Research on the Application and Management of Digital Teaching Resources in Guangdong Higher vocational Colleges

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Abstract. This paper focuses on the application and management of digital teaching resources in higher vocational colleges in Guangdong Province, and constructs an analysis framework of "policy coordination, technology empowerment and ecological symbiosis". Through the empirical investigation and typical case analysis of 12 colleges and universities, it is found that there are some problems in the current resource construction, such as serious heterogeneity, insufficient digital literacy of teachers, and unbalanced regional development. The research puts forward: to build a four-party linkage mechanism of "government, school, enterprise and action", and formulate the standard of resource co-construction and sharing; Micro-service architecture and blockchain technology are adopted to realize intelligent resource integration and copyright protection. Implement the "dual system" development mode, deepen the cooperation between schools and enterprises to educate people. The research provides a replicable practical path for the digital transformation of vocational education, and suggests strengthening institutional guarantee, optimizing technical support, deepening the integration of industry and education, and facilitating the high-quality development of vocational education in the Guangdong-Hong Kong-Macao Greater Bay Area.

Keywords: Guangdong higher vocational colleges; Digital teaching resources; Application and management; Integration of industry and education

1 Introduction

Driven by the Action Plan for Digital Transformation of Education in Guangdong Province (2023-2027), there is an urgent need for the application and management of digital teaching resources in higher vocational colleges. The development of educational technology provides technical support for resource application and management, but the practice shows that Guangdong higher vocational colleges are still facing bottlenecks such as low resource utilization rate and insufficient interdisciplinary coordination. According to the data of Guangdong Provincial Department of Education in 2022, the dispersion rate of digital resource platforms in higher vocational colleges reaches 68%, and the sharing rate of interdisciplinary resources is less than 25%. This paper aims to

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explore the application and management mode of digital teaching resources in accordance with the characteristics of Guangdong higher vocational colleges, and provide theoretical and practical basis for solving the problem of digital transformation.[1]

2 Current Situation of Application and Management of Digital Teaching Resources in Guangdong Higher Vocational Colleges

2.1 Progress of Resource Application and Management Practice

In recent years, Guangdong higher vocational colleges have actively explored the integration of digital teaching resources and achieved certain results. Guangdong Vocational and Technical College of Light Industry (hereinafter referred to as "Guanglight Vocational College") has built an "online platform for Light industry education", integrated enterprise resources, and formed a teaching mode of "one core, four dimensions and five interactions". The platform has introduced more than 50 enterprise projects, benefiting thousands of students and realizing seamless connection between classrooms and enterprise production sites. Students' learning data is recorded through the platform to provide data support for teaching decision-making, and students' learning effect is significantly improved. [2]

2.2 Analysis of Existing Problems

Guangdong higher vocational colleges have made some progress in the integration of digital teaching resources, but they still face challenges such as resource fragmentation, insufficient school-enterprise resource linkage, insufficient technology application, management system obstacles, technology and cost constraints, and contradiction between education equity and quality. Further exploration and practice are needed to improve the application and management level of digital teaching resources.

3 Challenges in the Application and Management of Digital Teaching Resources

3.1 Managing Institutional Barriers

In the digital transformation of some higher vocational colleges in Guangdong, due to the lack of unified top-level design, various departments are independent, and it is difficult to share and circulate resources. According to statistics, about 60% of universities have the situation of resource division of academic affairs office, scientific research department, library and other departments, and the repeated construction rate of resources is as high as 30%, which increases the construction cost and reduces the efficiency of resource utilization. The imperfect cross-department collaboration mechanism leads to poor communication and inconsistent interest demands in the process of

resource integration, resulting in slow progress of the project. For example, in the online course construction project, due to the poor cooperation among the academic affairs office, information technology center, teachers and other departments, there are often problems in the course design, technical support, teaching implementation and other links, and the course construction period is extended by 20% on average. In addition, there are institutional barriers to data sharing. Some universities are cautious about data sharing due to unclear data ownership and imperfect security and privacy protection systems, which leads to the blockage of data circulation and the failure to give full play to the value of scientific research data.

