

Research on Regional Sharing of Educational Reform Resources under Big Data

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Abstract: At present, the level of educational resources sharing in China has been greatly improved, and the focus of research work is to promote the sharing of high-quality educational resources by means of information technology. On this basis, this paper analyzes the core factors of promoting the sharing of high-quality educational resources in the information system, puts forward the structure and function analysis framework of high-quality education resources sharing under the information environment, and probes into the typical problems affecting the sharing efficiency at present, and points out the construction and utilization of Digital Education resources, the sharing of digital education resources, and the lack of regional chain technology mechanism The Enlightenment of sharing mode reform. On this basis, the framework and mode of digital education resources sharing based on block chain are constructed from the aspects of data recording, resource transaction, resource sharing and resource management, which provides a theoretical basis for the effective realization of educational resource sharing. The system structure and resource sharing environment determine how to improve the adaptability and effectiveness of the system. Holistic view and cooperation theory are the theoretical basis for information technology to promote high-quality resource sharing, and system integration is an effective way to realize micro to macro resource sharing.

Keywords: Big data; Teaching reform; Resource sharing

1. Introduction

At present, China's education development is facing the dual pressure of equal educational opportunities and improving the quality of education. At present, the main problem restricting the development of education is the unbalanced allocation of educational resources. With the development of education informatization, it has become an important issue to promote the sharing of high-quality educational resources [1]. Universities in the sharing of educational resources in the forefront of the country, and has been rapid development and popularization. Its construction and application of educational resource sharing platform is still in its infancy. Local education departments should combine local reality, fully consider the characteristics of primary and secondary school teachers and students, consider the equipment and investment mechanism of campus network, strive to realize the transformation of educational resource sharing platform from disorder to order, from low efficiency to high efficiency, and promote the construction of campus network [2]. Through the computer network technology, Wuxi as the representative of the public education service platform, integrate regional resources, directly provide knowledge services to the public, and build a regional shared education resource platform. Different from the traditional education concept, it takes the educational resources integration system as a technical platform, takes the Educational Metropolitan area network as a

resource sharing platform, and simply integrates various resources (teaching materials, videos, courseware, etc.) together. The Ministry of education takes the characteristic school resources as the supplement, unceasingly develops and introduces the high quality resources [3]. Through Xicheng learning network self-learning platform equipment to promote learning, teaching management and learning service effect is remarkable. Although some achievements have been made, few people pay attention to the output benefits of information construction because "the project is within the scope of funding from the education administrative department"; moreover, the economic operation mode is positive and luxurious, regardless of cost, and does not pay attention to cost management. At present, there are still some problems in the establishment and application of educational resources sharing platform in China, such as shortage of funds and serious waste, which restrict its healthy development. After the above analysis, we found that the main problem of resource sharing in Wuxi public education service platform is the lack of performance appraisal [4]. On this basis, it is of great significance to develop an educational resource sharing platform by using the theory and method of performance technology and apply it to educational practice.

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2. Optimization of Regional Sharing Mode of Educational Reform Resources

2.1. Construction of educational reform resource sharing system

In the process of modern teaching, web design, animation, virtual reality, image processing, network security and other professional technologies are important teaching resources, but it is difficult for teachers to establish a platform for non computer majors to share learning resources. The conflict of economy, law and interest is a common problem in the process of resource integration [5]. In addition, the lack of supporting management and

incentive mechanism, it is difficult to fully mobilize the enthusiasm and initiative of teachers. There are many difficulties in establishing the course of resource sharing [6]. In order to achieve this win-win goal, we should establish a unified platform, establish and improve the corresponding organization and management mechanism, interest incentive mechanism, evaluation and supervision mechanism and policy guarantee mechanism, so as to realize the concept sharing, technical support and system guarantee. In order to realize the intellectual property rights of teachers, we need not only the system guarantee, but also the corresponding authorization and sharing mechanism. Establish an open, basic, public welfare, inclusive and strategic resource sharing mechanism. Visitors usually offer permission for non-commercial use, reuse, conversion and dissemination [7]. For example, resource sharing can increase watermark, electronic certificate and other measures, so that resources can only be browsed online, and can not be copied and disseminated; teachers can give priority to making resource CDs and protecting their own copyright; education administrative departments and schools can provide matching funds to obtain resource copyright through acquisition and reorganization, and distribute them to the society free of charge, so as to realize the dual objectives of copyright protection and resource sharing. Based on this, the construction of teaching resource sharing course is discussed.

