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Rational Planning of Educational Resources Based on Big Data Fusion

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ABSTRACT

The education system in China's education industry has been undergoing continuous reform. The current educational resources integration and sharing system is inefficient and needs a lot of time to find resources, which greatly affects the efficiency of education. The integration and sharing of educational resources have become unavoidable problems in teaching. In order to solve this problem, this paper takes the rational planning of educational resources as the research object, analyzes the problems faced by the integration and sharing of educational resources, discusses the main direction of the integration and sharing of educational resources, designs the integration and sharing system of educational resources based on big data fusion, compares it with the traditional ant colony algorithm and cloud computing teaching resources integration and sharing system, and analyzes the performance and efficiency of this system. The educational resources integration and sharing system designed in this paper is closer to the ideal value and has stronger integration and sharing ability.

KEYWORDS

Big Data Technology, Educational Resources, Integration and Sharing Efficiency, Integration and Sharing System

INTRODUCTION

Educational resources, especially teaching materials, serve as a basic (but valuable) tool for personnel training. In addition, they are the foundation for formulating a teaching syllabus and training objectives (Zhao & Li, 2022). With the development of science and technology, educational resources have evolved from traditional, paper-based formats to CD-ROMs to digital tools.

However, educational resources under new media are no longer simply digitized. Redesigned resources make use of video, images, and other multimedia technologies to connect knowledge points. For instance, short micro-lectures are convenient for teaching and conducive to understanding (Jia, 2021). As the level of informatization continues to improve, the way we learn will also change.

Big data plays a key role in linking online technologies, profoundly impacting all walks of life (Qi & Tao, 2018). Emerging networks represented by mobile devices will continue to drive teaching modes and methods, creating an even more digital and networked resource with integration and three-dimensional capabilities. Big data can connect educational resources and promote the deep integration of information technology, education, and teaching (Long, 2020). The integration and

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sharing of vast, complex educational resources have, therefore, become an important research topic in the current education industry.

Research results have been obtained on the rational planning of educational resources under the integration of big data (Wang, 2017). Researchers have studied the integration and sharing of educational resources based on two-dimensional (2D) code technology, applying it to the integration and sharing of remote digital educational resources. They fully consider the context of educational resources, combining the 2D code icon and 2D code before placing it in the appropriate location within the manuscript.

Other researchers have studied the application of QR codes to an experimental education resource management system. This satisfies students' independent learning after class, solves the inconvenience of obtaining educational resources for teachers and students, and meets the daily management of laboratories (Cui et al., 2023). Teachers and students can scan QR codes to view animations and videos or link to online massive online open courses (MOOCs) and colleges' learning platforms to share digital resources (Chen et al., 2020). Thus, learning can be achieved at any time and any place.

Researchers have also proposed the use of artificial intelligence (AI) convolutional neural network technology to integrate shared educational resources. Device programs can be developed through convolutional neural networks. Then, teachers and students can use the program to obtain important resources during the learning process. They can be used to optimize the design of the convolutional neural network education resource integration and sharing methods, improve the model or test it in teaching activities, and carry out evaluations through questionnaires or interviews. Convolutional neural network device recognition programs in learning greatly improves learning efficiency. At the same time, the recognition program aligns with the needs of learning personnel, enabling direct access to educational resources and direct dialogue.

Some researchers have proposed changes in ideological and political educational resources under the background of big data (Rathore et al., 2016). They have analyzed the impact of the era of big data on the development of educational resources, combined with problems in the ideological and political education classrooms of public undergraduate colleges. Research has found that big data improves existing problems, puts forward innovative ideas for the integration and sharing of educational resources in the ideological and political education classrooms of public undergraduate colleges, and streamlines the integration and sharing of ideological and political educational resources (Shi et al., 2019). Some scholars have employed the integration and sharing program of the education resource platform for university martial arts and traditional sports majors via several technical methods (e.g., summary method, typical case study method, and logic analysis method). The corresponding optimization measures improve the quality and efficiency of the integration and sharing of educational resource platforms. In addition, they provide theoretical guidance for the integration and sharing of educational resources.