3.2 Technology and Cost Constraints

Technology and cost are another major factors restricting the integration of digital teaching resources in Guangdong higher vocational colleges. Some higher vocational colleges have old infrastructure, insufficient network bandwidth and low server performance, which are difficult to support large-scale resource integration and efficient data transmission. Especially in remote areas, the Internet speed is slow, and the interruption rate is as high as 25% when students watch online courses, seriously affecting the learning experience. At the same time, it is difficult to integrate resources, lack of unified technical standards and interface specifications, and poor compatibility between different platforms and systems, which makes teachers and students need to switch frequently when using multiple platforms, and the operation is complex and the time cost is high. In addition, resource integration requires a large amount of capital investment, including hardware equipment update, software system development, technical personnel training, etc. For higher vocational colleges with tight funds, it is difficult to bear the high cost, resulting in the slow process of resource integration. According to statistics, about 40% of private higher vocational colleges can only rely on free or low-cost resource platforms due to financial problems, but the quality and quantity of resources on these platforms often cannot meet the teaching needs. [3]

3.3 Education Equity and Quality Contradiction

The distribution of digital teaching resources among higher vocational colleges in Guangdong province is uneven. According to the survey, the number of online courses offered by colleges and universities in the Pearl River Delta region is three times that in northern Guangdong, and the quality of courses is significantly higher than that in other regions, aggravating the education gap between regions. In addition, some higher vocational colleges rely too much on commercial platforms and ignore the development of school-based characteristic resources, resulting in a lack of characteristics and innovativeness in teaching. Although a large number of business online courses have been introduced, these courses do not fully match the school's professional Settings and teaching objectives, and cannot meet students' personalized learning needs. At the same time, the school does not make full use of the professional advantages of teachers to develop characteristic resources, and it is difficult to improve the teaching quality.

4 Innovation Path of Digital Teaching Resources Application and Management Mode

4.1 Policy-driven Coordination Mechanism Optimization

In Guangdong higher vocational colleges, the policy-driven collaborative mechanism has become the key to promote the application and management of digital teaching resources. The establishment of the tripartite linkage platform among the government, universities and enterprises has effectively broken down the barriers and promoted the sharing and circulation of resources. According to statistics, more than 85 percent of Guangdong's higher vocational colleges have participated in the linkage platform , ensuring the fairness and sustainability of cooperation by clarifying the rights and obligations of all parties. [4]

The formulation of standardized resource co-construction and sharing agreement provides an important guarantee for resource integration. The agreement defines the construction standards, sharing methods and copyright ownership of resources, effectively avoiding disputes. For example, Guanglight Vocational Institute has cooperated with a number of enterprises and successfully established enterprise technology, equipment and other resource libraries by relying on the "Light Industry Education Online" platform, realizing the deep integration and efficient utilization of resources. Up to now, the resource library has covered more than 6,000 enterprise resources, benefiting more than 15,000 teachers and students.

4.2 Upgrade of Integration Strategy of Technology Empowerment

Technology empowerment is an important means to improve the efficiency of the application and management of digital teaching resources. Higher vocational colleges such as Guanglight Vocational College adopt micro-service architecture and containerization technology to build intelligent platform architecture, which significantly improves the flexibility and scalability of the system. Through the independent development and deployment of corresponding microservices, the personalized management and service of course resources are realized. According to statistics, adoption of the technology has improved platform responsiveness by 30% and user satisfaction by 20%.

4.3 Content Ecological Construction of Deep Integration Between Universities and Enterprises

The implementation of "dual system" resource development mode is an important measure to realize the deep integration of universities and enterprises. Guanglight Vocational College and other higher vocational colleges jointly participate in the curriculum design with enterprise engineers, and integrate the actual production needs and advanced technologies of enterprises into the curriculum content. Taking the "JavaWeb Development Foundation" course of Guanglight Vocational College as an example, this course is jointly developed by the enterprise software engineers and the teachers of the

school. The course content closely meets the actual project needs of the enterprise, and significantly improves the students' practical ability and problem-solving ability. According to statistics, students who participate in the program are nearly 30% more competitive in the job market and more than 95% more satisfied with businesses.

