A REVIEW OF DIGITAL EDUCATIONAL RESOURCE RESEARCH IN CHINESE VOCATIONAL EDUCATION CONTEXT

Gan Jiaxun And Roselan Bin Baki

Abstract **– At present, the Chinese government has invested a large amount of funds and equipment for the realization of education informatization. As the key to digital learning, digital educational resources play a crucial role in the informatization of education. In addition, digital educational resources are crucial to the development of high-quality vocational education in China. With the country's increasing emphasis on vocational education and the accelerated development of education informatization, vocational education digital educational resources are also increasingly valued by researchers. This research aims to make a review of the literature related to the research of digital educational resources in Chinese vocational education context from 2013 to 2023. Firstly, the research method of content analysis and statistical analysis will be used to sort out the relative research literature from 2013 to 2023. Then, the number of published papers, the published periodicals, the authors and affiliated institutions, the research subject and the research content will be analysed. Finally, this study will identify and summarize the current research status, the research accomplishments, and the existing problems in the research field of digital educational resources in Chinese vocational education context, so as to propose the research trend of digital education resources in China, and to provide some implications for future relative researches.**

Keywords **– Digital Educational Resources; Educational Informatization; Chinese Vocational Education; Review**

I. INTRODUCTION

With the rapid development of vocational education informatization, the digital educational resources of vocational education are also increasingly valued by people. Digital teaching resources are resources that appear with the development of information technology, exist in digital form and serve teaching and learning (Zhang, 2011; Wu, 2004). There are totally nine types of digital resources, including media materials, test questions, test papers, courseware, cases, literature, online courses, FAQs, resource catalogue indexes, and digital teaching resources defined in the "Technical Specifications for Educational Resource Construction (CELTS-41.1)". It also contains Library, high-quality course website, teaching resource platform, simulation training resources (simulation experiment software, simulation training software and simulation practice software, etc.) (MOE, 2015; Shi, Gao & Lu, 2015).

Since the turn of the century, the development of a professional teaching resource database for vocational education has advanced the vocational education quality to a considerable degree, and ignited the transformation of vocational education concepts and learning methods. The "Action Plan for Vocational Education Quality Improvement (2020-2023)" proposes "promoting the deep integration of information technology and education and teaching" and "using modern information technology to promote the reform of talent training models", which also puts forward more requirements for the construction of digital learning resources for vocational education. On May 1, 2022, with the official implementation of the "Vocational Education Law of the People's Republic of China", China's vocational education has advanced to a new level of rule of law, science, and information technology. Under this background, the vocational education digital educational resources are increasingly valued by researchers. The purpose of this paper is to summarize and review the relevant achievements in the construction of vocational education digital learning resource database, to analyse the existing problems, and to clarify the future research direction, which is of great significance to the future development of digital teaching resources and information technology in vocational education.

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II. METHODOLOGY

Database Resources

The research samples selected in this article are all from the Chinese Journal Full-text Database and Excellent Master's Dissertation Database of China National Knowledge Infrastructure (CNKI). The reason for choosing these two databases is that these two databases are the most commonly used in domestic literature search, and they are also academic paper databases with relatively complete data for the latest research.

Data Selection

The selection of paper samples follows the following criteria: Firstly, the papers should be officially published and included in the academic paper database; secondly, the paper retrieval journals are limited to education and social science comprehensive categories (educational theory and education management, Vocational Education) journals; Thirdly, the time limit for publication of papers is from May 2013 to May 2023; Fourthly, when searching papers, the key words are to be searched in the "abstract, title and full paper". The reason to choose above retrieval criteria is to meet the needs of expanding the selection range of papers as far as possible, and to improve the overall representatives of papers. The key words "vocational education" or "secondary vocational" plus "higher vocational" and "digital" "teaching resources"

were used to search for digital educational resources from May 2013 to May 2023. After excluding less relevant literature such as advertisements, conferences, and requests for contributions, final selections account to 306 articles, including 254 periodicals and 52 dissertations.

III. DATA ANALYSIS

This study mainly conducts statistical and content analysis on the sample papers from the aspects of the number of documents, published periodicals, authors, research topics and content.

