High Quality Resources Sharing of College Students' Career Guidance Course Teaching Based on Decision Tree Classification Algorithm

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Abstract. In order to improve the quality and efficiency of sharing high-quality teaching resources and achieve ideal results, a decision tree classification algorithm based method for sharing high-quality teaching resources in college student employment guidance courses is proposed. Firstly, before resource sharing and transmission, design a security key for public information and encrypt the public information of high-quality teaching resources. Secondly, the decision tree classification algorithm is used to construct a classification standard for electronic archives, and regional partitioning is performed to extract resource sharing classification codes. At the same time, establish a database of teaching resources for employment guidance courses to store information related to high-quality teaching resources for college students' employment guidance courses. Finally, establish a blockchain based teaching resource security sharing model to achieve information sharing of high-quality teaching resources. Experimental analysis shows that the proposed method can complete the high-quality resource sharing task of college student employment guidance course teaching within 5–8.5 ms after application, with a significant advantage in resource sharing efficiency.

Keywords: Decision Tree Classification Algorithm · College Student · Career Guidance Courses · Teaching. High Quality · Resource Sharing

1 Introduction

The employment of college students has always been the focus of social attention. Classroom teaching of employment guidance course is an important way to promote the employment guidance work in colleges and universities [1]. For colleges and universities, it is particularly urgent to focus on the research on the current teaching situation of career guidance courses. Employment guidance is a kind of social service work [2] produced with the rapid development of economy and the continuous differentiation of occupations. Employment guidance focuses on the whole process of career selection, career preparation and career acquisition, and runs through the whole process of college education. The career guidance course refers to a quality improvement course for college students to choose, prepare for and obtain a career according to social needs

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and their own characteristics on the premise that it is included in the teaching plan and university curriculum system. In this study, courses involving "career development planning", "career guidance", "career development and employment", "career planning and employment" and other contents are uniformly defined as "career guidance courses" [3].

College students' employment guidance and career planning are two different concepts that are related to and obviously different from the needs of the object at different stages and goals in college. Career planning refers to the object's cognition, formulation, determination and development of its lifelong career development, while employment guidance directly refers to the object's employment [4]. Employment guidance is derived from vocational guidance." Career guidance" is "the process of providing consultation, guidance and help for job seekers to obtain employment, maintain employment stability, develop their careers and employers to reasonably employ people". With the reform and development of the graduate employment system in China, the employment guidance in the new era has changed a lot compared with the traditional graduate employment education. The employment guidance in this article is different from the vocational guidance activities such as career counseling, career introduction and so on that are carried out in the society for all kinds of people with needs. It also does not include a series of employment services and management related to college graduates in colleges and universities. The employment guidance in this paper refers to an educational activity carried out for college students throughout the whole process of college education. Therefore, college students' employment guidance is to help college students to achieve smooth employment, with colleges and universities as the main body, college students as the object, college students' career guidance personnel as the actual operator, colleges and universities' advantageous educational resources as the carrier, college students' career planning as the core, and improving college students' employability and employment quality as the goalSelf realization is an educational activity that runs through the whole process of the university.

There are a large number of high-quality teaching resources in college students' career guidance courses, so we need to adopt reasonable sharing methods to achieve the goal of sharing massive high-quality teaching resources. Decision tree classification algorithm is a method to approximate the value of discrete function [5]. It is a typical classification method. First, it processes data, generates readable rules and decision trees using inductive algorithms, and then analyzes new data using decisions. In essence, a decision tree is a process of classifying data through a series of rules. In order to realize the ideal goal of high-quality resource sharing of college students' career guidance course teaching, this paper introduces the decision tree classification algorithm to carry out the research on high-quality resource sharing of college students' career guidance course teaching.

