The Characteristics, Trends, and Strategies of Digitalization in Higher Vocational Education

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Abstract. With the rapid development of information technology, higher vocational education is facing unprecedented digital transformation. This article aims to provide theoretical support and practical guidance for the development of higher vocational education in the digital age by deeply analyzing the characteristics of digitalization in higher vocational education, exploring its development trends, and proposing corresponding strategic suggestions. The article first outlines the three major characteristics of digitalization in higher vocational education, namely the digitization of educational resources, the intelligence of teaching processes, and the personalization of learning methods. Furthermore, by analyzing the current technological development and educational policy trends, the development trend of digitalization in higher vocational education was predicted. Finally, based on the actual situation, specific strategies for promoting the digital development of higher vocational education were proposed, including strengthening the construction of digital infrastructure, improving the information literacy of teachers and students, innovating digital teaching models, and constructing a digital evaluation system.

Keywords: higher vocational education; digitization; features; Trends; strategy

1 Introduction

In today's rapidly changing information technology, digitization has become an important trend in the development of higher vocational education. As an important base for cultivating high-quality skilled talents, higher vocational education's level of digitization directly affects the quality and efficiency of talent cultivation. Therefore, in-depth exploration of the characteristics, trends, and strategies of digitalization in higher vocational education is of great significance for promoting reform and innovation in higher vocational education.

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2 The Characteristics of Digitalization in Higher Vocational Education

2.1 Digitalization of Educational Resources

The digitization of educational resources is the primary characteristic of digitalization in higher vocational education. First, through digital technology, traditional educational resources can be digitally processed to enable them to be shared and spread on the Internet, thus improving the utilization efficiency and coverage of educational resources [1]. Secondly, digital educational resources have the characteristics of richness, diversity, and interactivity, which can provide more vivid and vivid teaching content for higher vocational education. Meanwhile, through digital technology, teachers can also customize personalized teaching plans based on the learning situation and needs of students, thereby improving teaching quality and effectiveness . Thirdly, by utilizing digital educational resources, higher vocational education can continuously explore and innovate teaching methods and approaches, promoting educational transformation and development [2]. According to incomplete statistics, as of the end of March 2023, the National Vocational Education Smart Education Platform has launched a total of 1324 professional teaching resource libraries, 7126 online quality courses, and 2403 video open courses, including 39 rural revitalization professional resource libraries and 79 online quality courses. The smart vocational education platform serves over 22 million users, with a total of 3.76 billion views and a daily peak of over 35.96 million views. This not only helps alleviate the problem of uneven distribution of educational resources, but also provides more learning opportunities and possibilities for students located in remote areas or economically disadvantaged families.

2.2 Intelligentization of Teaching Process

With the widespread application of technologies such as big data, cloud computing, and artificial intelligence, the teaching process of higher vocational education is gradually becoming intelligent [3]. Firstly, intelligent technology can provide personalized learning resources and teaching plans based on students' learning habits, knowledge levels, and interests, better meeting their actual needs and improving learning outcomes [4]. Students have a high dependence on digital devices, with a particularly prominent usage rate of 92.16% for mobile phones as learning devices. This demonstrates the popularity and importance of smartphones in digital learning. Secondly, real-time data-driven teaching strategy adjustment. The intelligent teaching process collects and analyzes student learning data, adjusts teaching strategies in real time, and can more flexibly respond to student learning changes, adjust teaching content and methods in a timely manner, to ensure the maximization of teaching effectiveness. Thirdly, intelligent teaching tools such as virtual assistants and learning management systems can enhance interactivity in the teaching process. This interactivity not only stimulates students' interest in learning, but also provides immediate feedback and personalized guidance [5], thereby helping students better understand and master the knowledge they have learned.

Fourthly, the intelligent teaching process combines modern technologies such as artificial intelligence, big data, cloud computing, etc. with traditional teaching, achieving diversified teaching methods [6].