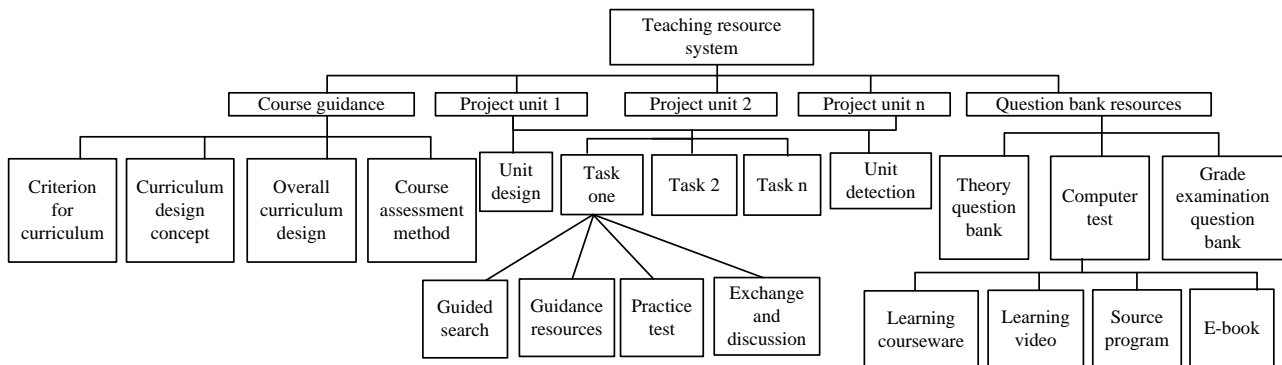


Figure 1. Curriculum system of regional teaching resource sharing

Resource sharing curriculum based on network and multimedia information technology has gradually become a trend of educational development and reform at home and abroad because of its openness, resource sharing, knowledge commonweal and comprehensive application. "Resource sharing" course is student-centered and network-based. It is open to the society and shares high-quality teaching resources [8]. It plays an important role in updating teaching concepts, changing teaching models, improving teaching environment and reforming teaching methods. Although the construction quality and sharing

depth of resource sharing courses in China are higher than those of quality courses in the past, in terms of content and audience depth, the degree of resource sharing is low, the use of information means is insufficient, and the corresponding organization management and supervision and evaluation mechanism are lacking, which makes the existing curriculum construction uneven and the overall level is low. Through the analysis of the current situation of resource sharing curriculum construction in China, this paper points out the existing problems and deficiencies, and puts forward corresponding countermeasures, in or-

der to provide new ideas for promoting the reform of teaching mode and improving the construction of resource sharing curriculum [9]. High quality education resources refer to the digital resources formed by the collection, transformation, processing and processing of information means under the information environment. The other part is the digital resources formed through the collection, screening and evaluation of the existing high-quality education resources [10]. In terms of life cycle, there are not only teachers' courses, teaching materials

and other resources that can be stored as digital files for a long time, but also the sharing form of high-quality education resources transmitted in real-time by using instant messaging tools such as distance teaching. It also includes the relationship between teaching resources such as cross regional lectures, remote consultation and Q & A, and high-quality education resources, such as high-quality education resources, information-based education resources and high-quality information-based education resources.