2 Design of High-Quality Resource Sharing Method for College Students' Career Guidance Course Teaching

2.1 Design Public Information Security Key of Teaching Resources

In order to ensure the security and privacy of high-quality teaching resources of college students' career guidance courses in the sharing process, it is necessary to encrypt the resources before sharing and transmission, and establish a security key for public information. First set a safe information parameter q_a, compare this parameter with a large prime number k_a And jointly establish the common attribute set of the two.

$$U_t = \{xr_{a1}, xr_{a2}, xr_{a3}\} \tag{1}$$

Among them, U_t Represent the general structure of attribute set circular mapping generated by combining security parameters with large prime numbers; xr_{a1} Indicates the previous cell of the selected attribute cell; xr_{a2} Indicates the selected attribute unit in the attribute set; xr_{a3} Indicates the next cell of the selected attribute cell. At this time, the attribute group in the collection is formed, and the global security public key should also be set in the attribute group, so that the cloud center of data transfer can encrypt any public key. At this time, the output structure of the security public key is:

$$G_{xaq} = \left\{G_{a1g}, G_{a2g}, G_{ang}\right\} \tag{2}$$

Among them, G_{xaq} It can represent the attribute unit in any security public key; G_{a1g} Represents the first attribute unit in the security public key, similarly G_{ang} Represents the last attribute unit in the security public key. Each security public key can generate its own security private key. The algorithm determines the user's identity and provides a random number as the generation attribute of the private key. Its structure is:

$$G_{xaq} = \left\{\delta_i, \forall xaq_i \in G : k_i^{\delta}\right\} \tag{3}$$

Among them, G_{xaq} Represents any output unit in the security public key; δ_i Indicates the random number of the verification code that needs to be provided by the user during identity determination; k_i^{δ} Represents the obtained private key structure. The obtained private key can be used as a ciphertext for covert data transmission G_{xaq} The random vectors are generated in plaintext and converted into ciphertext [6]. Convert the key into the public key of the data information in the computer, and transfer it from the transmitter to the cloud of the central processing unit.

2.2 Extracting Resource Sharing Classification Code Based on Decision Tree Classification Algorithm

After the public information security key conversion of teaching resources is completed, next, use the decision tree classification algorithm to build a classification standard for electronic files, divide them into regions, extract the classification code of resource sharing, and lay the foundation for sharing high-quality resources in the follow-up college students' career guidance courses [7].

First, build a decision tree centered on electronic archives. This decision tree needs to give full examples of all collected samples, then calculate the overlapping part, and judge the error of decision classification through mathematical methods. Assume that the number of sample sets is x_i, training samples are $x_i = \{x_1, x_2, ..., x_n\}$, where x_i express n Any one of the training samples. The characteristic value in the sample is ζ_i Each sample has a characteristic value, then the set of characteristic values can be expressed as:

$$\zeta_i = \{\xi_1, \xi_2, ..., \xi_n\} \tag{4}$$

Among them, ζ_i It represents any sample feature in the characteristic value. In the feature classification of archive resources, there are usually three categories. The decision tree classifier shown in Fig. 1 can be established through the decision tree.

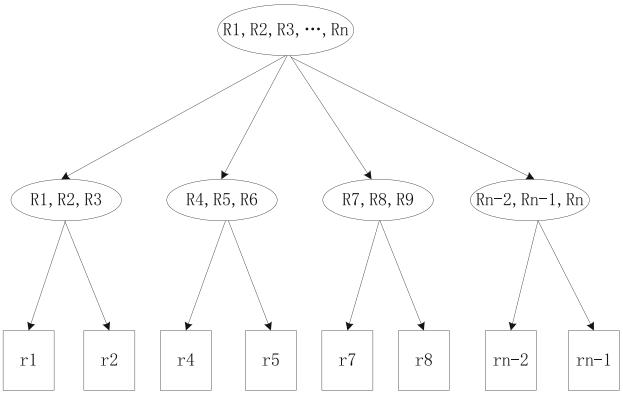

Fig. 1. Structure diagram of decision tree classifier

The decision tree classifier established through Fig. 1 will have a feature to summarize each information gain node. At this time, the classification expectation of high-quality teaching resource samples is:

$$E_s = \sum_{i=1}^{n} \frac{P_i}{\log_2 (P_i)} \tag{5}$$

Among them, E_s The automatic classification expectation of decision tree representing the digitalization of electronic archives resources; P_i Indicates that any sample is classified as a category i Probability of. In the feature classification of high-quality teaching resources at this time, the information gain of resource A can be expressed as:

$$T_A = \left(E_s, E_f\right) \tag{6}$$

Among them, T_A Indicates the classification of resource A, E_s Represents the first attribute code of the decision tree classification; E_f Represents the second attribute code of the decision tree classification. Combining the above two attribute codes, we can get the specific classification position of the high-quality teaching resources in the decision tree.