2.3 Personalization of Learning Methods

Another notable feature of digitalization in higher vocational education is the personalization of learning methods [7]. Firstly, in higher vocational education, students have different learning needs due to differences in personal interests, professional backgrounds, career planning, and other aspects. The digital education platform can more accurately grasp the personalized needs of each student by collecting and analyzing their learning data, thereby providing them with more practical learning resources and paths. Secondly, personalized learning emphasizes students' initiative and autonomy. In higher vocational education, digital technology provides students with more convenient and flexible learning tools and environments, enabling them to engage in self-directed learning anytime, anywhere. Thirdly, digitalization of higher vocational education provides students with diverse learning methods, such as online courses, virtual laboratories, and simulated practices. Students can choose a suitable learning method based on their own learning characteristics and preferences. Fourthly, through digital technology, higher vocational education can design personalized learning paths for students [8]. Customized learning paths can help students achieve their learning goals more efficiently based on their learning situation, interests, and professional needs. According to a report released by a well-known educational technology company, the number of users on its personalized learning platform has increased by 300% in the past five years, with 40% of users in the field of higher vocational education. A study on higher vocational education students shows that students who adopt personalized learning methods have an average score 15 percentage points higher than those who use traditional teaching methods in final exams; At the same time, these students also demonstrate stronger advantages in practical and innovative abilities.

3 The Development Trend of Digitalization in Higher Vocational Education

3.1 Technology Integration and Innovative Application will be Further Deepened

In the future, digitalization of higher vocational education will place greater emphasis on technology integration and innovative applications [9]. With the continuous development of new technologies such as 5G, Internet of Things, and blockchain, higher vocational education will usher in more innovative application scenarios. For example, implementing remote real-time teaching through 5G technology; Implementing intelligent management of teaching equipment through IoT technology; Ensure the authenticity and credibility of teaching data through blockchain technology. The application

of these technologies will bring new development opportunities for the digitization of higher vocational education.

3.2 The Integration of Online and Offline Teaching Modes will Become Mainstream

The integration of online and offline teaching mode is the mainstream trend of digitalization in higher vocational education in the future. This teaching model will fully leverage the flexibility of online teaching and the practical advantages of offline teaching, providing students with a more diverse learning experience. For example, learning and exchanging theoretical knowledge through online platforms; Conduct skill operations and project training through offline practice bases. This integrated teaching model helps to improve the learning effectiveness and comprehensive quality of students.

3.3 The Digital Evaluation System will Gradually Improve

With the continuous development of digital technology, the evaluation system of higher vocational education will also gradually improve. The digital evaluation system can comprehensively and objectively evaluate the learning outcomes and ability levels of students, providing scientific teaching feedback and improvement suggestions for teachers. Meanwhile, the digital evaluation system can also help students better understand their learning situation and development direction, and formulate reasonable learning plans and goals.

4 Strategy Suggestions for Digitalization of Higher Vocational Education

4.1 Strengthen the Construction of Digital Infrastructure

The construction of digital infrastructure is the fundamental project for the digitization of higher vocational education, as shown in Figure 1. In order to promote the digital development of higher vocational education, the government should first increase investment in the construction of digital infrastructure for higher vocational education, ensure that schools have advanced network equipment and stable network environment, and provide a solid foundation for digital teaching. Secondly, schools should upgrade their existing network architecture and adopt advanced technologies such as "all fiber+WIFI6+5G" to achieve wired and wireless multi network integration, meeting the needs of teaching, research, and management for high concurrency, high-speed response, and high reliability. By upgrading the cloud computing center, achieve flexible expansion of resources and on-demand allocation; Build a big data center, integrate various business data, and provide data support for precise management and scientific decision-making. In addition, advanced technologies such as virtualization and containerization should be introduced to improve resource utilization efficiency and system flexibility. Building a smart campus integrated platform to achieve unified integration

of identity authentication, business navigation, message notification, mobile office and other functions; Build a data center, construct a data flow topology, and achieve visual management and analysis of data assets [10]; Build smart security, smart logistics and other application scenarios to enhance campus security management and service levels. In addition, in order to ensure the stable operation of digital infrastructure, schools establish a sound data governance system, clarify data management responsibilities and processes, and ensure the accuracy, integrity, and timeliness of data. Strengthen data security protection, establish a multi-level security protection system, and prevent data leakage and illegal access. Table 1 shows the data security governance system diagram. Finally, schools should encourage teachers and students to actively participate in the construction and management of digital infrastructure, cultivate their information literacy and technical abilities, and provide strong support for the deepening of digital teaching.