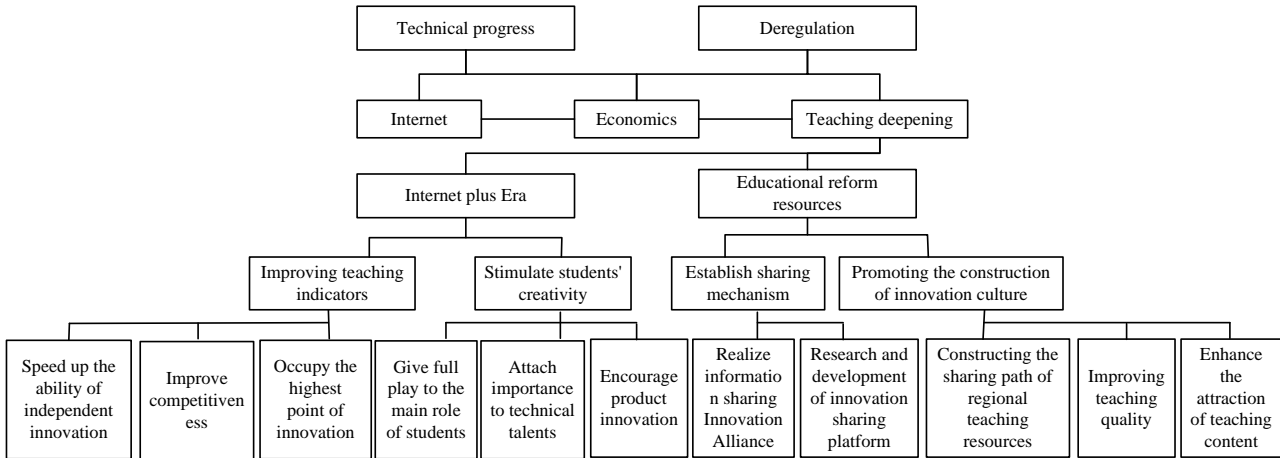


Figure 2. Optimization of teaching sharing information relationship structure

In order to solve the problem of regional distribution of educational resources, we should rely on the backbone network of regional colleges and universities, establish an educational resource grid, and use grid technology to connect schools, scientific research institutions, educational institutions, enterprises and individuals to form a large-scale, diversified and heterogeneous educational resource integration system to realize resource sharing. To build a grid, we must first establish a scientific and reasonable grid architecture. Therefore, this paper first studies the grid application framework system [11]. The grid hierarchical model takes the local university grid as the central platform, integrates the resources of various industries, institutions and business departments, and forms a grid sharing system. It is divided into six functional modules: information management system, resource management system, data management system, user management system, job scheduling management system and grid management system. The dynamic management of security course resources, network resources, teaching materials resources, information resources, grid users and other resources, the implementation of file system directory system authority management protocol database service life cycle management strategy.

2.2. Design of teaching resource sharing platform

The subject of university education resources sharing is the main carrier of university education resources sharing. The teaching content can be teachers, students and other individuals, functional departments and schools or other institutions within the school. As the main body of educational resources sharing, colleges and universities should first provide resources to functional departments, teachers and students, so that they can become the providers of resources; secondly, they should be the recipients of resources. In terms of resource allocation, there is still a big gap in China's colleges and universities, which urges universities, especially "key universities" and universities with rich resources, to undertake the important responsibility of promoting resource sharing and opening their own educational resources [12]. The main body of educational resources has a strong demand, which is the basic driving force to promote the sharing of educational resources. Participatory process can meet their interests and needs, and ultimately achieve the sharing of results. In the "cloud" end, the resources of each server are integrated through the big data platform to realize data processing and storage. Through the unified management of large data processing centers, supercomputing storage capacity is provided, and the capacity of each server is expanded through virtualization technology. The figure below shows the big data data resource processing model.