2.3 Establish a Database of Teaching Resources for Career Guidance Courses

After the above resource sharing classification code is extracted based on the decision tree classification algorithm, the specific classification position of high-quality resources for college students' career guidance course teaching in the decision tree is obtained. Next, establish a database of teaching resources for career guidance courses, and store the data with the blockchain through the call of the contract layer. Store interactive data on the blockchain and teaching resources for big data on IPFS.

And then store the resource address of IPFS on the blockchain [8]. First of all, design the entity map of college students' career guidance course attributes, as shown in Fig. 2.

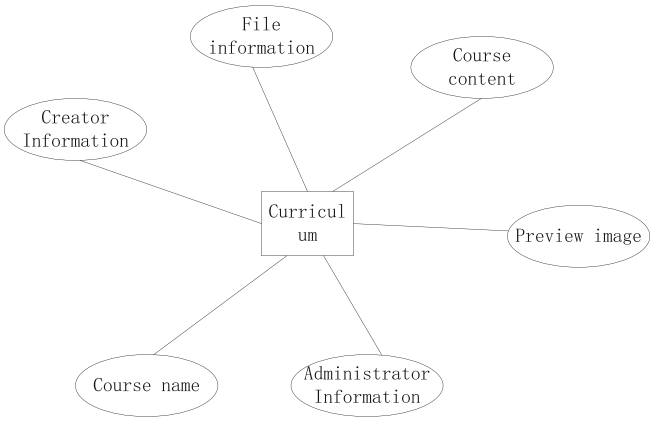

Fig. 2. Entity Chart of Undergraduate Employment Guidance Course Attributes

Through the course attribute in Fig. 2, the database entity of college students' employment guidance course attribute is obtained. On this basis, a database is established to store the basic information and operation information related to high-quality resources of course teaching. The database of teaching resources for career guidance courses is shown in Table 1.

According to the field classification in Table 1, store the relevant information of high-quality teaching resources for college students' career guidance courses, set the courses as the primary key, and ensure the security of resource storage. The sharing of high-quality teaching resources is divided into five layers: user layer, application layer, service layer, contract layer and data layer. The data layer is used to store high-quality resource data. The contract layer is responsible for the realization of resource storage and sharing functions. The service layer is the interface between contract and application, and the application layer and user layer are the realization of user operations [9]. This paper introduces the design and implementation of smart contracts in detail, which can solve the problem of safe storage of high-quality teaching resources and provide basic guarantee for resource sharing.

Table 1. Database of Teaching Resources for Employment Guidance Courses

Field Name	explain	type
KC-MC	Course name	VARCHAR
KC-JS	Course Introduction	VARCHAR
KC-HYDZ	Course contract address	VARCHAR
KC-CJZZHDZ	Account address of course creator	VARCHAR
KC-JGTDZ	Course Structure Map Address	VARCHAR
KC-ZYDZ	Course resource address	VARCHAR
KC-XZRS	Number of course downloads	INT
KC-PLNR	Comments	VARCHAR
KC-GXCS	Course sharing times	INT

2.4 Sharing of High-Quality Teaching Resources

After the establishment of the database of teaching resources for career guidance courses, the problem of safe storage of high-quality teaching resources has been solved. On this basis, this paper establishes a blockchain based security sharing model of educational resources (EduMSFB). The framework uses the consensus mechanism, encryption algorithm, smart contract, cloud storage, public and private key encryption scheme, authority authentication management and other technologies of the blockchain to complete the information sharing, secure storage and authority management of high-quality teaching resources [10].

First of all, through the analysis of the high-quality resource structure of college students' career guidance course teaching and the demand for safe sharing of resources, the basic structure of the sharing model framework is designed, which is divided into three parts: the user layer, the service layer, and the management layer. The user layer can use the functions of the service layer to carry out corresponding operations, while the management layer mainly manages the sharing process to achieve safe sharing of resources. The framework structure of high-quality teaching resource sharing designed in this paper is shown in Fig. 3.

As shown in Fig. 3, in the sharing of high-quality teaching resources, the user layer includes not only the service objects (resource users) of resource sharing, but also resource providers, such as large institutional databases and individual resource sharing. Therefore, users can be both resource consumers and resource providers.

