Design of Networked Volleyball Distance Teaching System Based on Big Data Mining

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ABSTRACT

In order to improve the quality of networked volleyball remote teaching, a networked volleyball remote teaching system based on big data mining is designed. Complete the system hardware structure configuration, add and deploy databases and servers in the hardware configuration, and deploy a firewall in front of the volleyball remote teaching system server to enable the server to enter the user-accessible local area network; on the basis of hardware design, the networked volleyball The software structure of the distance teaching system is optimized, and big data mining technology is applied to volleyball distance teaching, as a bridge connecting distance teaching and distance teaching activities, thus forming a brand new volleyball distance teaching ecosystem. The simulation experiment results show that the teachers and students of the proposed system are highly satisfied, which improves the efficiency of networked volleyball distance teaching, and the teaching quality has been significantly improved in the actual application process.

Keywords: Big data mining, Network, Volleyball distance teaching, Local area network.

1. INTRODUCTION

Modern distance education based on Volleyball information technology is a new form of constructing lifelong learning system and learning society in the era of knowledge economy. The progress of technology has a profound impact on distance education. In recent years, distance education has played an important role in increasing educational opportunities, improving the overall enrolment rate of higher education and improving the national cultural quality. With the development of education information, information technology and volleyball teaching technology have changed the time-space relationship of education and the educational organization form of educators and educates [1]. At present, volleyball distance teaching technology represented by G-mobile and Web 2.0 technology has been widely used. The application of distributed virtual reality technology and other new technologies in the field of education has become a hot spot in the field of distance education. With the continuous advancement of education information construction, design a networked volleyball distance teaching system based on big data mining [2]. The information technology in volleyball teaching is

changing the relationship between time and space of education, the relationship between educatees and teachers, and the form of education organization. In the modern teaching environment, the application of new teaching methods, such as distance teaching, interaction between teachers and students, will change [3]. Changing the relationship between the elements in the volleyball teaching system, forming a new volleyball teaching ecosystem, bringing new opportunities and challenges for modern distance education. From the perspective of educational ecology, it is of great theoretical significance to study the impact of new network technologies on volleyball distance teaching, solve the current ecological imbalance, build an open, interactive and participatory volleyball distance teaching ecosystem, and promote the reform of volleyball distance teaching mode.

2. RESULTS AND ANALYSIS

2.1. Design of Networked Volleyball Distance Teaching System Based on Big Data Mining

In order to improve the performance of the networked volleyball remote teaching system, two servers are added to the hardware configuration of the networked volleyball remote teaching system, and the database and server are deployed [4]. A firewall is deployed in front of the server of the volleyball remote teaching system to enable the server to enter the user-accessible local area network. In the system startup phase, the single server mode is temporarily adopted. When a single server cannot meet the system requirements, the system running speed is reduced by adding a single database server to manage and process the system data. If the system cannot meet the requirements, users can also process user requests by adding multiple database servers, multiple internal program processing servers, realizing data read-write separation, and making rotation to internal servers. The system adopts modular design, and uses ASP language of Microsoft company and object-oriented database of access [5]. It can coordinate each function module well, work independently, and facilitate the expansion of each function module independently. Based on this, optimize the CPU configuration of the networked volleyball distance teaching system, as shown in Figure 1.
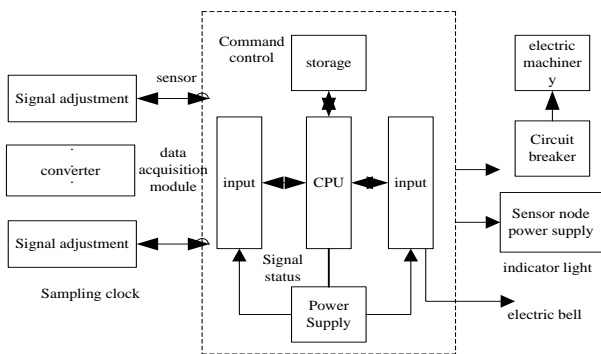

Figure 1 The volleyball distance teaching system CPU configuration structure

2.1.1. System hardware configuration

Furthermore, ado module and ODBC technology are used to access the database, which has the characteristics of low cost, large measurement range and strong anti-interference ability. The system can adapt to the requirements of the environment, and can accurately measure various gases under harsh conditions [6]. The program-controlled teaching system of volleyball adopts Windows Server 2008 operating system. It is equipped with 8-core CPU, 16 g memory and 250 g hard disk. Tomcat60 is a server middleware for remote volleyball teaching. The database server adopts server 3008 operating system, 8-core memory and 250 g hard disk space. Use miskel's particle number principle to adjust the output of database. As a sensor node, the front end of the system completes the data acquisition, processing and transmission. The hardware configuration structure of the networked volleyball distance teaching system is as shown in Figure 2.