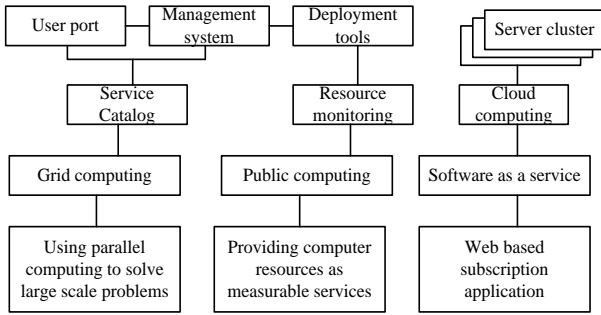


Figure 3. Big data data resource processing model

Virtual technology is an important foundation to realize big data and cloud storage in data center. In this way, the computing power of the data center will be stronger, the data access will be more flexible, the management will be simpler, and it will be more suitable for big data. Virtualization can dynamically map the physical resources of the infrastructure to application drivers. The infra-

structure creates a virtual resource pool, which can manage servers, storage and network in a unified way, and can call the resources in the resource pool whenever necessary. At the same time, resources can be shared on a single physical machine in a virtual machine. The virtual infrastructure can optimize the resource combination and has high flexibility. The virtualization infrastructure isolates the software environment from the underlying hardware infrastructure, allowing multiple servers, storage, and networks to be concentrated in a shared resource pool [13]. The resources in the resource pool can be provided to the application safely and reliably according to the needs of users. By using low-cost industry standard servers, users can build self optimized data centers, while virtualization infrastructure can create dynamic sharing platform services to improve utilization, security, availability and flexibility, and achieve unified distribution of hardware resources. This figure shows the resource sharing structure virtual framework.

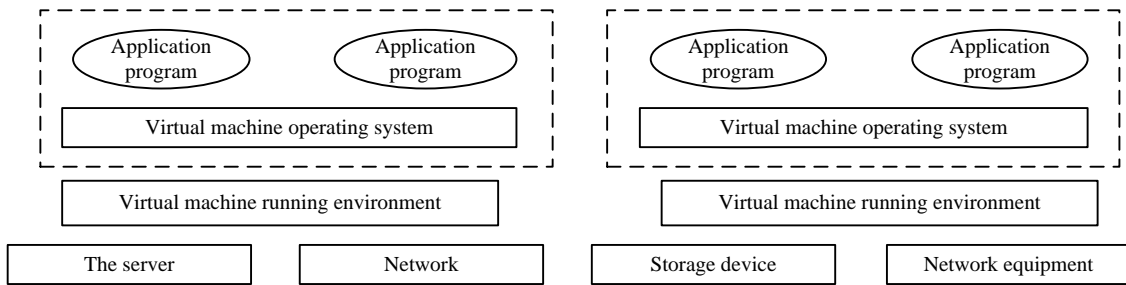


Figure 4. Virtual framework of resource sharing structure

The support layer is mainly responsible for user interaction with resource pool. The user can decide the number of instances to be opened and the setting parameters of the instances. The support layer allocates the resources needed by the instance to the user in the instance resource pool composed of instances within the instance standard set by the user. The support layer is also respon-

sible for the unified management and expansion of the resource pool, monitoring the runtime status of the instance, managing the instance migration when necessary, and verifying and detecting the user's usage behavior [14]. There are four modules in the support layer: resource management, image management, security management and user management. The specific division is as follows.

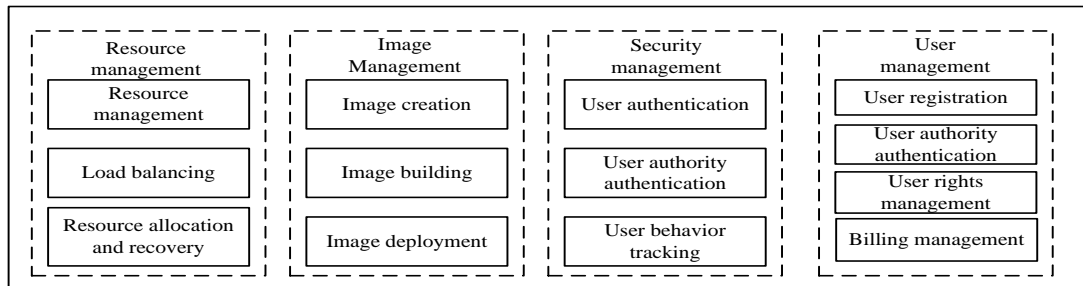


Figure 5. Function optimization of hierarchical module of teaching reform resources