The service layer mainly includes the main functions of resource sharing, including uploading, browsing, downloading and other functions of resources. Users conduct corresponding operations through the corresponding function modules of the service layer to meet their own needs.

In the established sharing framework of high-quality teaching resources, the management layer, through the relevant technologies of the blockchain and through multiple institutional members and users to jointly form the nodes of the chain, jointly manage

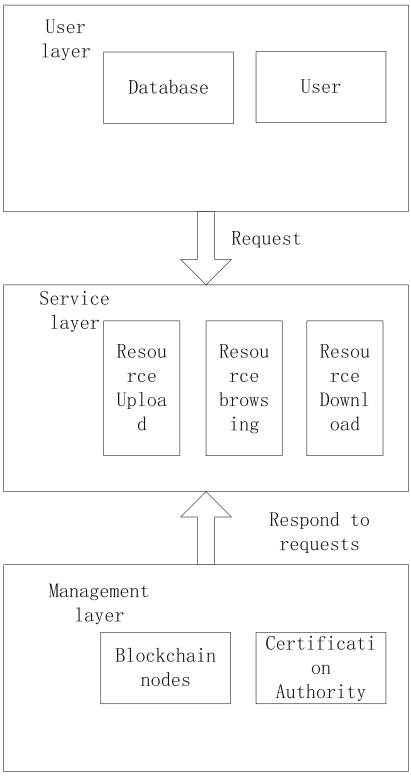

Fig. 3. Framework for sharing high-quality teaching resources

and maintain teaching resources, so as to carry out free circulation and exchange of educational resources within a certain range, realize their safe sharing and break information barriers. The certification authority in the blockchain conducts systematic management on behalf of all nodes, but all operations of the certification authority will be broadcast in all nodes through the consensus mechanism to achieve consistency of data and operations; The identity authentication service is carried out through the identity management mode of the blockchain network itself. All nodes entering the resource sharing must be authenticated. Only through authentication can the corresponding user operations be carried out.

The users of teaching resource sharing framework include resource providers and resource users. According to the identity of resource sharers, their sharing methods are also different. First, the resources in the institutional database are shared through the centralized sharing mode, but the shared information will be backed up and managed through the blockchain, and the safety and reliability of transactions can be effectively guaranteed through the supervision of the certification authority; For ordinary users, the decentralized sharing mode is used to share resources, effectively taking advantage of the decentralized characteristics of the blockchain network.

The high-quality resource sharing process of college students' career guidance course teaching designed in this paper is shown in Fig. 4.

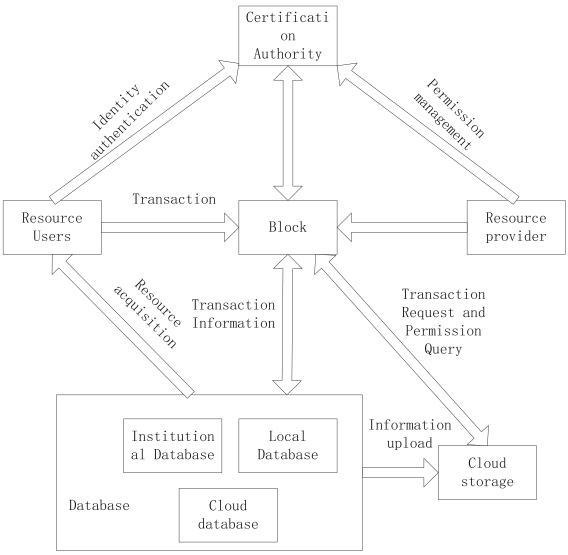

Fig. 4. High quality resource sharing process of college students' career guidance course teaching

As shown in Fig. 4, in the process of resource sharing, institutional data resource sharing is to upload the resource index of its database to the blockchain, where only upload records, transaction information, etc. are saved, and the index table is placed in the database function cloud database.

For individual resource sharing, the resource provider uploads the index of shared resources to the blockchain, and stores the source data in the local database or ECS of the database module. Users of resources browse the resources through the functions in the service layer. After purchasing the resources, they can obtain the address information and decryption key of the real data through the certification authority according to the obtained permissions, and decrypt and use the obtained resources; When downloading the resources in the institutional database and accessing the address information of the corresponding resources obtained through the blockchain, the institutional resource provider judges whether the resource requester has access to the resources by querying the access permission list of the blockchain, and then responds to the operation.