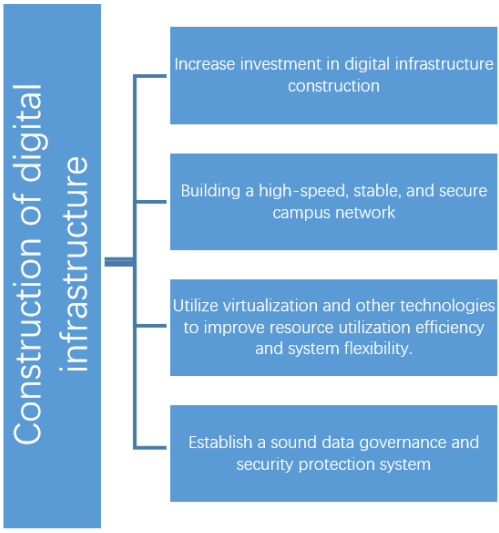

Fig. 1. Construction of Digital Infrastructure.

4.2 Enhancing the Information Literacy of Teachers and Students

Improving the information literacy of teachers and students is the key to promoting the digitization of higher vocational education. Firstly, for higher vocational education teachers and students, regular information literacy training courses should be offered, covering basic knowledge of information technology, application of digital tools, and network security, Regular information literacy training and workshops can also be organized, inviting industry experts and technical backbone to teach teachers and students the latest information technology knowledge, tools, and platform application skills, ensuring that teachers and students can proficiently master and apply digital teaching resources and equipment [11]. Secondly, encourage teachers to use information technology to innovate teaching methods, such as flipped classrooms and blended learning, to

enhance their information literacy and digital teaching abilities through practice. At the same time, organizing teacher information literacy competitions and other activities to stimulate teachers' enthusiasm for improving their own abilities. In addition, providing students with diverse digital learning platforms and tools, such as online courses, digital libraries, etc., to cultivate their self-learning and information processing abilities. Through project driven and team collaboration methods, students can enhance their information literacy in practice. By organizing information technology cultural festivals, information literacy knowledge competitions, and other activities, relevant knowledge and cases of information literacy can be widely promoted, forming a good situation where all teachers and students in the school jointly pay attention to and actively participate in information literacy construction. Finally, establish a mechanism for evaluating the information literacy of teachers and students, regularly evaluate their information literacy, and provide personalized improvement suggestions based on the evaluation results, forming a virtuous cycle and promoting the digitalization process of higher vocational education. The above measures are shown in Figure 2.

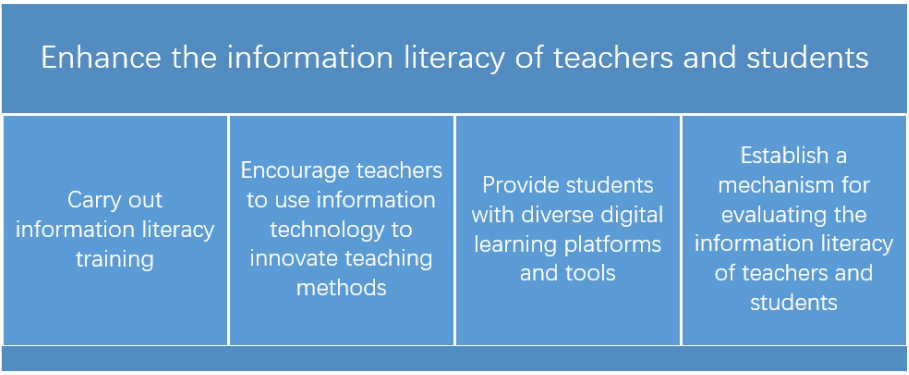

Fig. 2. Enhancing the Information Literacy of Teachers and Students.