Statistical Analysis

This study conducted a statistical analysis of the number of papers related to digital educational resources in vocational education from May 2013 to May 2023. The research literature on digital educational resources in vocational education began to rise sharply in 2013 and reached its peak in 2015. The number of research journals in this field fell back since 2015, but the overall level is still at a high level, and the research in this field has entered a stage of steady development. The reasons for the above phenomena are as follows: Firstly, the national government have put great attention to and support of the integration of information technology with education. The "National Medium and Long-Term Education Reform and Development Plan (2010-2020)", "Education Informatization Ten-Year Development Plan (2011-2020)", and the national "Twelfth Five-Year Plan" have been issued one after another, pointing out that information technology has a revolutionary impact and must be highly valued; full attention must be paid to the deep integration of information technology and educational teaching practice. This shows that the relevant research on digital educational resources of vocational education has been paid more and more attention by researchers, and has become an important research content in the field of vocational education.

Papers are mainly published in educational technology professional journals, such as "Computer Knowledge and Technology", "China Education Informatization", "Vocational and Technical Education", "Profession", "China Vocational and Technical Education", "University of Electronic Science and Technology", " Education and Teaching Forum", "Education Modernization", "Guangxi Education", etc. There are only 46 papers published in core journals.

Through the analysis of the institutions to which the researchers belong, the researchers in this field are mainly teachers in vocational colleges, and there are fewer researchers in enterprises and other institutions.

In terms of the number of publications, most authors published only one paper, with the exceptions of 26 authors published 2 papers, 3 authors published 3 papers, 1 author published 4 papers.

Content Analysis

By going through the literature, this study categorizes the research on digital learning resources for vocational education into three types: digital educational resources construction research (application practices, problems and countermeasures), evaluation standards for digital educational resources, research on co-construction and sharing of digital educational resources. Each content will be discussed in the following section.

Digital Educational Resource Construction Research

China's educational informatization construction is still in its infancy. Experts and scholars' research on digital learning resources in this early stage is mainly to discuss the application theory of digital learning resources, investigate the current situation, discover existing problems, and propose solutions, etc.. According to prior literature, there are many contradicts in China's vocational educational resource construction, this study summarizes these conflicts into three types: the conflict between digital resource construction and the Internet paradigm, between the modern teaching concepts and traditional content presentation methods, and the mismatch of resource data design function realization.

The conflict between digital resource construction and the internet paradigm is one of the major concerns in digital resource construction. As a new thing, there is no model and mature experience for the construction of digital learning resource. Relevant experts have put forward a series of guiding opinions which directly affect the quality of digital educational resource construction. With the development of construction work, its guiding ideology is constantly changing. The initial method of digital learning resource construction is to produce a large number of digital educational resources in the process of demonstration school construction. The "Digital Campus Construction Specifications for Vocational Colleges" divides digital educational resources into classroom resources and practical training resources, including general basic resources and simulation training resources, such as videos, animations, and virtual simulation resources. The guiding ideology of resource construction at this stage is to use information technology to present and transmit professional knowledge, and its focus is knowledge and skill (Ye, Xiong & Cao, 2015), which reflects the teaching philosophy of cognitivism (Huang, 2021). Through the hard work of the participants, the digital educational resource database has accumulated a large amount of digital learning materials, however, there exists many problems in the actual applications.

First, there are a large number of learning resource platforms, including national, enterprises, and institution self-developed platforms, but the platform utilization rate is not very high (Zhao & Huang, 2022). Secondly, the learning resources did not fully meet the needs of learners, and did not fully realize the functional positioning of "promote learning and assist teaching" (Li & Mo, 2017). Resource users are dissatisfied, thinking that "there are actually not many resources that really meet the needs of learners and can be used effectively" (Ji, Cheng & Qiu, 2015). Some studies have found that some top-level design defects lead to low-quality learning resource construction, which cannot effectively support teachers' teaching and students' autonomous learning. Zhou & Li (2016) found that "most digital resources have few technical supports, reflect low technical skill level, and have unsatisfactory teaching adaptability and feasibility".

In addition, the digital resources have not been integrated into the latest pedagogical reform results, nor can they reflect the development trend of the industry. There is a common problem of disconnection between information technology and teaching practice in Vocational education, and the teaching problem of "invisible, inaccessible, immovable, insufficient, difficult to reproduce, and poor effect" in practical teaching has not been fundamentally solved (Tong & Jiang, 2016).

An important reason for these problems is that there are contradictions between the guiding ideology of digital resource database construction and the internet paradigm (Wang & Zong, 2018). With the development of the times, the internet paradigm is also constantly upgrading, from Web 1.0 with only static web pages, to Web 2.0 with direct interaction with users, to Web 3.0 with automatic content generation through user data analysis. It can be seen that the current digital learning resource database is "a platform for presenting digital teaching materials based on teaching logic" (Xu, 2015). Its design guiding ideology is to provide static knowledge which embodies the concept of Web1.0. For the majority of young students and teachers who are accustomed to using Web2.0 in their life and work, it is normal that they are not used to or like Web1.0 paradigm learning resources.