Writing appropriate access control protocols through smart contracts can make the behavior of the certification authority more fair and effective, and the sharing process of resources can be more secure through user identity authentication, identity management, and permission management, ensuring the privacy of user information and the transparency of transactions. After obtaining the resource address, the user must have access to the resource at the same time before downloading the resource. At the same time, all data on the chain are encrypted, and the corresponding information can be seen through the certificate issued by the certification authority.

Set the database teaching quality resource sharer as A1, the individual teaching quality resource sharer as A2, and the teaching quality resource user as U. Use the transaction process between A1, A2, and U to specifically design the process of the whole employment guidance course teaching quality resource sharing. The steps are as follows.

1. Institutional database A1, personal resource sharer A2 and resource user U are authenticated through the blockchain and become members of the educational resource sharing framework.
2. The resource upload process is divided into two parts: (1) The institutional database A1 uploads resources, and the shared resources uploaded by A1 are divided into two parts. The index information of the shared resources is stored in the blockchain, and the resource address information corresponding to each index is put into cloud storage and encrypted. (2) The resources uploaded by personal resource sharer A2 are also divided into two parts. The information about shared resources stored on the blockchain includes resource processing permissions, content summaries, time information, and real data addresses. The other part is the source data of shared resources, which is encrypted and stored in the database. All resource sharers can set their personal transaction records as encrypted or public according to their own needs. If encrypted, they can use their uploaded public key for encryption.
3. The transaction of the certification authority and the transaction in the blockchain are confirmed through the consensus mechanism. The nodes confirm the transaction information through broadcasting, update the local ledger information, and check the effectiveness of the local ledger and whether it has been tampered with at regular intervals.
4. The resource user U purchases resources and sends a request to the blockchain, including the information of the resource requester, the summary of the purchased resources, etc. The request is broadcast to all nodes through the blockchain consensus mechanism and confirmed, and the transaction is handed over to the certification authority for the resource user U's permission modification.
5. According to the transaction information, the certification authority unlocks the permission of the corresponding resources, decrypts the resource request information, obtains the resource address information through the blockchain, and sends it to the resource user U. The resource user U obtains the shared resources according to the resource address to complete the sharing process.
6. When resource sharer U obtains the address information in institutional database A1 and requests resources from institutional database A1 through the resource address, resource database A1 first queries the transaction information and corresponding permission information of the corresponding resource user U in the blockchain network, and then opens the interface after confirmation so that resource users can download shared resources.

3 Experimental Analysis

3.1 Experiment Preparation

In order to test the feasibility of the above method of sharing high-quality resources for college students' career guidance courses based on the decision tree classification algorithm, the experimental analysis is carried out as shown below. First of all, based on the demand of high-quality teaching resource sharing, build the operating environment required for resource sharing. The building steps are as follows: Download JDK 6.0 or above from the official website Oracle, install and configure it; Download Eclipse development tools; Download Struts -2.5.10.1, spring framework -4.3.5. RELEASE, hibemate core -5.2.9. Final framework; Download and install the Tomcat server and integrate it into the Eclipse development environment; Download Maven; To download and install Hadoop, it is necessary to set up environments such as HADOOP-HOME and HADOOP-CONF-DIR; Download and install HBase and ZooKeeper; Install and deploy SolrCloud. The teaching high-quality resource sharing testing platform consists of four servers. The specific allocation plan is: one application server, with Tomcat deployed on it, one NameNode serving as the Master, and two DataNodes serving as the Slave.

The teaching quality resource sharing test platform consists of four servers. The specific allocation scheme is: one application server, on which Tomcat is deployed, one is the NameNode acting as the master, and two are the DataNode acting as the slave. Following the above process,, build the high-quality teaching resource sharing operating environment required for this experiment. In addition, the underlying environment is based on HDFS, specifically storing massive data of various types on HDFS, and the teaching resource sharing system under big data manages the database based on MySQL. On top of that, other tools and products related to big data technology are introduced, such as HBase, SolrColoud, and Zookeeper. In order to realize the rapid retrieval of high-quality teaching resources of college students' career guidance courses, this experiment optimized the retrieval of HBase, combined with the index mechanism of Solr, and achieved the perfect integration with HBase index. The index structure of high-quality resource sharing for college students' career guidance course teaching is shown in Fig. 5.