Other researchers designed a computer course educational resources integration and sharing system based on big data technology. They found that current university educational resources integration and sharing systems allot significant time to finding resources. The system, including collector and memory hardware, undertakes the creation, management, and maintenance of educational resources through optimization design. Via big data adaptive features, the system extracts computer course educational resources and uses adaptive integration or sharing generalization for analysis. The designed university educational resources integration and sharing system effectively integrates and distributes university educational resources, which improves the retrieval efficiency of users.

Currently, the existing educational resource integration and sharing system's low operating efficiency impedes educational efficiency. On the one hand, ordinary colleges and universities are short of high-quality educational resources due to low investments in educational funds. On the other hand, colleges and universities rebuild the same educational resources. Their low utilization rate, in turn, results in a shortage and waste of educational resources. In addition, colleges and universities

in different provinces differ in terms of funds, teachers, teaching conditions, and scientific research level. This leads to greater differences in their educational resources (Zhang, 2018).

The integration and sharing of educational resources have become an important and inevitable barrier to teaching (Zhou, 2022). Thus, the current article uses the integration and sharing of educational resources as its research object. It analyzes problems faced by the integration and sharing of educational resources, discusses the main direction of the integration and sharing of educational resources, designs an integrated and sharing system of educational resources based on big data fusion, and analyzes the selected educational resources. Finally, it provides theoretical data support for the rational planning of educational resources.

MATERIALS AND METHODS

Composition of Educational Resources

In the big data environment, teachers face challenges related to extracting useful tools from complex educational resources. Only by understanding the connotation of the integration and sharing of educational resources and analyzing the composition of educational resources can we achieve effective resource integration, sharing, and screening. Table 1 shows the composition of the core elements of educational resources, which can be divided into three major categories and 15 subcategories. Educational resources mainly include project resources, curriculum resources, and information resources. Table 2 provides the specific content within the resources.

Educational resources in the big data environment are complicated, presenting difficulties in the integration and sharing of educational resources. The number and variety of educational resources vary and involve many disciplines, fields, and levels. In addition, there are various providers and users of the resources. Therefore, the sharing and integration of educational resources must be addressed to solve problems related to inconsistent data formatting, accuracy of quotations, and copyright. However, this is a difficult task. At the same time, due to the particularity of educational resources, it is necessary to consider teaching applicability, knowledge structure, and teaching objectives.

The goal of the integration and sharing of educational resources is to achieve teachers' tasks and operability. In the era of big data, information spreads rapidly. Vast amounts of information are accessed and used each day. Students serve as the protagonists of learning. Thus, with a robust education and learning platform, students can embrace new learning and knowledge through resource integration

Table 1. Composition of core elements of educational resources

Core Elements	Contents
Content attribute	Title Theme Describe Source Language Associate Coverage
Intellectual property attributes	Creator Publisher Other responsible persons Permissions
Formal attributes	Date Type Format Identifier

Table 2. Specific content of educational resources

Resource Type	Specific Category
Educational program resources	Educational reform project
	Competition
	Social practice project
Educational curriculum resources	Common electives
	Public compulsory courses
	Professional elective courses
	Professional required courses
Educational information resources	Course information resources
	Content information resource
	Video information resources
	Interactive information resource

and sharing. At the same time, the platform can identify, screen, and guide teachers to help students navigate negative emotions or experiences (Liu et al., 2020).

Fully aligning students' learning goals with teachers' guiding roles supports the learning process, provides positive educational resources, and eliminates useless information. However, it is not simply the merging of information. Teachers must establish their own tools to build on resource sharing, thereby avoiding repeated teaching and improving work efficiency. Teachers and students can also build and share teaching resources together to improve the exchange of knowledge.

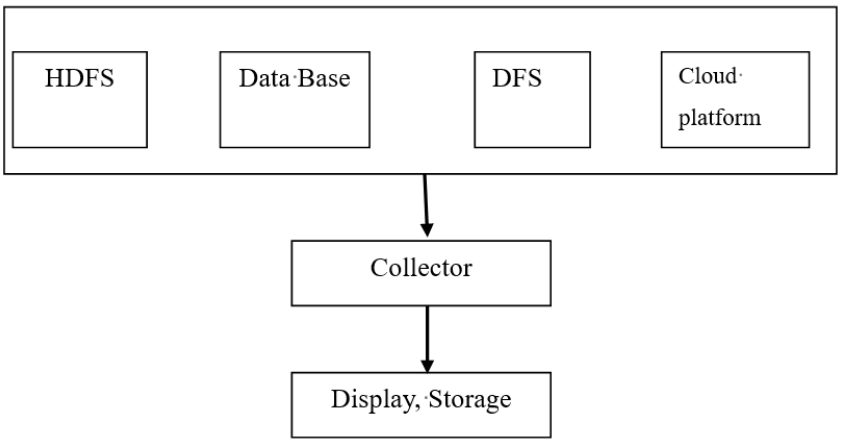
Integration and Sharing of Educational Resources