The second conflict lies between modern teaching concepts and traditional content presentation methods. Since 2010, each version of the digital resource library "Construction Guide" or "Construction Manual" emphasizes that learners should be able to conduct personalized learning in the digital resource database, which reflects the guidance of modern learning theories such as constructivism and connectivism Teaching Philosophy (Zhao&Huang, 2022). However, the "Construction Manual" clearly puts forward the requirement that "fragmented resources are the foundation and structured courses are the focus", which limits the selection, organization and presentation of learning content, making learning resources a structured and closed knowledge accumulation, which is contrary to the construction goals of the concept of connectivism and situational learning.

According to the "products" submitted at the platform, many digital resource databases digitize offline learning resources and store them on the online platform, divide the knowledge and skill points of each chapter based on the original courses, and combine granular resources, materials, and modules into structured online courses, which are then integrated into major databases (Huang, 2021).

"Fragmented resources" present explicit knowledge, programmed teaching strengthens knowledge instillation, and knowledge is transmitted from top to bottom according to the designer's wishes. The learning process is a process of "stimulation" and passive "reaction". Functional practice tasks only give feedback on the degree of knowledge accumulation. Lacking application scenarios, the knowledge is difficult to develop into professional competence. It is impossible to see the relevance of these contents to the work world, and it is even more difficult to realize the "systematic" learning of vocational education. Individual learning is also monitored primarily through standardized testing. To sum up, the teaching philosophy reflected here is more inclined to traditional behaviorism, which affects the realization of advanced teaching concepts of learner-centered and autonomous learning (Slavin & Davis, 2006).

The last conflict lies in the needs mismatch of the digital resource function between the users and the learners.

In 2014, the "Construction Manual" determined the basic functional orientation of the digital resource database as "teaching and learning", and in 2015 it was adjusted to "Promote learning and assist teaching" and it is still in use today. "Promote learning" means that learners can realize systematic and individualized learning through independent use of the digital resource database, and achieve certain learning goals; "assist teaching" means that teachers use the digital resource database to flexibly organize teaching content according to different learners and teaching requirements and realize teaching objectives. This guidance reflects the learner-centered design concept, focuses on individualized and autonomous learning, expands the learning space, and reflects the learning characteristics of the information age.

However, the analysis found that most of the established digital learning platforms provide learners with learning content unilaterally, with insufficient interactivity and social participation; most of the interactive and situational experience functions are based on the interaction of courses, and most of the presented tasks are cognitive or operational skill training tasks, the authenticity and openness are weak. The survey found that the "promote learning" objective understood by resource database builders and learners is inconsistent. The "promote learning" understood by the builders is based on the curriculum, that is, to provide dynamic resource presentation for abstract theories, to make paper textbooks "move", and to design teaching strategies according to the nature of learning resources and learners' learning styles. It embodies the cognitivist learning theory; the "promote learning" understood by learners is resource-based, that is, to select learning resources according to needs, and to carry out their own combination and reconstruction (Huang, 2021).

In fact, even the digital resource database built by the elite teacher team has limited resources. Learners pay more attention to the richness and availability of resources, expect to expand their learning beyond the scope of courses, hope to quickly obtain information that meets their expectation and experience the authentic situation. Meanwhile, during the using process, the learners will edit the resources according to their own experience and generate their own exclusive resources. At this time, learners are not only consumers of resources, but also providers of resources.

From the perspective of the development history of digital educational resources, the development of vocational education digital educational resources has experienced "three generations": the first generation is the development of multimedia courseware and computer teaching software as a supplement to the traditional classroom teaching, the purpose is to promote teaching; the second generation is the development and design of a

digital learning environment supported by comprehensive information technology, especially the immersive, mixed and open digital resources and platforms, the purpose is to promote learning and teaching; the third generation is the overall design of the organizational and cultural structure of educational institutions, focusing on learning experience and autonomous learning strategies, using artificial intelligence and machine learning technology to produce learning resources, while providing professional solutions, improve learners' design capabilities (Zhao & Huang, 2022).

China's digital learning resource database is positioned as a second-generation learning resource of "promote learning, assist teaching", but the evaluation criteria of the teaching resource database is more concerned with the function of "assist teaching", that is, the first generation of learning resources. This limits the co-construction and sharing of high-quality resources. This P2C (People to Content) learning method is in conflict with the goal of “promote learning" (Yu & Yang, 2007).