The core part of support layer is resource management in virtual resource pool. Its main task is to monitor the running state of instances in virtual resource pool, and sub-

mit node and instance status to administrator. This layer attempts to dynamically migrate the running instance when the instance fails to run, and then masks the com-

puting nodes. The running status of the whole resource pool is statistically summarized to facilitate the administrator to monitor the running status of the platform in real time[15]. Load balancing is an effective method, which can provide the correctness and flexibility of instance running. It allocates a large number of instances or resources to multiple computing nodes for processing, and then integrates the processing results. It can decide which node's instance request should be handled by which node according to the idle degree of each computing node in the system, so as to reduce the delay. At the same time, avoid wasting the resources on the idle nodes. This is a learning resource sharing service based on big data, which provides a platform for students, teachers and managers to interact with each other. This system is mainly composed of database, learning platform, management platform, access layer and so on. It provides a learning resource sharing service platform for students. Students can search the existing learning resources and subscribe to the learning resources they are interested in. Subscribers need to decide whether to pay or not and how much to pay according to the group rights the students have. The bottom layer is the database system and the learning resource pool, which is rented to store data in the logical layer. It is mainly used to store learning resources. Information storage adopts decentralized storage and centralized management to provide redundant backup. The upper layer is configured with metadata server to manage the distributed information resources;

2.3. Realization of regional teaching resources sharing

In order to better realize the sharing of teaching resources, we should first understand the actual needs, which is the goal of regional digital education resources sharing service and management. In order to formulate effective management and service strategies, we must understand the problems existing in the current regional digital education resources and explore their practical needs. The sharing of regional digital education resources should not only have certain safeguard measures, but also be supported by technology, talents, funds and policies. To realize the sharing of regional digital education resources, an open and efficient support platform is needed. No matter how rich the educational resources, how perfect the service and management, the sharing platform is essential. The elements of the regional education resources sharing system include the actual needs, sharing platform, management services, security mode and the most basic digital education resources. Various factors restrict and support each other, and jointly guarantee the smooth operation of the system. The relationship between elements is represented graphically.

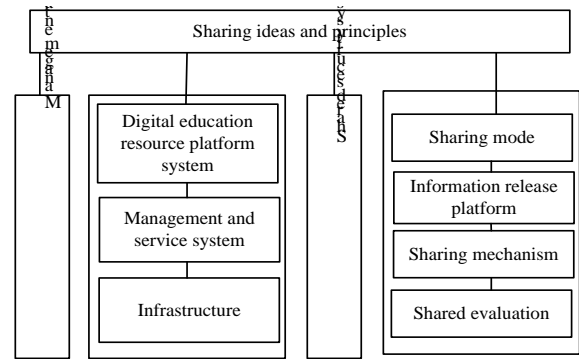


Figure 6. Optimization of regional teaching resources sharing elements

Under the guidance of the concept of sharing, the elements of the system complement each other, and take the actual needs as the starting point to build a digital education resource sharing system; the combination of management, service and sharing platform provides an effective way for sharing, and provides new content and form requirements for the establishment of a more abundant educational resource database to adapt to the current development of information technology; at the same time, as a digital education resource, it is also a digital education resource. The "logistics" support mechanism of the source sharing system provides guarantee for the full implementation of all elements, and provides a certain feedback and evaluation mechanism. It also provides effective suggestions for improving the functions of various elements and links within and between the sharing system. Therefore, as a whole system, each element supports and cooperates with each other, which is an indispensable whole system. Based on the analysis of the elements of digital regional resource sharing, this paper summarizes all aspects that should be considered and involved in digital regional resource sharing. This paper studies the regional digital education resource sharing system. The basic goal of constructing regional digital education resource sharing system is to make full use of the Internet and establish regional digital education resource sharing system, so that users can better understand and use digital education resources. The big data structure is used to separate the teaching resource forwarding plane from the control plane and the service forwarding plane. The layer uses the service scheduling function to avoid the impact of scheduling on the underlying business forwarding and improve the forwarding efficiency. This paper analyzes the transmission of teaching resources from the physical point of view by using the design idea of covering network structure. The sharing of educational resources is a systematic project, which requires the relevant departments to perform their duties and cooperate closely to ensure its smooth implementation. As far as the main body of influence is concerned,