The sensor node of the networked volleyball remote teaching system is mainly composed of four modules: data collection, processing, wireless communication and power supply, which realizes the effective collection and transmission of environmental information. There are many abstract knowledge points in the concept, which are difficult for teachers to express clearly and students to understand [7]. Understanding and grasping the rules is the basic premise for judges to correctly use the rules in law enforcement and trial. For example, the back attack should meet three conditions, namely the three-dimensional sense of space and time. Using flash animation tools, combined with 3D Studio to make 2D and 3D animation, describe abstract and complex problems in a scientific and intuitive way, which is convenient for students to understand and master. In the remote monitoring system of volleyball teaching environment, the coordinator uploads the teaching data of sensor nodes through serial mode. Therefore, it is necessary to establish hardware circuit for coordinator. As shown in Figure 3.
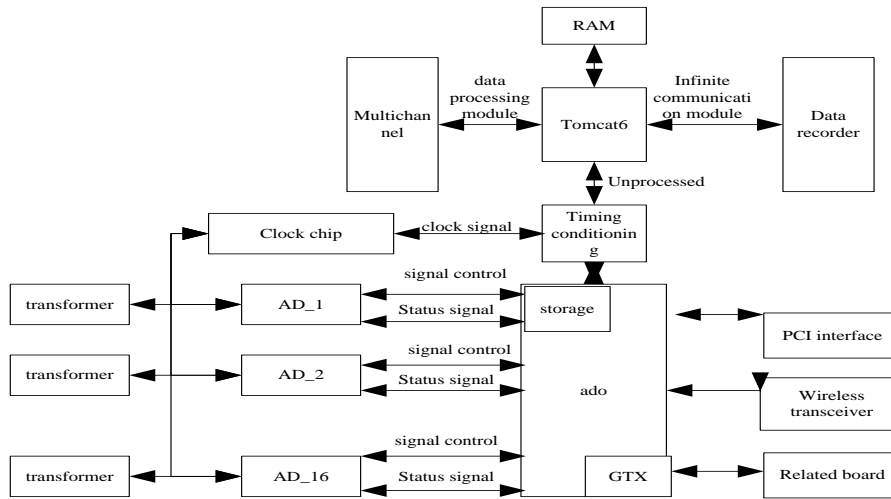
Figure 2 Hardware configuration of networked volleyball distance teaching system
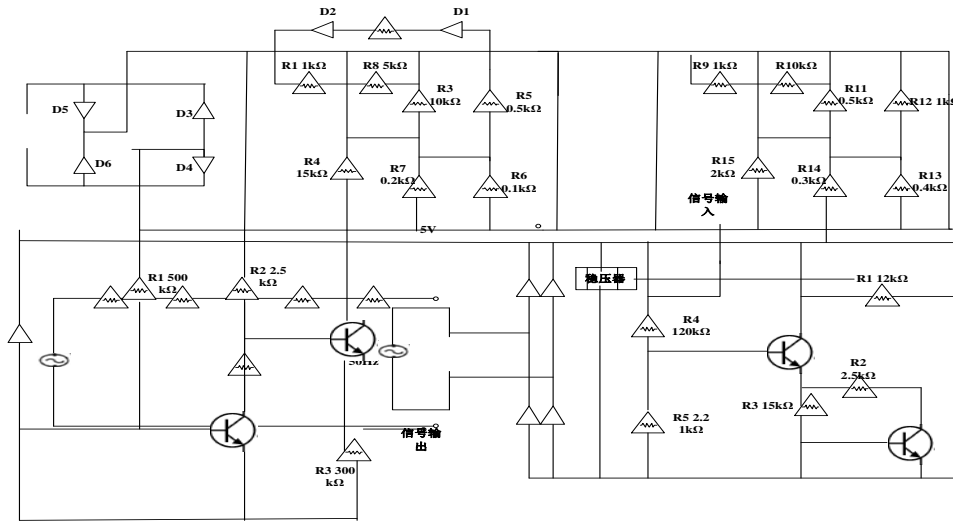

