Creating and Utilizing a Teaching Resource Repository for Digital Media Technology Courses in the Digitalized Era

Qi Xing

602977670@qq.com

Weifang Engineering Vocational College, Weifang,Shandong,262500,China

Abstract. In the context of digitalization, constructing a networked, intelligent, and personalized teaching resource framework to optimize resources in the digital environment is an urgent issue to be addressed. Based on this theoretical framework, this study designs and implements a teaching resource repository for digital media professional courses. Regarding the construction of the resource platform, a cloud server with B/S architecture is chosen to achieve economical and efficient resource deployment; the design of functional modules conforms to standard specifications, ensuring scalability. Metadata is organized to facilitate resource organization and management. In the resource application stage, evaluation criteria are designed from the dimensions of learning process and outcomes, and various methods such as questionnaire surveys are employed for effectiveness evaluation. The results indicate that the resource repository can basically meet the needs of teachers and students. This study provides valuable reference for the construction of teaching resources in other professional courses and offers suggestions for further optimizing the content and functionality of the repository.

Keywords: digitalized era; teaching resource repository; digital media technology professional

1 Introduction

Currently, the wave of digitalization is profoundly transforming education, and the construction and application of teaching resources urgently need to keep pace with the times. However, many resources are still at the "informatization" stage, such as PDF documents, without realizing networked sharing, unable to be allocated according to personalized needs, and difficult to adapt to the digital environment. Therefore, constructing a new type of teaching resource framework oriented towards digitalization to achieve intelligent resource construction and services is the driving force of this research. Based on previous research, this paper clarifies the framework requirements in three dimensions: networked, intelligent, and personalized, designs and implements a teaching resource repository for digital media professional courses, and evaluates its application effects from multiple dimensions, providing valuable experience for subsequent resource construction. Of course, digitalization is still evolving, and resource construction needs to keep pace with the times to generate greater value. It is expected that this research will provide inspiration and reference for the development of teaching resource construction.

EIMT 2024, March 29-31, Wuhan, People's Republic of China

DOI 10.4108/eai.29-3-2024.2347700

2 Research on a Digitalized Teaching Resource Framework

2.1 Networked Framework

The networked framework is an important aspect of digitalized teaching resource construction. Networking can break the geographical restrictions of resources and realize remote access to resources. Establishing an open educational resource repository based on the network can fully utilize the high-quality resources of various universities, making them open to society and the public, thereby greatly expanding the scope of resource utilization. For example, Tsinghua University's "XuetangX" platform has opened tens of thousands of video open courses, with a total viewing count exceeding 1.3 billion, which has played a positive role in improving educational quality. At the same time, the development of mobile networks provides strong support for the networking of teaching resources[1]. According to data released by the China Internet Network Information Center, as of June 2019, China's internet users reached 854 million, and mobile internet users reached 817 million. The popularization of mobile networks facilitates teachers and students to access teaching resources through mobile terminals. Teachers can use their spare time to access the required teaching resources through mobile apps, and students can also log in to the app to study resources at any time. This greatly reduces the restrictions on accessing teaching resources, making the application of networked resources more convenient and efficient(See Figure 1).