4.3 Innovative Digital Teaching Mode

Innovative digital teaching models are an important direction for the digital transformation of higher vocational education, and higher vocational education should actively explore and innovate digital teaching models, as shown in Figure 3. Firstly, promote the deep integration of traditional teaching and digital teaching, introduce new models such as flipped classroom and blended learning, and make students the main body of learning, with teachers serving as guides. Project based and case based teaching emphasize problem orientation, learning and mastering knowledge by completing specific projects or analyzing real cases. In the digital teaching mode, network platforms and collaborative tools can be used to organize students to collaborate across regions and disciplines in a team to jointly solve complex problems. Enhancing interaction and feedback between teachers and students can be facilitated through online discussion forums, instant messaging tools, voting systems, etc, to facilitate real-time communication and interaction between teachers and students. Secondly, utilizing technologies

such as big data and artificial intelligence, analyze students' learning habits, interests, and abilities, and tailor personalized learning paths for each student. Through intelligent recommendation systems, students are provided with course resources, learning paths, and learning plans that meet their learning characteristics and needs, promoting self-directed and deep learning. Once again, strengthen the application of technologies such as virtual reality (VR) and augmented reality (AR), build an immersive learning environment, and enhance students' practical abilities and innovative thinking. In addition, establish a digital teaching case library and experience exchange platform, share successful digital teaching cases and strategies, and promote mutual learning and common growth among teachers [12]. Through these measures, we will promote the innovation and development of teaching models in higher vocational education.

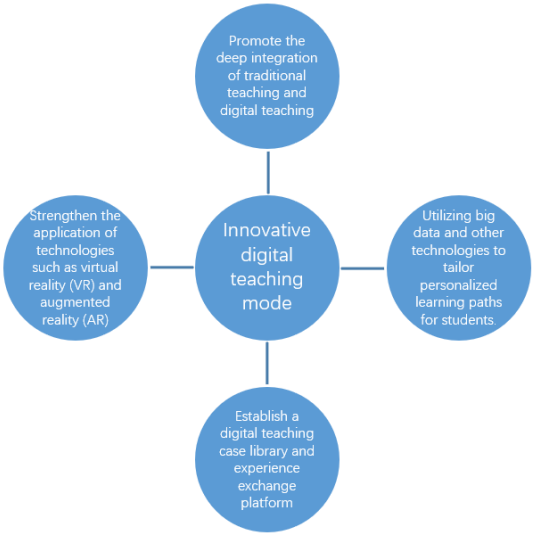

Fig. 3. Innovative Digital Teaching Mode.

4.4 Building a Digital Evaluation System

Building a digital evaluation system is an important link in promoting the digitization of higher vocational education. Firstly, the digital evaluation system should go beyond traditional single academic performance evaluation, and include students' comprehensive quality, innovation ability, practical ability, and information literacy in the evaluation scope. At the same time, pay attention to the evaluation of teachers' teaching abilities, innovative teaching methods, and development of teaching resources, and form a diversified and comprehensive evaluation target system. Secondly, developing intelligent evaluation tools. Utilizing advanced technologies such as big data and artificial intelligence, develop intelligent evaluation tools to achieve real-time monitoring, data collection, and analysis of student learning processes. These tools can include online testing systems, learning behavior analysis software, intelligent feedback systems, etc., which can accurately capture students' learning status, learning outcomes, and potential

problems, providing a basis for personalized teaching [13]. Thirdly, strengthen the application and feedback of evaluation results. An effective evaluation result application and feedback mechanism should be established to timely feedback the evaluation results to teachers and students, helping them clarify their strengths and weaknesses and develop personalized improvement plans. At the same time, the evaluation results will serve as an important basis for the allocation of educational resources, teaching improvement, teacher assessment, and other aspects, promoting the continuous improvement of educational quality. Fourthly, promote the openness and sharing of the evaluation system. By building an evaluation resource sharing platform, the exchange and mutual recognition of evaluation data can be achieved, promoting the unity and improvement of educational evaluation standards. At the same time, drawing on advanced international evaluation concepts and methods, continuously improving the internationalization level of the education digital evaluation system. Fifth, strengthen the ethics and privacy protection of the evaluation system. Ensure that the collection, storage, processing, and use of evaluation data comply with relevant laws and regulations, and respect the privacy rights of teachers and students.

5 Conclusion

Digitalization of higher vocational education is an important trend in the future development of education. By deeply analyzing the characteristics, trends, and strategies of digitalization in higher vocational education, we can better grasp the development direction and reform focus of higher vocational education in the digital era. In future educational practice, we should actively explore and innovate digital teaching models and evaluation methods, providing strong support for cultivating high-quality skilled talents.

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