the allocation of intercollegiate education resources in China is mainly affected and restricted by the government, the market and the school. The internal elements of university is an important aspect of the sharing of educational resources among universities. It is the core element of the university community and an important part of the university community. Among these factors, the government and the market are important external factors, and the role of University associations can not be ignored. The transmission of teaching resources in physical state adopts big data structure, which separates the service forwarding plane from the control plane and the service forwarding plane, and makes full use of the scheduling function to avoid the impact of scheduling on the underlying business forwarding, and has high forwarding efficiency. This paper uses the design idea of overlay network structure to analyze the transmission of traffic teaching resources from the physical point of view.

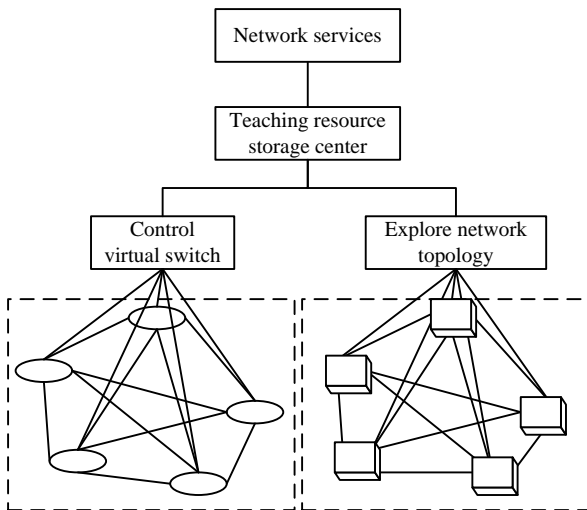


Figure 7. Teaching resource sharing management allocation scheme

The complementary quality of teaching resources is another principle of university educational resources sharing, that is, the educational resources shared by universities should be oriented to all students, that is, the educational resources shared by universities are better than or suitable for schools in theory. Sharing will improve the quality of teaching in our school. When the quality of educational resources shared by other universities is not high or lower than that of universities, we should make them complement each other, or make their subjects, courses, teachers and other educational resources highly complementary to improve teaching quality.

3. Analysis of Experimental Results

In the big data architecture, through the design of small network business with topology structure, the path identification and teaching resource scheduling are tested and analyzed to verify the feasibility of resource management and allocation under the big data architecture. Build a floodlight + mininet big data experimental platform. The platform adopts 2.4.0 virtual switch inside, which can realize the underlying switching equipment, and support the function of path identification and table item release. Floodlight runs on an independent virtual switch and provides a control platform for big data architecture. It is mainly responsible for monitoring network link load and dynamically adjusting table items. Mininet is used to design a network topology supporting information interaction between the network structure and the control platform on floodlight. In this scheme, script language is used to program, the protocol packets are transmitted to the host computer, and the teaching resources are injected into the backbone network. This paper uses 60 services as the experimental object to simulate the resource congestion in the network. All the 60 services are concentrated between switches 1 and 2, that is, between the sub-networks 168.11.0.0/9 and 168.12.0.0/9, resulting in two link congestion. Big data architecture mainly uses an identifier to represent a route. In this process, there will be no replacement or loss, and all of them can flow to the backbone network for identification processing. However, designing an identity route with traditional methods will be affected by the pop-up of the previous identification path, making it impossible for the new identification path to realize a route represented by one identifier. In order to prove that the method using big data architecture can allocate teaching resources more effectively than traditional methods, we need to compare the two methods and get the following results.