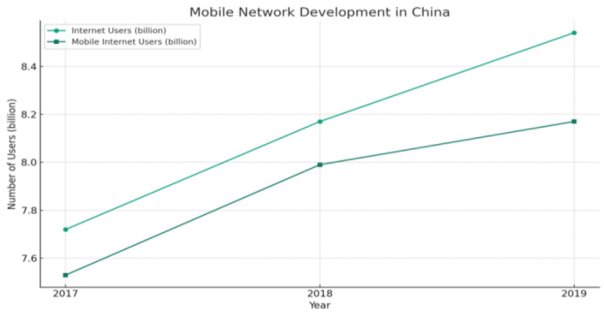

Figure 1: Development Status of Mobile Networks in China

2.2 Intelligent Framework

Intelligentization is the development trend of teaching resource framework construction. Building an intelligent teaching resource platform based on artificial intelligence technology can realize functions such as personalized recommendations and automatic generation. Students can receive intelligently matched learning suggestions, and the system can automatically evaluate learning outcomes. Meanwhile, the application of technologies such as speech recognition and affective computing enables a more humanized interaction between the teaching resource system and users. Taking Tencent Classroom as an example, its AI teacher product integrates knowledge graphs, semantic matching, and emotion recognition algorithms, enabling the automatic design of teaching plans and providing answers to questions, truly achieving "one-on-one" teaching and gaining widespread recognition from students. Constructing a resource repository using intelligent technology can alleviate teachers'

repetitive tasks, provide personalized services, and enhance learning experiences and outcomes[2]. As shown in Figure 2.

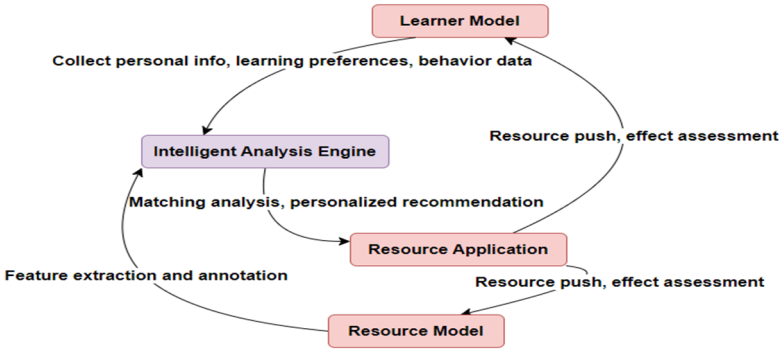

Figure 2: Schematic Diagram of Intelligent Teaching Resource Framework

2.3 Personalized Framework

The personalized framework emphasizes configuring teaching resources based on the characteristics and needs of each learner. Unlike uniform teaching resources, personalized resources can provide customized services for students with different learning styles and cognitive levels. For example, visual learners tend to prefer video learning resources, while conceptual learners are suitable for textual resources. The resource system collects student data to establish learner models, thereby achieving personalized resource recommendations and services. According to a survey by the Chinese Academy of Educational Sciences, suitable learning resources can increase students' interest in learning by 81% and enhance their initiative in learning by 76%. The construction of a personalized resource framework is of great significance for stimulating students' learning motivation and improving their self-directed learning abilities[3]. Currently, personalized learning has become one of the important approaches in teaching resource construction.

3 Design and Implementation of the Resource Repository

3.1 Platform Selection

The selection of the platform for the teaching resource repository directly affects the construction effectiveness and needs to consider multiple factors. Through comparative analysis, this study chooses a B/S architecture platform based on the web. The advantages of the B/S architecture are obvious: 1) cross-platform, resources can be fully deployed on the server, and students can access them using ordinary browsers without the need to install special clients; 2) simple development and upgrade, only need to upgrade the server-side; 3) good scalability, able to easily cope with the growth of access volume. Choosing a platform with mature commercial-grade development frameworks. For example, the Java EE platform based on Spring and SpringMVC has complete security mechanisms, transaction support, and other features, which can rapidly and efficiently develop resource platforms. The technical framework is the cornerstone of ensuring platform reliability[4]. Finally, cloud servers can

provide flexible deployment services to achieve dynamic resource expansion and reduce construction costs. In summary, a B/S architecture cloud platform is an ideal choice for the construction of digital teaching resource repositories.

3.2 Functional Module Design

The teaching resource platform mainly includes user management, resource management, webpage management, system management, and other modules. The relationships between modules are shown in Figure 3.

