack of communication and coordination often leads to disagreements between educational institutions and enterprises regarding talent cultivation goals, teaching content, and practical training arrangements, hindering the effectiveness of these partnerships. Furthermore, the absence of a shared-benefit model diminishes the enthusiasm of enterprises to participate in school-enterprise cooperation, preventing them from fully contributing to talent cultivation.

5 Exploring Higher Vocational "Digital craftsmen" Training Pathways Under the Context of New Quality Productive Forces

5.1 Define Training Objectives and Positioning

Firstly, to precisely align with the demands of new quality productive forces, higher vocational colleges should collaborate with industry associations and leading enterprises to conduct job analyses and vocational competency research. This will help clarify the necessary knowledge, skills, and qualities for Digital craftsmen, enabling the formulation of targeted and forward-looking training objectives. At the same time, training objectives should be promptly adjusted and updated to reflect the dynamic changes in industrial development, ensuring that Digital craftsmen produced are equipped to meet the evolving demands of new quality productive Forces.

Secondly, higher vocational colleges should align closely with the unique characteristics of local industries, defining a regional focus for Digital craftsmen training to precisely match talent development with regional industrial needs. This involves, firstly, establishing relevant majors and courses tailored to regional industry specifics, ensuring students' knowledge and skills are tightly integrated with local demands, thereby enhancing their employability and career

prospects. Secondly, it means actively collaborating with local businesses to deliver customized talent development services, catering to their specific requirements for Digital craftsmen.

Furthermore, vocational colleges should anticipate future trends in regional economic development by proactively establishing majors and courses related to emerging industries. This will cultivate Digital craftsmen equipped with the knowledge and skills in cutting-edge technologies, providing a talent pool for the sustainable growth of the regional economy.

5.2 Optimize the Curriculum System

Firstly, construct a modular curriculum system. A modular curriculum system organizes course content into relatively independent yet interconnected modules based on the logical relationships between knowledge and skills. Characterized by flexibility, openness, and selectivity, this system is better suited to meet the demands of new quality productive forces in cultivating Digital craftsmen. Higher vocational colleges should typically establish a modular curriculum encompassing basic course modules, professional course modules, practical course modules, and extension course modules [4].

Secondly, enhance the digitalization and practicality of course content. Course content should emphasize the deep integration of digital technology with professional courses, exposing students to the latest technologies and concepts and fostering their ability to apply digital technology to solve real-world problems. To enhance students' practical abilities, beyond simply increasing the proportion of practical teaching, practical teaching projects should be enriched. This can be achieved by introducing real-world enterprise projects and authentic case studies, and strengthening the development of practical training bases, allowing students to hone their practical skills and professional qualities in genuine work settings.

Furthermore, higher vocational colleges should also thoroughly explore the ideological and political elements inherent in professional courses, integrating ideological and political education throughout the entire curriculum to cultivate students' professional ethics and moral character. Simultaneously, it's crucial to enhance higher vocational teachers' awareness and competence in integrating ideological and political education through training, seminars, and other methods, thereby improving their ability to identify and incorporate these elements into their teaching.

5.3 Strengthening the Construction of the Teaching Staff

Firstly, higher vocational colleges should conduct digital skills training for teachers, including training on fundamental digital technology knowledge, the application of digital teaching tools and platforms, and digital teaching design, to enhance teachers' ability to leverage digital technology in their instruction.

Secondly, higher vocational colleges should enhance the practical skills of their faculty by supporting their participation in industry placements, academic exchanges, training seminars, and other activities. They should also encourage teachers to participate in various vocational skills competitions to hone their practical abilities and innovation ability.

Furthermore, higher vocational colleges should recruit professionals with extensive practical experience and digital technology skills from enterprises to augment the teaching staff as adjunct instructors, imparting real-world work experience and skills to students.

5.4 Deepen the Integration of Industry and Education

Firstly, higher vocational colleges should collaborate closely with enterprises to jointly develop talent cultivation programs, ensuring they are closely aligned with industry needs. This could involve implementing order-based training to cultivate digital artisans specifically for those enterprises. Furthermore, they should jointly establish internship and training base to offer students authentic production practice environments, and co-develop professional courses and textbooks that integrate real-world enterprise projects and case studies into the curriculum, thereby making the course content more relevant to actual industry demands.

Secondly, higher vocational colleges should actively explore innovative models of industry-education integration. Examples include piloting modern apprenticeship programs to achieve dual-master education led by both schools and enterprises; establishing industry-specific colleges in partnership with enterprises, focusing on Industry Development Needs to conduct talent development, technology research and development, and social services; and forming school-enterprise partnerships with businesses and industry associations to create a collaborative mechanism with shared benefits and risks, fostering deep cooperation and collaborative innovation.

Thirdly, government departments should develop relevant policies and regulations that clearly define the rights and obligations of schools and enterprises in industry-education integration, providing policy support and legal guarantees. Furthermore, the government should increase financial investment in vocational education, diversify funding sources,

encourage private capital to participate in industry-education integration, and support collaborative projects between vocational colleges and enterprises.

6 Conclusion

As a new type of talent adapting to the development needs of new quality productive forces, exploring the cultivation path of higher vocational "Digital craftsmen" is of great significance to promoting the development of new quality productive forces. These two aspects mutually reinforce and synergistically develop, jointly empowering and enhancing efficiency in the pursuit of high-quality development.

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