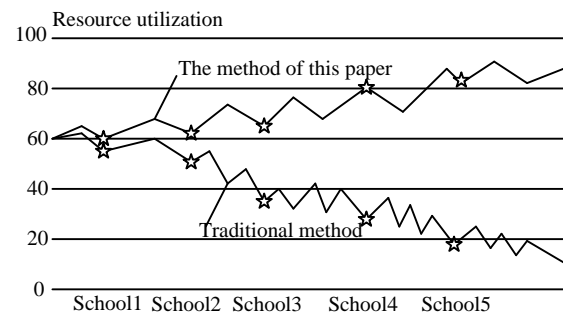


Figure 8. Resource sharing accuracy test results

From the user's point of view, the service quality of the resource management system based on big data architecture and the original management system is compared by taking the system response time as the measurement standard. The response time is the waiting time, which refers to the delay time from the request sending to receiving the server response. The test method of this part

is to simulate multiple users accessing the same request concurrently, and then gradually increase the number of concurrent users, respectively test the big data platform to get different response time, so as to get a comparison chart. Apache JMeter is used to simulate the multi-user access system. Jmete: a Java based software stress testing tool developed by Apache, which can be used to test the performance of static or dynamic resources. For servers, networks, or objects, large loads can be simulated to test its strength and analyze the overall performance of different types of stress. However, jmete: at present, Poisson distribution is not supported. In order to simplify this process, this section uses uniform distribution to simulate user requests. All user requests are evenly sent within 1 second when visiting the system home page. The initial and newly developed systems are deployed on the same hardware facilities to test the consistency of shared resources and the satisfaction of teachers and students. The specific test results are as follows.

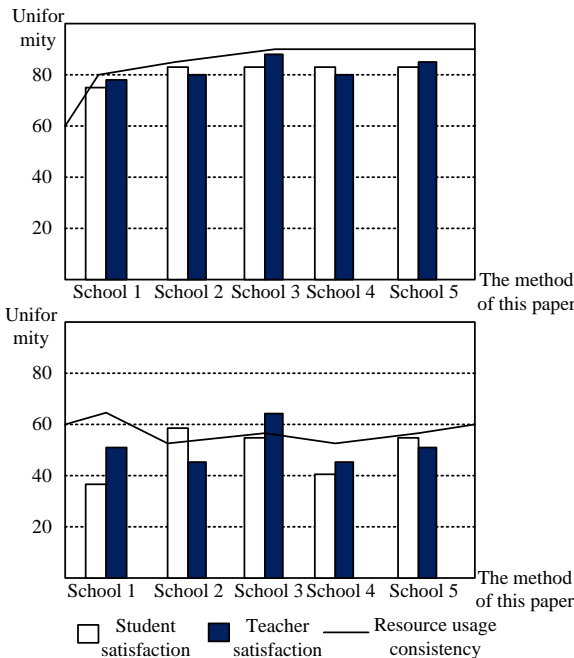


Figure 9. Test results of consistency and satisfaction of teaching resources

Based on the comparative analysis of the test results in Figure 8 and Figure 9, compared with the current use method, the Regional Sharing Mode of teaching reform resources under big data proposed in this paper has significantly higher efficiency and consistency of resource sharing in the practical application process, and the satisfaction of students and teachers has also been greatly improved, which confirms that the regional teaching reform resources under big data The sharing method has better effect in the practical application process, which

can better promote the teaching reform and improve the teaching quality.

4. Conclusion

In order to make a better long-term planning and overall arrangement, we should take the network as the carrier, take the co construction and sharing as the concept, take the systematic organization and management as the coordination, take the reasonable sharing mode as the support, take the perfect rules and regulations and supervision mechanism as the guarantee, take the fair benefit distribution mechanism and the effective incentive mechanism as the promotion, establish and perfect the corresponding rules and regulations and promotion mechanism, so as to promote the learning The construction of science and technology really plays a role of demonstration and radiation.

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