Professional Teaching Resource Library of Vocational Education in the Context of "Internet+"

Lei Duan, Xingshu Liu*, Mengmei Jiang, Zhiqing Zhu, Mingtao Xiao

Hunan Automotive Engineering Vocational College, Zhuzhou, 412001, China

*Corresponding author: Xingshu Liu,1263493303@qq.com

Abstract. Education informatization is the inevitable trend of education and teaching reform. The construction of teaching resource library for vocational education majors is an important embodiment of education informatization, and is also the natural requirement of "Internet+vocational education". The teaching resource library for vocational education majors is a vivid practice of information technology in the field of vocational education, an effective carrier of school enterprise cooperation in vocational education, leading the direction of vocational education teaching reform. In the construction process, it follows the principles of teaching demand orientation, diversity, continuous updating, open sharing, system integration, user experience, privacy and security protection. Taking the teaching resource library of Automotive Intelligent Technology Major as an example for practical case analysis, in order to provide theoretical guidance and practical reference for the construction of the resource library.

Keywords: "Internet+vocational education"; Teaching resource library for vocational education majors; Automotive Intelligent Technology Major.

1 Introduction

In the era of "Internet+vocational education", the joint construction of a shared professional teaching resource library for vocational education (resource library for short) has entered people's vision. After more than 10 years of efforts, vocational colleges across the country have accumulated valuable experience and effectively promoted the reform and development of vocational education. The research on resource pool is a relatively broad topic, involving the Internet, informatization, professional construction, education and teaching, institutional mechanisms and other aspects. Many scholars have studied from the three elements of resource pool resources platform mechanism, the overall construction and application of resource pool, and the development and evaluation of resource pool. For example, Huang Huiting, Zhuang Rongxia, Zhao Zhiqun discussed the collaborative relationship between the three elements of resources, platform, and mechanism. Resources are the first element of resource library construction, with granular characteristics, reflecting the principle of layered development of integrated components, modules, and courses. The platform is the bridge of resource library application, with personalized and intelligent features, supporting large-scale users to be online

Y. Feng et al. (eds.), *Proceedings of the 4th International Conference on Internet, Education and Information Technology (IEIT 2024)*, Atlantis Highlights in Social Sciences, Education and Humanities 26,
https://doi.org/10.2991/978-94-6463-574-4_50

without traffic congestion and intelligent push of resources, as well as various teaching modes and learning situation analysis. The mechanism is the driving force for the operation of the resource library, with open and efficient characteristics, ensuring resource standardization and learning achievement authentication, and various user grading management[1]. E Scanlon, P Mcandrew, T O'Shea concluded through practice that the value of an online shared learning platform is evaluated by enabling students to complete moderately difficult tasks. Based on student feedback, the conclusion is drawn that open and shared self-learning resources enhance students' learning abilities and interests[2]. Some developed countries abroad have established comprehensive teaching resource libraries in the field of vocational education, such as the O*NET (Occupational Information Network) and DEWITT (Database of European Work Integrated Time Tables) in the United States. These resource libraries contain a large amount of teaching resources to help teachers and students better carry out teaching activities and learning[3]. The research on resource libraries in China is gradually increasing, and some universities and research institutions are beginning to establish and explore the construction and application of resource libraries. Some studies focus on the construction mode, content organization, technical support, and other aspects of resource libraries, providing theoretical and practical support for the construction of resource libraries[4].

2 The Value and Connotation of the Resource Library

2.1 Resource Library is a Vivid Practice of Information Technology in the Field of Vocational Education

Promoting the deep integration of information technology and vocational education, and cultivating high-end technical and skilled talents in the era of artificial intelligence and "Internet+" are the inevitable requirements of the major reform of vocational education to promote economic and social development. In 2012, the Ministry of Education issued the "Opinions on Accelerating the Informatization Development of Vocational Education", which clearly stated "to comprehensively strengthen the ability of information technology to support the reform and development of vocational education, transform traditional education and teaching with advanced educational technology, and promote the modernization of vocational education with informatization". The resource library is to meet the needs of the era of "information technology+majors", closely integrate the construction of vocational education majors with information technology, promote the reform of information education and teaching, and improve the overall level of majors. At present, the resource library has constructed over 1000 standardized courses, with nearly 3 million resources, and created a batch of information resources for video, animation, and virtual simulation, visualizing the concept of abstract micro black boxes. Through information technology, we have effectively solved internship and training difficulties such as "unable to enter", "invisible", "unable to move", and "difficult to reproduce", effectively promoting the comprehensive application of information technology in vocational education and training.