Figure 3 Circuit structure optimization of hardware equipment

It can be seen from Figure 3 that the coordinator must have a stable power supply directly used for data volleyball teaching. The game is held at the venue designated by the rules of the game. Familiar with the specification, layout, drawing, measurement and other knowledge of volleyball match field. Using Photoshop, firewall and other professional drawing software to process the image, combined with the various display effects provided by flash, can well express the volleyball teaching content, with teaching operability [8]. The referee's job is to organize and manage the volleyball match process. Therefore, the referee on-the-spot video recording is an essential material in volleyball teaching. Through video window technology, the collected avi format video signal is intercepted in the form of AVI file, and the playback time, start frame plane, speed, format, scale and other attributes of AVI format video signal are controlled by premiere video tool. By logging on the website and using FTP upload tool, the multimedia network teaching system of volleyball competition rules is uploaded to the campus network for remote teaching.

2.1.2. System Software Optimization

Optimize the software structure of the networked volleyball distance teaching system, apply big data mining technology to volleyball distance teaching, as a bridge connecting distance teaching and distance teaching activities, thus forming a brand new volleyball distance teaching ecosystem [9, 10]. In the planning and implementation of volleyball distance teaching (especially online learning), three factors should be considered in teaching practice: social factors, volleyball teaching factors and cognitive factors. Social existence refers to the ability of the subject to show "real" self in the social emotional level by using volleyball teaching means, that is, the sense of social existence; cognitive existence refers to the degree to which the subject constructs and solidifies the meaning

through continuous reflection and dialogue during its activities. In volleyball teaching, we need to design, promote and guide the process of cognition and social communication, so that the learning results have personal significance and educational value [11]. From the aspects of social survival, volleyball teaching, cognition, etc., the strategy of using network technology to reconstruct the ecology of volleyball teaching is discussed, and a networked volleyball distance teaching framework is proposed, as shown in Figure 4.

The system mainly includes course data management, course development management, course content editing, volleyball teaching management and so on. In this course, the system management module is used to contact the user [12].

After the general user uploads the related document, the landing system chooses the course to study. The important standard system modules of distance teaching training and examination include question bank management, test paper management, online examination management, process monitoring management, marking management, score management, etc. In this process, combined with the experience of previous distance education training, the original operation process was integrated, and the above design mode was changed. An important module of the system is remote video system, which includes online teaching management, online discussion and other functions [13]. As shown in Figure 5.
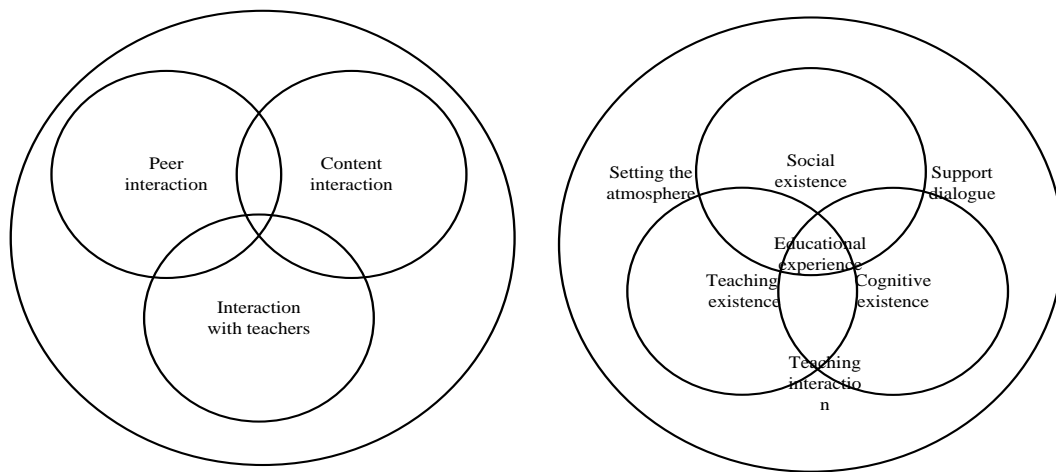

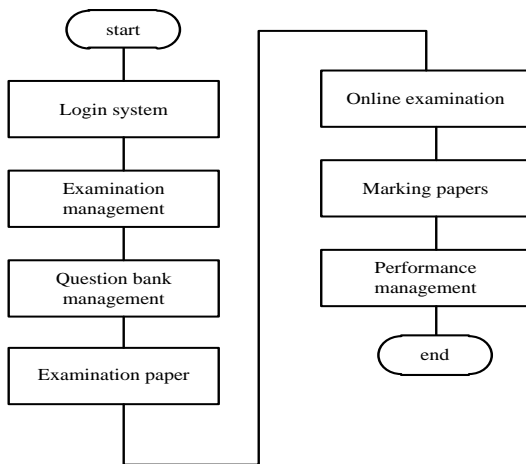**Figure 4** Networked volleyball distance teaching framework