5 Impact and Prospect of Digital Resource Application and Management on Education

5.1 Reconstruction of Education Ecology

The integration of digital resources promotes the construction of a lifelong learning system, which integrates the digital learning resources of a number of higher vocational colleges, including Guangdong Polytechnic of Light Industry, and forms a learning resource base covering a wide range of disciplines. As of the latest data, more than 600,000 learners have registered in the "credit bank" and are free to choose courses to study, enabling cross-school resource certification and credit accumulation. This model breaks the resource barriers between universities, improves the autonomy and flexibility of learning, and promotes the formation of a learning society. Taking Guangdong Vocational and Technical College of Light Industry as an example, the school cooperations with other universities through the "credit bank", so that students can study and certify the high-quality courses of other universities, which greatly enriches the learning resources and improves the teaching quality. [5]

5.2 Future Trends

With the continuous progress of educational technology, the integration of digital teaching resources presents a dual trend of technology integration and policy improvement.

Convergence of technology. The application of AI generated content (AIGC) and digital twin technology will continue to deepen the personalization of resources. It is predicted that by 2025, more than 80% of Guangdong higher vocational colleges will use AIGC technology to provide students with customized learning content. At the same time, digital twin technology will build a realistic virtual learning environment to improve students' learning immersion and experience. For example, in the mechanical engineering major of Guangdong Polytechnic of Light Industry, an initial attempt has been made to create a virtual laboratory using digital twin technology, which is expected to improve the experimental teaching effect by more than 30%.

Policies have been improved. Data security and privacy protection regulations will further regulate resource sharing. With the expansion of resource sharing scope, data security and privacy protection are paid more and more attention. In the future, the government will introduce stricter regulations on data security and privacy protection, and clarify data use norms and security responsibilities in the process of resource sharing. Guangdong higher vocational colleges will actively respond to this policy orientation, strengthen data security protection, to ensure the personal information security of

students and teachers. According to incomplete statistics, more than 90% of Guangdong higher vocational colleges have established a sound data security and privacy protection mechanism. [6]

6 Conclusion

This study deeply explores the application and management of digital teaching resources in Guangdong higher vocational colleges, and puts forward an integration mode with "policy coordination, technology-driven, school-enterprise symbiosis" as the core. Through the tripartite linkage of government, universities and enterprises, standardized resource co-construction and sharing agreements have been formulated, which effectively promotes the collaborative co-construction and efficient utilization of resources. Using microservice architecture, containerization technology and blockchain technology, the technical level and management efficiency of resource integration are significantly improved. At the same time, the "dual system" resource development mode is implemented to realize the deep integration of schools and enterprises and enrich the content ecology of teaching resources.

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References

1. Qiu Yang. Research on the Construction, Sharing and Application of Digital Teaching Resources in Higher Vocational Colleges [J]. China Education Technology and Equipment.2024 (21).
2. Zhang Xiaopeng. Development and application of Digital Teaching Resources in Higher Vocational Colleges based on VR technology [J]. Modern Vocational Education.2024 (25)
3. Yang Yong. Thinking on the Development and application of Digital Teaching resources for Ideological and Political Courses in higher vocational Colleges [J]. Journal of Guizhou Open University.2024,32 (03).
4. Zhu H B. The application of three-dimensional digital teaching resources in the cultivation of students' innovation ability in higher vocational colleges [J]. Science, Technology and Innovation.2020 (18).
5. Yu Kun. Research on the Construction and Application of Digital Teaching Resource Library in Higher vocational Colleges [J]. Invention and Innovation (Vocational Education). 2020 (05).
6. Wang N. Research on the application of Digital Teaching Resources in Computer application Basic Courses in higher vocational Colleges [J]. Shaanxi Education (Higher Education). 2019 (11).

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