The integration and sharing of resources optimizes and integrates education across disciplines (Cai & Zhu, 2015). Under big data technology, the integration and sharing of resources is achieved through computer storage and transmission. Through the resource integration and sharing platform, users' educational resources are delivered to users in an efficient manner, thereby developing educational information products (Wei, 2016). Educational resource integration and sharing platforms can, in turn, reduce the cost of education.

At present, educational resources require certain hardware to create, collect, store, manage, and maintain their systems. The distributed file system, a software system built on the network, adopts the C/S mode. The file system and storage are distributed in different nodes on the network; however, they provide unified external services and access to multiple users at the same time. When the function is implemented inside the system, it can be accessed between multiple storage servers. Then, the distributed data can read and write operations. In this article, the distributed file system is applied to the educational resource information integration and sharing system. Then, a complete system structure is constructed. Figure 1 shows the hardware structure of the distributed file system.

The collector is designed to use data acquisition chips to process data in a distributed file system. To improve the reliability of the system, two controller area network (CAN) buses and a separate signal channel are set up in the collector and processor. As a separate controller, the CAN controller is embedded in the microcontroller unit (Li & Mao, 2022). It automatically switches to another channel when one of the channels fails. This keeps only one channel running. When the bus communication transceiver works, the value gradually becomes 0. If an incorrect counter value exceeds the maximum limit set by the system, the bus is turned off. Then, the CAN controller goes offline and the communication channel is converted to CAN. In turn, the information is cleared. After

Figure 1. Distributed file system hardware structure



the conversion is complete, the CAN channel is closed and the signal is cleared for any interruption and bus failure.

The memory structure design is composed of main memory, high-speed and virtual memory, and the central processing unit. The cache performance of the system is greatly improved by using various memories (Swan, 2013). When the data cannot be read into the cache, the access rate of the memory is reduced. Then, the system automatically selects a larger memory. If the data cannot be read from the memory, the system read outs the virtual memory in batches to meet the requirements of the system.

RESULTS

Educational Resource Integration and Sharing Design

There are many kinds of educational resources in the era of big data. These, in turn, become teaching resource packages with a multitude of uses. It is imperative to explore the design and construction of educational resources integration and sharing in the face of dilemmas related to China's educational resources and the characteristics of educational resources in the era of big data.

Schools should have innovative educational concepts. They should integrate and share educational resources in a targeted, scientific, and reasonable way. In addition, they should adhere to the leadership of students. Personalized educational resources should be built according to students' differences. Schools should cultivate teachers' concepts related to the strengthening of the learning process. In addition, schools should implement the latest changes in educational resources within the network and reform the evaluation model of teaching levels (Zhang et al., 2015). When integrating and sharing educational resources, teachers should highlight their subjective initiative, identifying problems related to curriculum resources through student feedback on the course. Then, they should solve these problems when integrating and sharing curriculum resources.

As noted, educators should develop personalized resources according to the student. Under the influence of different social concepts, people have varying evaluations on the integration and sharing of educational resources. Negative evaluations may affect teachers' enthusiasm and attitude toward their work (Roden et al., 2017). In this case, teachers must firmly guide students, possessing a strong sense of responsibility when carrying out teaching activities and devoting themselves to the integration and sharing of educational resources (Xiao et al., 2021). At the same time, students have

advantages. In perfecting the integration and sharing of educational resources, they build a larger teaching system to integrate, share, and construct of educational resources in a big data environment. This will promote the improvement of teaching levels.

In the context of big data, teachers should strengthen their concepts of learning, keep up with changes in online educational resources, and organize teaching professionals to share the latest resources on a regular basis. This will, in turn, improve the teaching level at schools (Cao et al., 2020). At the same time, using a variety of network channels can obtain the teaching reform status and educational resources of other schools. Thus, it is possible to obtain and integrate different educational resources to improve the school's teaching system and enrich the teaching content. This will attract more teachers to participate in the integration and sharing of educational resources, as well as promote the depth of educational resources integration and sharing.