2.2 Resource Library is an Effective Carrier for Vocational Education School Enterprise Cooperation

The characteristic of vocational education lies in adhering to the integration of industry and education, and school enterprise cooperation. The inevitable path for the development of vocational education is the combination of engineering and learning, and the integration of knowledge and action. The resource library has built a platform for school enterprise cooperation, playing an indispensable role in both the construction of "dual teacher" teaching teams and the cultivation and training of students and enterprise employees on campus. At present, more than 100 industry organizations and over 3000 enterprises have jointly allocated resources through resource library construction, leveraging the advantages of industry enterprises and vocational colleges, forming and continuously expanding joint construction and sharing alliances, and deeply participating in vocational college talent cultivation, technological innovation, employment and entrepreneurship, social services, and cultural inheritance. On the one hand, enterprises bring skill masters and production practices into the resource library. On the other hand, the resource library is widely used in the training and assessment of industry enterprises, achieving the co construction and sharing of high-quality resources between schools and enterprises, providing substantial support for the continuous deepening of vocational education school enterprise cooperation.

2.3 Resource Library Leads the Direction of Vocational Education Reform

Reforming educational concepts, deepening changes in teaching methods and learning methods, and enhancing the level of teaching informatization are the basic requirements for resource library construction. With the popularization of information technology applications, the protagonist of the classroom is gradually transforming from a teacher to a student, and teachers become learning designers and assistants. The main identity of students in independent learning is gradually emerging, and vocational colleges have entered a stage of integrating teaching and management models for innovation. The construction and application of resource libraries have played a catalytic role. From the resource pool submitted and approved in recent years, it can be seen that the joint construction units have continuously changed their traditional education and teaching concepts and management systems. They have achieved significant results in revising professional talent training programs, adjusting curriculum systems, optimizing digital resources, evaluating classroom teaching and teacher assessment and management[5].

3 Principles for Constructing the Resource Library

The resource library follows the basic principles of "demand driven, application oriented, and service oriented", and follows the construction logic of "integrated design, structured courses, granular resources, and multi scenario applications". "Integrated design" refers to the construction of a resource library that targets specialties and corresponding industries, focuses on the training goals of professional talents, coordinates resource construction, platform design, and co construction and sharing mechanisms,

and forms the top-level design of the overall system; "Structured courses" refer to standardized courses in the resource library that should be included in professional talent training programs, covering core courses and basic courses, to meet the needs of blended online and offline teaching; "Granulated resources" refer to the minimum unit of resources in the library that must be independent knowledge and skills points or complete media materials, making it easy for users to learn and organize courses; "Multi scenario application" refers to the introduction of new technologies such as learning assistants and digital teachers into the resource library, establishing diverse application scenarios to meet the diverse learning needs of different groups of users[6].Figure 1 shows the teaching and learning process diagram of the resource library.