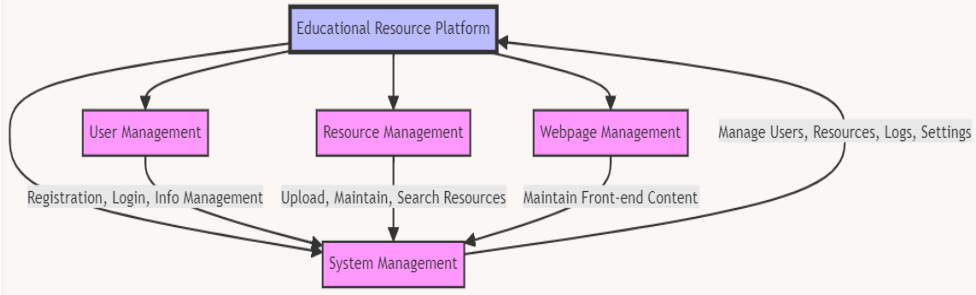

Figure 3: Functional Structure Diagram of the Teaching Resource Platform

The main functions of each module are as follows:1)User Management: Implement functions such as user registration, login, and information management.2)Resource Management: Upload and maintain resource information, support resource retrieval.3)Webpage Management: Maintain the content of the system's front-end pages.4)System Management: Manage users, resources, access logs, system configuration, etc.Reasonable function design is the foundation of the platform. Each module is relatively independent but interconnected, collectively supporting the construction and operation of the resource system[5].

3.3 Resource Collection and Organization

Resource collection adopts a combination of active exploration and user submission. On one hand, relevant resources are actively collected from various high-quality course websites. On the other hand, an open submission portal is provided to encourage users to contribute resources. The collected resources are reviewed, filtered, and copyright processed, then classified, stored, and metadata generated to facilitate user search and retrieval[6]. The resource organization classification system is illustrated in Table 1.

Table 1: Schematic Representation of Resource Classification System

Primary Category	Secondary Category	Tertiary Category
Documentary Materials	Courseware	PowerPoint Slides, Word Documents
	Exam Papers	Past Exam Questions, Practice Papers
Video Materials	Theoretical Courses	Public Lectures, Teaching Videos
	Practical Skills	Laboratory Operations, Project Productions

The systematic organization of resources directly impacts their searchability and forms the foundation for resource sharing. Careful construction of resource metadata is key to achieving intelligent management and service of resources[7].

4 Resource Application Effect Evaluation

4.1 Evaluation Index System

Establishing a scientific evaluation index system is the basis for evaluating the effectiveness of teaching resource application. This study comprehensively considers two dimensions: the learning process and learning outcomes, and designs an evaluation index system as shown in Table 2:

Table 2: Evaluation Index System for the Effectiveness of Teaching Resource Application

dimensionality	index	Instructions
Learning process	Page view	Reflects resource usage
	Online time	Reflect student engagement
	Operational activity	Student interaction behavior statistics
Learning outcome	Student satisfaction	Quality evaluation of learning experience
	Professional evaluation	Check students' grasp of the situation
	Graduation way	Employment quality as effect feedback

The indices cover various aspects of resource application, enabling a comprehensive evaluation of the effectiveness of teaching resources. This provides a basis for subsequent effectiveness assessments.

4.2 Evaluation Methods

This study employs various methods such as questionnaire surveys and testing to evaluate the effectiveness of teaching resource application:1)Questionnaire Method: Satisfaction questionnaires are designed, and students' user experience is examined through quantitative scoring.2)Access Log Analysis Method: Statistical analysis of platform access data to evaluate resource usage.3)Professional Assessment: Theoretical or practical tests are conducted to assess students' mastery of knowledge and skills.4)Graduate Employment Tracking: The final effectiveness of resource application is judged based on the employment quality of graduates.Using diverse methods allows for comprehensive data collection to assess resource effectiveness, conducting evaluation analysis through a combination of quantitative and qualitative approaches[8].

4.3 Evaluation Example

Taking the digital media major as an example, a questionnaire survey was conducted to evaluate the effectiveness of resource application, as shown in Table 3.