Through students' social practice, reforming the evaluation mode of teaching level is an important path for the integration and sharing of educational resources under the background of big data (Tao et al., 2018). The integration and sharing of educational resources can strengthen the emphasis on students' social practice and guide students to have a positive outlook on life and values. At the same time, it allows us to see the knowledge and hands-on ability of students.

In the design of the integration and sharing of educational resources, a new teaching level evaluation model is adopted to integrate students' evaluation into their daily life and learning. This promotes the design and research of the integration and sharing of educational resources (Yang & Lei, 2022). Teachers should analyze the strengths and weaknesses of students, teach students in accordance with their aptitude in the teaching process, carry out personalized education for students, and improve the teaching effect by fostering strengths and avoiding weaknesses.

Educational Resources Integration and Sharing System

To improve the effect of data integration and sharing, this article integrates and shares educational resources based on random forest decision tree calculation, data integration and sharing model, and generalization error detection. The decision tree of big data technology is used for random forest calculation. It determines the scale of educational resource data integration and sharing. The parameter size of the feature set of educational resource data is also determined by training the decision tree.

Through the data integration and sharing model, the study standardizes the data format requirements of the educational resource databases of different schools (Yao et al., 2020). When integrating shared educational resources, there are often errors due to data flow direction or format (Zhu et al., 2019). To ensure the accuracy of integrated shared data, generalization error detection processing is performed. The current research method involves the following steps:

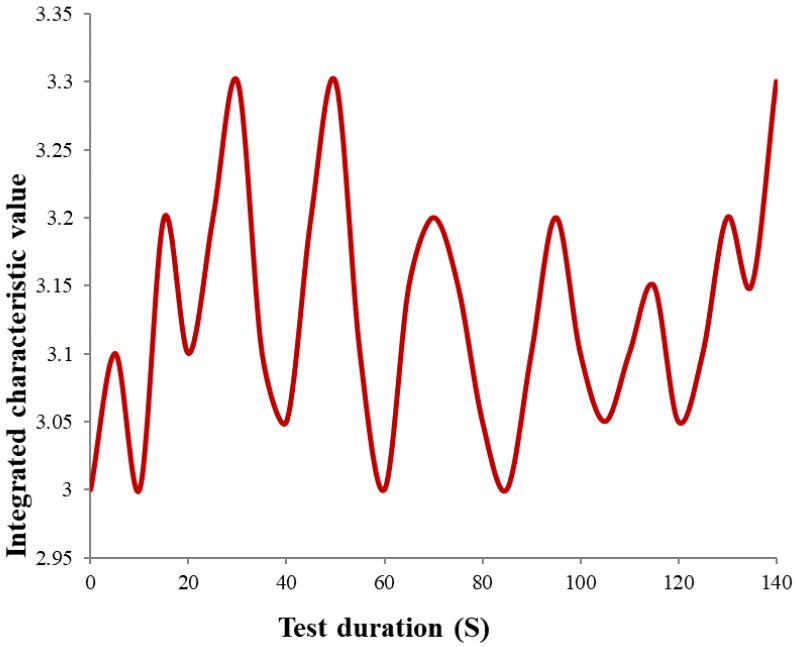
- **Data Collection:** The researchers collected educational resources from various schools and sources to secure a comprehensive dataset for analysis.
- **Pre-Processing:** The collected data were cleaned and processed to eliminate errors and inconsistencies. The researchers also used a selection to identify relevant features for integration and sharing.
- **Random Forest Decision Tree Calculation:** Big data technology was used to construct a decision tree using the random forest algorithm to determine the scale educational resource data integration and sharing. The decision tree was trained to determine the optimal parameter size of the feature set that would ensure accurate data integration.
- **Data Integration and Sharing Model:** The researchers implemented a data integration and sharing model to standardize the data format requirements of educational resource databases from schools. This model allowed for the efficient sharing and integration of data, reducing errors caused by data flow directions or formats.
- **Generalization Error Detection:** The generalization error detection ensured the accuracy of the integrated and shared data. This step included identifying and resolving errors that may have occurred during the data integration and sharing process.