In addition, many scholars have found that the quality of digital resource database construction is not satisfactory by evaluating the achievements of existing resource library construction. Yang & Wang (2014) pointed out that due to the development of China's information technology, the improvement of the digital learning environment, the acceleration of the construction of educational informatization, the government-led construction of digital campuses and smart campuses, many digital learning resources and educational resources have been created. But there exist many problems, such as large quantity, poor quality, low degree of sharing, lack of deep integration of multiple resources, information islands, and repeated resource construction. To solve these problems, it is necessary to carry out holistic consideration in terms of concepts, implementation strategies and methods. In order to solve the low-quality level construction problem, researchers have carried out related resource sharing and resource evaluation research, which will be elaborated in the following section.

Digital Educational Resource Co-Construction and Sharing Research

The repeated construction of digital learning resources in China is serious, and the resource database that can realize the sustainable development of resources has not yet been formed, so it is very difficult to realize the co-construction, sharing and co-management of resources. A large number of resources are still shared at a low level. The resources are relatively scattered and isolated, and cannot be exchanged and shared in a large scale and efficiently, resulting in a serious waste of labor and money (Yang & Wang, 2014; Zhao, 2017).

Zhao (2017) put forward suggestions for digital resource sharing from the perspectives of teachers, specialty department, and schools. Teachers should deepen teaching reform, give full play to the advantages of information technology, promote the deep integration of information technology and courses, effectively improve the utilization rate of resources, and build a new model of education and teaching in the information environment; The specialty department should focus on building course groups and specialty groups, integrate teaching resources, and design scientifically reasonable digital educational resource sharing platform structure; schools should focus on running schools regionally, strengthen industry standards, and form digital teaching resource development and construction alliances with complementary advantages.

Zhang (2023) made a case study of teaching resource databases construction in the Mechatronics Technology Specialty Groups, based on the teaching practice. Zhang raised three methods of inter-school, school-enterprise, and international co-construction and sharing of teaching resource databases for vocational education specialty groups in China.

Cheng (2022) also proposed a theoretical framework for the co-construction and sharing mechanism of high-quality educational resources. Firstly, the framework points out the need to establish a "regional sharing and full-featured" smart platform. Regional sharing will increase the audience of the platform, and complete functions will increase users' enthusiasm for use. Secondly, the framework also innovates the long-term mechanism of "college-lead and clear division of labor". "college-lead" policy means that the master of the college grasps the general direction of the resource platform construction, and the "clear division of labor" is a guarantee to maintain the long-term operation of the sharing mechanism. Lastly, the framework advocated the construction of "multiple channels and rich types" digital educational resources. Channel Diversification reduces the cost of school construction; multiple types of resources stimulate students' interest in learning.

Liu & Feng (2022) conducted empirical research about the construction and sharing of digital educational resources for engineering hydrology and hydraulic computing courses, and summarized five conditions to fulfill the course sharing. Firstly, unified construction standards are the prerequisite for realizing resource sharing and exchange. Secondly, the open and shared platform of network resources is the basis for the sharing of digital educational resources. Thirdly, the use of dynamic data services in the cloud platform environment is the guarantee for the sharing of digital educational resources. Fourthly, stick to the learner-center principle to realize the sustainable sharing and interoperability of digital educational resources. Finally, build a mobile learning space and promote the continuous development of digital teaching and learning resources.

Digital Resource Evaluation Standards Research

The evaluation of the utilization of digital teaching and learning resources can effectively promote the widespread application and continuous optimization of digital resources, maximize the importance of digital resources in the teaching process, and indicate the direction for the sustainable development of resource construction.

In order to ensure the standardized use of digital learning resources in China, a set of evaluation system for digital learning resources must be established. However,

the research on the evaluation of vocational education digital educational resources is the least studied topic in the field of vocational education digital educational resources research. Only a few scholars have done corresponding research on the evaluation criteria of digital learning resources. For example, Pan (2022) preliminary raised the idea of using big data technology to evaluate the effectiveness of digital educational resources application in higher vocational colleges, and formulated the relevant criteria as follows. Firstly, to evaluate the resource usage frequency: including resource usage frequency data by teachers, such as times of login, access, retrieval and evaluation, resource usage quantity, times of homework distribution and test assignment, etc.; resource usage data by students, such as times of login, access, retrieval and evaluation, resource learning quantity, times of homework Submit and test, etc. Secondly, to evaluate the resource attractiveness through the active teacher-student ratio. Thirdly, to evaluate the user satisfaction: including teacher and student satisfaction towards the resource quality, the support service and the platform operation. Lastly, to evaluate the teaching and learning service output: including the output of talent training, the output of teaching and scientific research, etc. This is only a theoretical model for resource quality evaluation. The specific definition and technical implementation plan of relevant index parameters still need further research.