Table 3: Survey of the Effectiveness of Digital Media Major Resource Repository Application

Content	Very Satisfied	Satisfied	Average	Dissatisfied
Resource richness	80	15	3	2
Resource targeting	60	30	8	2
Operational ease	70	20	5	5

The survey reflects a high overall satisfaction rate among students regarding the resources, with over 95% of students indicating satisfaction or high satisfaction. However, approximately 5% of students still reported issues with the operation. This indicates that while the resource platform is successful in meeting the needs of the majority of learners, continuous improvement is needed to enhance the quality of resources[9-10].

5 Conclusion

The digital wave presents new requirements for education, with the networking, intelligence, and personalization of teaching resources being inevitable trends. This study, based on an analysis of the impact of digitization on resource construction, proposes a technological framework oriented towards networking, intelligence, and personalization. Guided by this framework, a teaching resource repository for digital media technology courses has been designed and implemented. The resource platform adopts a B/S architecture, realizing the rational design of functional modules; the collection and organization of resources reflect the importance of metadata construction. In the resource application stage, a scientific evaluation index system has been established, and various methods have been employed to evaluate the effectiveness of resources. The results indicate that the resource repository can basically meet the needs of teachers and students, achieving the expected goals. This study provides valuable reference for the construction of teaching resources in other professional courses. However, digitization is an ongoing process, and resource construction needs continuous improvement and iteration to adapt to changes in technology and demand. We look forward to the production of more high-quality resources to provide strong support for teaching practice.

References

[1] Duan L B .The Design of Ideological and Political Classroom Teaching Resource Sharing System Based on Streaming Media Technology[C]//2020 IEEE International Conference on Industrial Application of Artificial Intelligence (IAAI).IEEE, 2020.DOI:10.1109/IAAI51705.2020.9332906.

[2] Liu H .How to Use Information Technology to Build a Digital Media Art Teaching Resource Library[J]. 2022.DOI:10.1007/978-981-16-7469-3_74.

[3] Kim S .Disasters and pains represented by mass media and art media in the digital platform era: construction of reality and virtuality[J].Journal of Digital Art Engineering and Multimedia, 2021.DOI:10.29056/jdaem.2021.12.08.

[4] Nayan S , Shafie L A , Chulan M ,et al.Graduate Employability and Digital Entrepreneurship in the Era of IR 4.0[J]. 2021.DOI:10.24191/ji.v16i1.376.

[5] Soman K K , Srinivasan P , Prasad A ,et al.Teaching Through Digital Media: Acceptance and use of Technology Among the High School Teachers for Inclusive Education in Kerala During the Covid-19 Pandemic[J].Indian Journal Of Science And Technology, 2023.DOI:10.17485/ijst/v16i8.2007.

[6] Burgess T , Williams A P .Utilizing theory to elucidate the work of creating equity for transformation within the science classroom[J].Science education, 2022.DOI:10.1002/sce.21721.

[7] Qian J .Research on Artificial Intelligence Technology of Virtual Reality Teaching Method in Digital Media Art Creation[J].Journal of Internet Technology, 2022(1):23.

[8] Adams M , Rodriguez S C ,K. Ramírez.Creating a digital culture of care: COVID-19 and digital teaching[J].Cogent Education, 2023, 10.DOI:10.1080/2331186X.2023.2208941.
[9] Nwaogwugwu J C , Isara A R .Utilization of Digital Media for Sexual and Reproductive Health Information among In-School Adolescents in Benin City, Nigeria[J].West African journal of medicine, 2022, 39(9):949-957.
[10] Ajeesh A K , Rukmini S .Integrating hyperreal literature with CALL in English language curriculum for engineering studies in India: an empirical study of the impact on students' learning[J].World journal of engineering, 2022(2):19.DOI:10.1108/WJE-07-2021-0393.