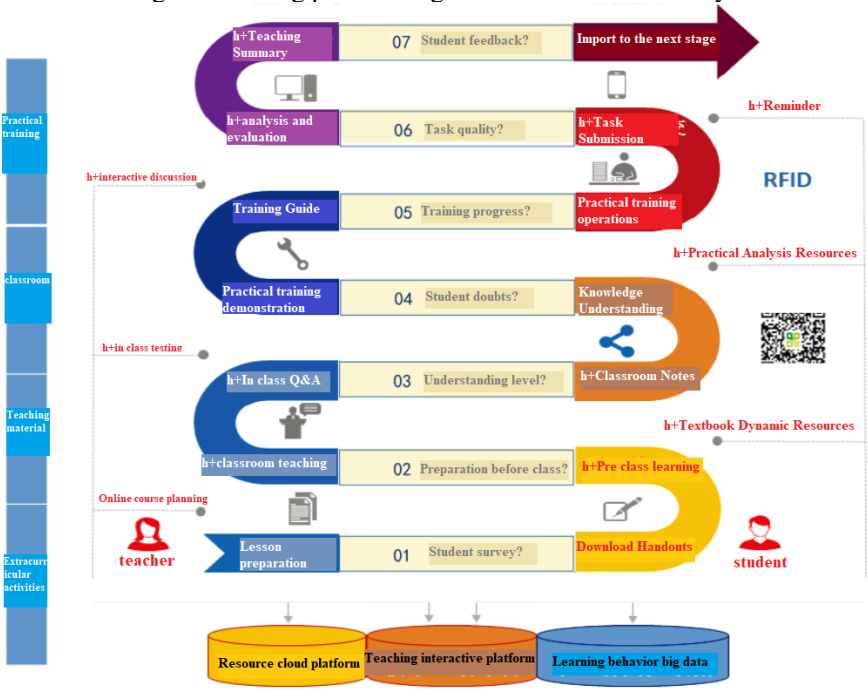

Fig. 1. The teaching and learning process diagram of the resource library

Teaching demand orientation: The construction of resource libraries should be centered around meeting the teaching needs of teachers and students, ensuring that the content in the resource library has practical support and guidance for teaching practice.

The principle of diversity: The resources in the resource library should be diverse, including course materials, teaching cases, teaching videos, practical training materials, and other forms, to meet the needs of different teaching scenarios and learning methods.

The principle of continuous updating: The content of the resource library should be kept updated, timely reflecting the latest developments and changes in the field of vocational education, and ensuring the timeliness and accuracy of resources.

The principle of open sharing: The resource library should support the open sharing of resources, promote resource exchange and cooperation between teachers and students, and achieve the co construction and sharing of resources.

System integration principle: The resource library should have systematicity and integration, and resources should be organically combined to form an organic teaching resource system, providing one-stop teaching support services.

User experience principle: The use of the resource library should be simple and convenient, with a user-friendly interface that can meet the personalized needs of users and improve their user experience and satisfaction.

Privacy and security protection principles: Resource libraries should strictly protect the privacy and information security of users, ensuring that the personal information of teachers and students is not leaked or infringed upon[7].

4 Typical Practice of Building the Resource Library

Taking the construction of a teaching resource library for Automotive Intelligent Technology Major as an example. The resource library was officially approved in November 2019 and passed acceptance in December 2022. As of now, the number of users in the resource library has reached over 22000, and more than 14800 material resources have been created. A total of 18 standardized courses, 6 training courses, 2 innovation and entrepreneurship courses, and 4 characteristic windows have been constructed[8].

4.1 Covering the Entire Industry Chain, Adapting to Industry Development Needs, and Designing an Integrated Overall Framework

Automotive intelligent technology is the integration of automotive technology, electronic technology, information technology, communication technology, artificial intelligence technology, and automatic control technology[9]. It has a long industrial chain, a wide range of technological fields, and rapid development. The resource library for Automotive Intelligent Technology Major must have a scientific logical structure, covering various fields and links in the industry chain, in order to meet the needs of different colleges and similar majors, as well as different majors in similar colleges and universities. Therefore, based on the needs of various links in the industrial chain, this resource library builds standardized and characteristic courses according to the logic of "materials integrables modules courses", and carries out teaching, training, and continuing education. In response to the needs of industrial development, four information windows are set up, including professional parks, technical services, innovation and entrepreneurship, and 1+X certification, to obtain new technologies and information and provide guarantees for continuously updating resource content. In summary, the overall framework of the resource library is "3+1+4" (3 application centers, 1 resource material center, and 4 information windows). Website: https://www.hnqczy.com/qczn/.

4.2 Deconstruct Work Tasks, Draw a Knowledge and Skills Map, and Develop Granular Resources Through "Construction According to the Map"

Relying on the National Committee for New Energy and Intelligent Connected Vehicles and the Joint Building and Sharing Alliance of Automotive Intelligent Technology Resources, we will connect with representative enterprises in the industry chain, conduct research and development on automotive intelligent product assistants, trial production, intelligent vehicle system application development, intelligent connected vehicle assembly and debugging, after-sales service and other typical positions[10]. Following the concept of "deconstruction work, reconstruction learning", we will "deconstruct" work tasks, obtain the knowledge and skills required to complete the work tasks, draw "knowledge and skills maps", and develop various types of materials such as graphics, videos, animations, VR/AR, etc. "according to the map construction" to meet the requirements of complete individual structures and ensure arbitrary open restructuring in different and loose teaching environments and content.

4.3 Refactoring Learning Tasks, Selecting Resources According to the Diagram, And Building Structured Courses

Customize diverse learning plans such as "O20 hybrid", "flipped classroom", "collaborative assistance", and "virtual real combination" for different teachers, students, enterprise users, and social learners, "reconstruct" learning tasks, select knowledge and skill points from the "knowledge and skill map" points, leverage the platform's flexible reference resources, build and reorganize integrated components, modules, courses, and other functions, "follow the map" to select resource materials, build "standardized courses" or "personalized courses", and achieve personalized learning and teaching[11].