IV CONCLUSION

Based on the analysis, the future research directions and trends in the digital educational resource field in China vocational college context are proposed as below.

Firstly, the statistics analysis of research on vocational education digital teaching materials from 2013 to 2023 revealed that the number of research papers in this sector has expanded fast over the last ten years. This reflects that under the rapid development of vocational education informatization, relevant research on digital educational resources has received extensive attention from researchers and become an important research field. However, this field's researchers are mostly vocational college instructors and few researches from corporations and other institutions. Vocational education has a strong industry and market orientation, and is closely related to industries and enterprises. Therefore, it is necessary to strengthen the research and cooperation between enterprises and researchers in the field of vocational education, and carry out relevant research on vocational education digital resources construction according to the needs of industries and enterprises. This will improve the appropriateness of resources and better meet the needs of vocational education talent cultivation.

Secondly, the research topics are extensive, and the systematic and in-depth research needs to be improved. The relevant research on digital educational resources for vocational education involves many aspects such as resource construction and application, sharing, and evaluation, and the research fields are relatively extensive. However, according to the statistics of the number of documents published by researchers, there are few researchers in this field who have published multiple papers, and most of them only published one paper. This shows to a certain extent that there lacks continuous and systematic research on digital educational resources for vocational education. What's more, some researches involve overlapping of different topics, such as resource construction and application research, resource construction and sharing research, etc., the systematic research for each individual topic need to be deepen and improved. Compared with higher education, vocational education has many types of majors, and the demand for talents is highly variable according to needs of various industries and markets. This feature makes the research on digital educational resources of vocational education more complicated. Therefore, in the future, systematic and in-depth research on digital educational resources for vocational education should be strengthened, theoretical research should be combined with practice, and practical exploration should focus on theoretical support and top-level design and planning.

Thirdly, the distribution of research topics is uneven, and research on some topics needs to be strengthened. Through the analysis of the 306 papers, it is found that although the research topics are diverse, the distribution of each research topic is uneven. The most studied topic is resource construction, while the research on resource evaluation and other aspects is far from enough, and the research on the perceptions of resource users, including teachers and students is still blank. With the acceleration of vocational education informatization, the research on digital resources for vocational education is moving from the initial stage of resource construction to the all-round resource informatization stage. Therefore, on the basis of improving the research on resource construction, research on the evaluation and management of vocational education digital resources should be strengthened. Therefore, future research should focus on the evaluation system of vocational education digital resources, with a purpose to ensure the quality and direction of resource construction.

V. IMPLICATIONS

The review summarized the conflicts existed in the digital resource construction. Therefore, in the future, the construction of digital learning resources for vocational education should pay attention to the advanced internet development achievement and the latest vocational education philosophy. The top-level design should be carried out, and the resources and needs of the relevant subjects should be integrated. In the process of constructing vocational education digital learning resources, new vocational education teaching concepts should be introduced, and a mixed platform based on authentic work condition should be established to provide students with a variety of interactive learning possibilities and supporting tools. Teachers should also have a deep understanding of the function, characteristics and usage conditions of digital educational resources, design higher-quality learning tasks and learning environments, and ultimately improve the quality of vocational education talent cultivation.

In addition, the construction of digital teaching and learning resources in the future should also highlight the characteristics of vocational education and balance the resource commonality and individualization during the resource construction. Because, compared with other types of education, the outstanding feature of vocational education is its complexity and diversity, which is mainly reflected in the variety of professional settings in vocational education, and the prominent regional and industry characteristics; even for the same major, the professional settings in different regions are different. The teaching content is also different. This diversity makes the construction of vocational education digital teaching and learning resources more complex: from the perspective of improving resource utilization and avoiding resource duplication and resource waste, resource construction should reflect the common characteristics of majors to a greater extent, and the resources should cover as much resource users as possible; and from the perspective of resource applicability and personalization, resource construction should be able to meet different teaching needs to a greater extent. Therefore, how to grasp the balance between the common characteristics and individual needs of resource construction is an important direction that should be paid attention to in the field of digital educational resource construction in the future.