These steps allowed for the effective integration and sharing of educational resources based on big data fusion. The combination of random forest decision calculation, data integration and sharing model, and generalization error detection helped ensure that the study's approach was accurate and efficient in integrating and sharing educational resources from different sources.

In this article, the proposed integrated sharing system was compared with the traditional ant colony algorithm system and the adaptive integrated sharing system of educational resources of cloud computing (Wu, 2022). The CPU with 12GB memory was used in this study. The operating system was Centos6.5. The voltage was set to 220V during operation. The working current was set to 110A. The study repeated the experiment 100 times.

Under the experimental conditions, by comparing the integration and sharing system proposed in this article with the traditional integration and sharing system for education system collection, the difference between the collection values and ideal values of the three systems under different experimental durations was used to determine the data integration and sharing capabilities of the system. Figure 2 shows the data integration and sharing capabilities of this system.

Figure 2. Data integration and sharing capabilities of the system



From Figure 2 and the experimental results, it can be concluded that as time changes, the eigenvalues show obvious nonlinear fluctuations. They fluctuate around a fixed value. The characteristic results of the integrated sharing system in this article fluctuate between 3.0 and 3.3, the average eigenvalue of integration and sharing in 140s is 3.3, the eigenvalue of the adaptive integration and sharing system of educational resources based on ant colony algorithm is 2.1~2.9, and the average eigenvalue is 2.5. The adaptive integration of educational resources is based on cloud computing. The eigenvalues of the sharing system range from 0. 8 to 1. 4 and the average eigenvalue is 1. 1. This

indicates that the educational resource integration and sharing system in this article is closer to the ideal value. In addition, it has stronger integration and sharing capabilities.

The system integration and sharing time is obtained through the integration and sharing of education resource information. Figure 3 shows the experimental results of the integration and sharing time of the three systems.

It can be seen from Figure 3 that before the amount of feature data reaches 200GB, the integration and sharing of the integrated sharing system proposed in this article takes more time. However, the integration and sharing of the ant algorithm system takes less time. When the amount of feature data exceeds 200GB, the data integration and sharing time of the integrated sharing system and the ant algorithm integrated sharing system proposed in this article increases sharply. When the amount of feature data exceeds 400GB, the data integration and sharing time of the allowed computing integration and sharing system increases sharply. When the amount of characteristic data reaches 1000 GB, the difference between the three systems is obvious. The integration and sharing time of educational resources of the system proposed in this article is only 42 seconds, while the integration and sharing time of ant algorithm is as high as 80 seconds. The integration and sharing time of cloud computing is also 73 seconds. Therefore, after the amount of feature data exceeds 200GB, the overall integration and sharing ability of the integrated sharing system proposed in this article is stronger. At present, the number of educational resources integrated and shared by each school in China is large, basically more than 200GB. The integrated and shared system proposed in this article has good performance, short time, and high efficiency.

For the educational occupation integration and sharing system proposed in this article, seven resource collections are selected. The total number of resource files contained in each resource collection is inconsistent. Table 3 and Figure 4 show the integration and sharing time of educational resources for each resource collection package in the integration and sharing system of this study. The analysis shows that the educational resource integration and sharing designed by the researchers has good performance. In addition, the integration and sharing time is efficient for teaching files below

Figure 3. Experimental results of the integration and shared time of the three systems