According to the shared index architecture shown in Fig. 5, some columns (or all columns) of the HBase table are indexed into the Solr index in near real time, which has high flexibility and scalability, and optimizes and customizes the retrieval scoring rules of Solr, so as to meet the needs of massive teaching resource retrieval in this article. After completing the above experimental preparation, the next step is to test the proposed high-quality resource sharing method for career guidance course teaching.

3.2 Result Analysis

In order to make the experimental results more intuitive and convincing, this paper introduces the principle of comparative experimental method. Set the teaching quality resource sharing method of college students' career guidance courses based on the decision tree classification algorithm proposed in this paper as the experimental group, and set the traditional teaching quality resource sharing method as the control group, and make a comparative analysis of the application effects of the two sharing methods.

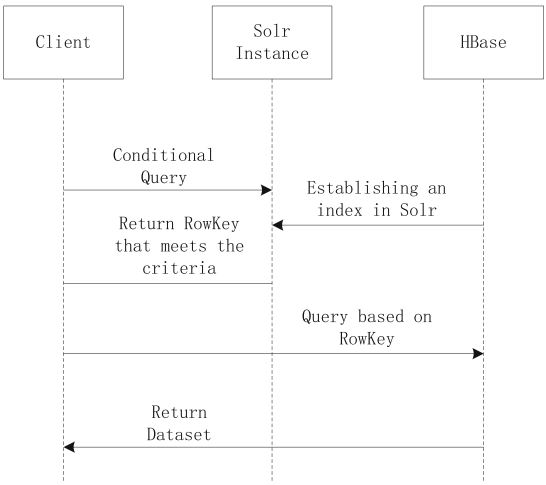

Fig. 5. Index structure for sharing high-quality teaching resources

The traditional method of sharing high-quality teaching resources is based on cloud computing technology, combined with cloud computing based shared learning mode and high-quality resource sharing platform for information-based teaching.

The completion time of high-quality teaching resource sharing task of college students' employment guidance course is selected as the evaluation index of this experiment. The shorter the completion time, the higher the efficiency of high-quality teaching resource sharing. The sharing function of high-quality teaching resources includes browsing, uploading, downloading and retrieving high-quality teaching resources of college students' employment guidance courses. Table 2 shows the testing process of the sharing function of high-quality teaching resources.

According to Table 3, complete the function test of sharing high-quality resources of college students' career guidance course teaching. On this basis, the MATLAB simulation analysis software is used to measure the time required for each resource sharing function to complete the operation after the application of the two sharing methods, and compare them to determine the application effect and feasibility of the proposed methods. The comparison results are shown in Fig. 6.

From the comparison results in Fig. 6, it can be seen that two methods for sharing high-quality resources in the teaching of college student employment guidance courses show performance differences. Among them, after the application of the teaching high-quality resource sharing method based on the decision tree classification algorithm proposed in this article, the completion time of various resource sharing functions is significantly shorter than traditional methods. It can complete the task of sharing high-quality resources in college student employment guidance course teaching within 5-8 ms, and display the resource list by category Uploading and downloading of resources. Users determine that they are looking for a certain resource and can search through resource sharing. Through parallel retrieval, shared search results are returned to users in a short amount of time.

Table 2. Test process of sharing function of high-quality teaching resources

function	input	Expected output	Whether it is normal
Browse Resources	On the main page, select resources under different categories and view them by discipline	Display resource list by category	normal
Download Resources	Click a resource to enter the details page of the resource, and click “Download” to download the resource locally	Successful download and prompt that the download is complete	normal
Upload Resources	Select the upload button, click the “Browse” button, find the local file to upload, click “Upload”, and upload the local resources to the sharing platform	Upload successfully and prompt that the upload is complete	normal
Retrieve Resources	Select the Search button to retrieve the corresponding high-quality teaching resources according to the needs	Retrieved successfully	normal