4.4 Optimizing Management Mechanisms, Strengthening Performance Evaluation, and Promoting Sustainable Development of Resource Libraries

It must further optimize management mechanisms, prioritize user experience, explore authentication and mutual recognition mechanisms, continuously improve resource and service quality, and maximize the effectiveness of resource libraries; Strengthening performance evaluation, promoting co construction and sharing, dynamic updates, and promoting the sustainable development of resource libraries[12].

5 Conclusions

The resource library is a demonstration project of comprehensive reform of vocational education and a vivid practice of "Internet+vocational education" in the field of vocational education. However, the resource library still faces some practical challenges,

mainly including low resource quality, insufficient technical support, data security and privacy protection, continuous updating and development, etc. The following corresponding measures can be taken: (1) Establish a strict review mechanism to ensure the quality and effectiveness of resources, encourage teachers to share high-quality resources, provide incentive mechanisms, and solve the problem of low resource quality. (2) Strengthen the construction of the technical team for the resource library, enhance technical support capabilities, introduce advanced technological means to improve the intelligence and user experience of the resource library, and thus solve the problem of insufficient technical support. (3) Strengthen data security management, use encryption technology to protect data security, establish a sound privacy protection mechanism, legally and compliantly manage and use data, thereby solving the problems of data security and privacy protection. (4) Establish a mechanism for updating the resource library, regularly review and update resources, provide training and guidance, motivate teachers and students to actively participate in the construction and updating of the resource library, and thus solve the problem of continuous updating and development.

References

1. Huang Huiting, Zhuang Rongxia, Zhao Zhiqun.Analysis of teaching philosophy in the design of vocational education professional teaching resource library [J] Chinese Higher Education Research, 2023, (09): 102-108.
2. E Scanlon, P Mcandrew, T O'Shea. Designing for Educational Technology to Enhance the Experience of Learners in Distance Education: How Open Education Resources, Learning Design and MOOCs Are Influencing Learning[J].Journal of Interactive Media in Education,2022(1):9.
3. EA Mcdowell. Using Open Educational Resources To Help Students Understand The Sub-Prime Lending Crisis[J].American Journal of Business Education,2023:12-20.
4. Zhang Qiming, Li Xiaoqiu, Li Li, etc. Strategies for Improving, Transforming, and Upgrading the Teaching Resource Library of Vocational Education Majors [J] China Vocational and Technical Education, 2021, (17): 25-30.
5. Fang Canlin, Zhang Qiming Resource library: the construction foundation, requirements, and representation of high-level professional groups [J] Modern Education Management, 2019, (08): 71-75.
6. Xu Jian. The Digital Development Process of Vocational Education in Germany and Its Inspiration [J] China Vocational and Technical Education, 2021, (09): 53-61.
7. Zhu Chunli. The significance, value, and path of constructing a teaching resource library for vocational education majors Vocational Education Forum, 2020, 36 (10): 58-62.
8. Zhao Zhifeng, Le Shiting. Construction and optimization of the ideological and political system for the teaching resource library course of railway logistics management major [J]. Journal of Wuhan Metallurgical Management Cadre College, 2023, 33 (04): 61-65.
9. Su Yi. Research on the Current Situation and Development Path of the Construction of High Level Professional Teaching Resource Libraries in Vocational Education - Based on 140 Effective Samples of National Professional Teaching Resource Libraries [J]. Journal of Jiujiang Vocational and Technical College, 2023, (04): 20-26.
10. Zhang Huan, Wu Xianan. Research on the effectiveness evaluation of the application of exhibition professional teaching resource library from the user's perspective [J]. Business Exhibition Economy, 2023, (22): 152-155.

11. Lu Wei, Liu Jing, Chen Zedong, etc. Research on the Construction Strategy and Path of Vocational Education Professional Teaching Resource Library: Taking the National Modern Pet Technology Teaching Resource Library as an Example [J]. Chinese Journal of Multimedia and Online Teaching (Mid October), 2023, (11): 9-12.
12. Yao Lijuan. Design and Application of Professional Teaching Resource Database in Vocational Colleges [J] .Heilongjiang Science, 2023, 14 (19): 127-129.