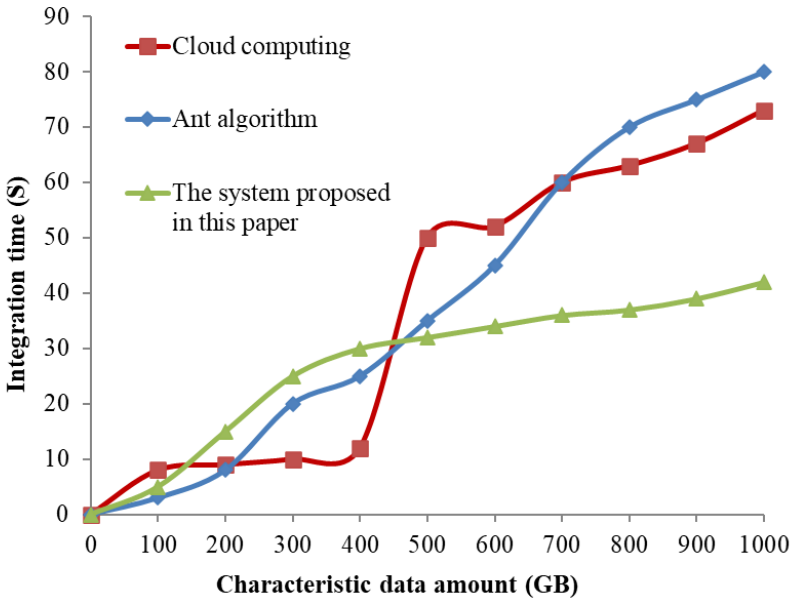
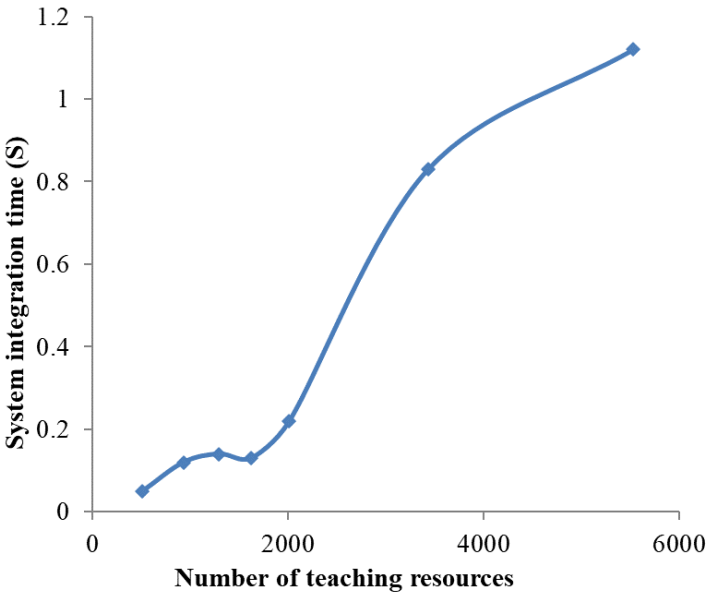


Table 3. System test results

Resource Collection	Number of Teaching Files	Integration and Sharing System of Educational Resources Designed in This Article (Integrate and Share)
1	510	0.05
2	930	0.12
3	1293	0.14
4	1621	0.13
5	2012	0.22
6	3432	0.83
7	5532	1.12

Figure 4. Integration and sharing time of educational resources in the integration and sharing system of resource collection packages in the current study



2,000. However, the study found a nonlinear increase in integration sharing time as the number of teaching files in the resource collection package increased above 2,000. This suggests that the efficiency of system may be limited for large-scale resource integration and sharing activities. Therefore, it may need to further optimize the system for large-scale activities or evaluate alternative approaches to maintain efficient integration and sharing.

The research findings provide insight for subsequent research activities in this area. The researchers recommend that further studies be conducted to optimize and evaluate the use of this system for large-scale resource integration and activities. Overall, the study provides a useful reference for designing more effective educational resource integration and systems for applications in online education. The results can be highly informative for the teaching of technology courses.

CONCLUSION

This article studies the integration and sharing of educational resources, analyzes problems related to this topic, designs integration and sharing systems based on big data fusion, integrates and shares information for educational resources, reviews its performance and efficiency, and provides theoretical data support for the rational planning of educational resources. The distributed file system is used to build an education resource integration and sharing platform to improve the cache performance of the system. Compared with the traditional ant colony algorithm system, as well as the adaptive integration and sharing system of educational resources of cloud computing, the educational resources integration and sharing system in this article is closer to the ideal value and has stronger integration and sharing ability.

Once the amount of feature data exceeds 200 GB, the integrated sharing system proposed in this article has stronger overall integration and sharing capability. In the future, the researchers will investigate the latest developments in technologies (for example, AI and virtual reality). They will also explore how to apply the developments to the rational planning of educational resources.

First, this article only considers the integration and sharing of educational resources via big data fusion. It has not explored the use of other technologies like AI or the integration and sharing of educational resources. Future research can, therefore, explore more advanced educational resource integration and sharing technology solutions.

Second, this article uses a simulated educational resource collection package. The data does not reflect the real complexity and heterogeneity of educational resources available to different schools or institutions. Research may involve real-world collections to improve the scalability of the results.

DATA AVAILABILITY

The figures and tables used to support the findings of this study are included in the article.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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