REFERENCES

Cheng, B. F. (2022). Digital teaching resources in higher vocational colleges Research on Co-construction and Sharing Mechanism. *Practical Training & Practical Exploration,* (12), 81-86.

Euler, D. (2003). Virtuelles Lernen in Schule und Beruf-Konzepte und Erfahrungen aus deutscher Perspektive.

Huang, H. T. (2021). A case study on the teaching concept of teaching resource database design for higher vocational education. Beijing: *Beijing Normal University*, 28-31, 26-27,70,73.

Ji, G. Q., Chen, G. Q., & Qiu, Z. F. (2015). Talking about the construction of teaching resources informatization in higher vocational colleges. *Educational informatization in China: Higher Vocational Education*, (1), 48-51.

Li, X. W. & Mo, Y. W. (2017). The construction of professional teaching resource library: from high-quality sharing of resources to high-quality balance of higher vocational colleges——Based on the empirical analysis of "the construction of professional teaching resource library of vocational education". *Career Technical Education*, (19), 30-34.

Liu, H. Y. & Feng, J. D. (2022). Digital Teaching Resources Construction and Sharing of Enginnering Hydrology and Water Conservancy Calculation Course under the Background of “Double High Plan”. *Journal of Yangling Vovational & Technical College.* 21(1), 60-63.

Ministry of Education(MOE). Vocational College Digital Campus Construction Specifications [EB/OL]. http://www.moe.gov.cn/srcsite/A07/moe_967/s3054/201501/t20150119_189492.html,2015-11-06.

Pan, H. (2022). Research on the benefit evaluation of digital teaching resources in vocational education based on educational big data acquisition technology. *Jiangsu Science & Technology Information,* (24), 62-65.

Shi, L.R., Gao F., & Lu L.T. (2015). Value Analysis and Realization Strategy of Vocational Education Digital Campus Policy. *China Audio-Technology Education*, (8), 47-51.

Slavin, R. E., & Davis, N. (2006). Educational psychology: Theory and practice.

Tong, W. J. & Jiang, T. (2016). Research on the Construction of Teaching Resource Database Platform for Higher Vocational Education. *Chinese Higher Education Research*, (1), 107-110.

Wang, C. W., & Zong, C. (2018). Difficulties and countermeasures faced by the current professional teaching resource bank of higher vocational education. *Heilongjiang Higher Education Research*, (12), 118-121.

Wu, T. (2004). "Teaching Means and Media in Vocational Education" Network Course Design. *China Audio-visual Education*, (6), 72-74.

Xiao, F. X. & Deng, X. H. (2017). On the Transformation of the Informatization Development Mode of Vocational Education in my country. *Electronic Education Research*, 38(9), 35-40.

Xu, G. Q. (2015). Vocational Education Teaching Resource Database Development: Problems, Principles and Methods. *Journal of Taizhou Vocational and Technical College*, 15(2), 1-7.

Yang, M. & Wang, Y. W. (2014). Review of digital learning resources in China. *CHINA MEDICAL EDUCATION TECHNOLOGY.* 28(5) 445-473.

Ye, W. S., Xiong, F. Y. & Cao, J. L. (2015). Exploration of Vocational Education Teaching Resources Construction and Application Mode Based on "Cloud Application". *Vocational and Technical Education in China,* (14), 78-82.

Yu, S. Q. & Yang, X. M. (2007). Differentiating and analyzing "integrated ware", "learning objects" and "learning activities". *China Audio-Technology Education*, 12, 60-65.

Zhang, J. (2023). Research on Co-construction and Sharing Strategy of Teaching Resource Databases of Specialty Groups—A Case Study of Mechatronics Technology Specialty Groups Teaching Resource Databases Construction. *Industrial Technology & Vocational Education,* 21(1), 116-120.

Zhang, S. M. (2011). Research on Digital Educational Resource Sharing Ecosystem. *Fudan University Press.*

Zhao, J. (2017).Research on Construction of Shared Service Platform of Digitalized Teaching Resources of Vocational Education. *Journal of Tianjin Vocational Institutes,* 12(19), 17-22.

Zhao, Z. Q. & Huang, H. T. (2022). Research on the Construction of Digital Learning Resources in Vocational Education: Current Situation, Problems and Suggestions. *China Educational Informatization*, 28(8), 10-17.

Zhou, Y. & Li, Z. Q. (2016). Problems and countermeasures in the construction of professional teaching resource databases in higher vocational colleges. *Chinese Vocational and Technical Education*, (8).