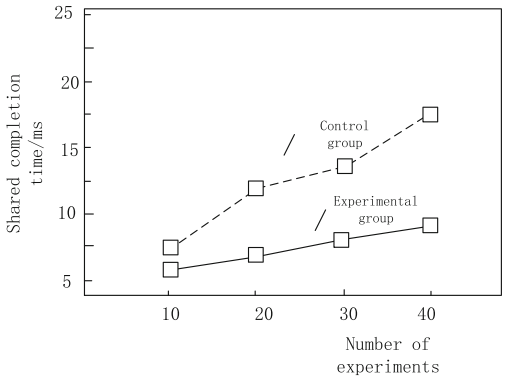

Fig. 6. Comparison Results of Evaluation Indicators of Teaching Quality Resource Sharing Methods

Establish a scoring system that allows users to rate high-quality teaching resources for college student employment guidance courses based on decision tree classification

algorithms. Evaluate the superiority of the decision tree classification algorithm based method in terms of resource sharing quality and popularity by collecting user rating data and comparing the average resource ratings of the experimental group and the control group. At the same time, collect user feedback to improve and optimize resource sharing methods and provide a better user experience.

The design of the scoring system is as follows:

Step 1. Set scoring standards: Determine a set of scoring standards from both richness and applicability. Use a 1–10 point scoring system to represent different levels of ratings.

Step 2. Scoring Interface: Provide users with a scoring interface that allows them to easily rate shared resources. The interface is intuitive, concise, and clearly instructs users on how to rate.

Step 3. Resource Display: On the rating interface, display relevant information about high-quality teaching resources for college student employment guidance courses, including resource names, descriptions, authors, etc. Ensure that users have a full understanding of the content and purpose of resources in order to make accurate evaluations.

Step 4. Scoring process: On the scoring interface, provide users with the option to choose a rating. Users can rate each aspect based on the set scoring criteria.

The partial scoring results are shown in the table below:

Table 3. Scoring Results

user	experimental group		control group	
	richness	Applicability	richness	Applicability
1	7 points	8 points	4 points	5 points
2	6 points	7 points	5 points	6 points
3	7 points	9 points	5 points	7 points
4	8 points	9 points	3 points	5 points
5	5 points	7 points	4 points	6 points
6	8 points	8 points	6 points	5 points
7	7 points	9 points	5 points	6 points
8	6 points	7 points	4 points	3 points
9	7 points	8 points	5 points	6 points
10	7 points	8 points	3 points	3 points
Average score	7 points	8 points	4.4 points	5.2 points

From Table 3, it can be seen that the average resource score of the experimental group is 7 points in terms of richness and 8 points in terms of applicability. The average resource score of the control group was 4 points in terms of richness and 5.2 points in terms of applicability. It shows that the method based on decision tree classification algorithm can provide a better experience of sharing teaching resources of college students' career guidance courses.

4 Conclusion

With the development of educational informatization, online teaching resources in schools are constantly enriched, providing students with diverse learning methods, but also posing challenges to traditional resource management. In order to expand the scope of resource sharing, improve the efficiency of resource utilization, and solve the problems of uneven distribution of teaching resources among schools and massive data resource management and retrieval, this paper designs a method of high-quality teaching resource sharing in the Big data environment. Firstly, design a security key for public information and encrypt the public information of high-quality teaching resources. Secondly, the decision tree classification algorithm is used to construct a classification standard for electronic archives and extract resource sharing classification codes. At the same time, establish a database of teaching resources for employment guidance courses to store information related to high-quality teaching resources for college students' employment guidance courses. Finally, establish a blockchain based teaching resource security sharing model to achieve information sharing of high-quality teaching resources. The experimental results show that the proposed method can complete the task of sharing high-quality resources in the teaching of college student employment guidance courses within 5–8.5 ms after application. Through the research in this article, the efficiency of sharing high-quality resources in the teaching of college student employment guidance courses has been effectively improved, enabling users to quickly and accurately share and retrieve the resources they want, with good scalability and flexibility. In the context of the continuous in-depth development of education informatization, the sharing method of high-quality teaching resources in the Big data environment will continue to be promoted. The sharing of high-quality teaching resources in the future will be more intelligent, cross school linkage, focus on data security protection, and expand the scope of sharing, providing students with more personalized and diverse learning resources, and promoting the sustainable development of educational informatization.

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