Figure 5 Login process of volleyball distance teaching

First, students log in to the interface, input their own user name and password to search, browse and download the courseware. They can watch online video at any time to make up for their shortcomings. Once students forget the login password, they can retrieve it according to the system prompts. The result is about fast and convenient operation, unable to log in to the system

because of forgetting the password. Based on this, this paper optimizes the login process of volleyball distance teaching, which can be represented by graph. On this basis, a topic based big data mining algorithm is proposed. By grading the difficulty level of students' history major topics, the recommendation is realized for students; on the basis of user clustering, users are recommended from the perspective of individual differences, and the two complement each other [14]. Through certain technical means, the two are combined to achieve complementary advantages and improve the performance of big data mining algorithm. The existing hybrid recommendation algorithm adopts the method of weighted addition of two or more recommendation results in a certain proportion to obtain the optimal recommendation result. If the user application information is a, Pui is the teaching quality of the course, the optimal recommendation is obtained The result is qui, l is distance learning classification registration. In order to meet the basic requirements of the system design. In the actual recommendation algorithm, the prediction score of hybrid big data mining can be written as follows:

$$S_{ui} = (1-\alpha)P_{ui} + \alpha Q_{ui}\|^* L \tag{1}$$

In the structure of network volleyball distance teaching system, courseware is an important module, which has an important impact on the dynamic hierarchical structure of the system. Based on this, combined with the courseware content, it establishes the connection between knowledge points of the network volleyball distance teaching system module, so that students can jump or learn when necessary, organize the content page of courseware and establish relevant links. The overall structure of the specific network distance teaching system of volleyball is as shown in Figure 6.

Based on the structure of the above figure, network volleyball network distance teaching has the characteristics of diversity and ecology [15]. It promotes individual learning and social learning, and forms a harmonious and symbiotic learning relationship between students' formal learning and informal learning. Volleyball online distance learning is a hybrid distance learning ecosystem that is supported by new network technology and promotes the transformation of distance education methods.

2.1.3. Realization of Online Volleyball Teaching

Under the conditions of determining the principles of networked volleyball remote teaching and clearing the ideas of networked volleyball remote teaching, further realize the teaching of networked volleyball remote volleyball and make the networked volleyball remote teaching system meet the design requirements. In order to effectively improve the stability of
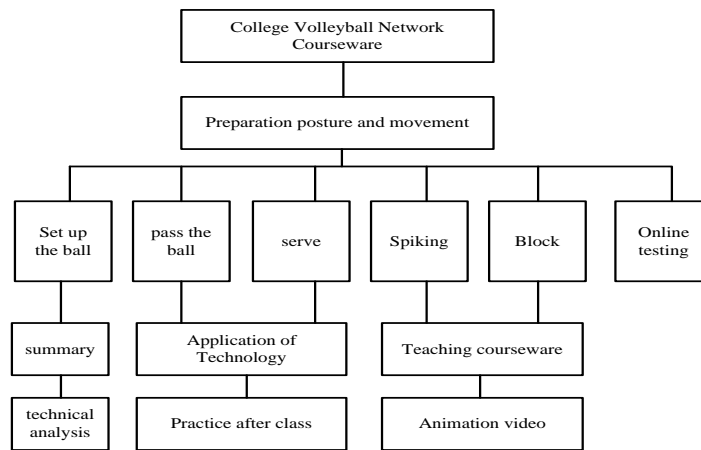

Figure 6 Network distance teaching system structure of volleyball

the system and avoid abnormal operation state, the data and data reserve must be determined according to the fields in the design standard control table when determining the data type and size [16]. In the design of volleyball distance teaching platform, we need to control the teaching methods of different venues. Continuously clean up internal redundant data, ensure the quality of data information, speed up the operation of the system, and improve the efficiency of database management. In order to ensure the reuse of information, redundant data must be removed. Based on the principle of security, we should improve the system security protection standards, integrate internal information resources, create a good operating environment, prevent internal information embezzlement and malicious tampering, and ensure the safety of students' information leakage. Fourth, adhere to the principle of standards. When dealing with the field relationship of tables in database, we should adhere to the principle of standardization, sum up the past experience carefully, ensure that all tables meet the design specifications, and improve the design quality of the system [17]. Since the networked volleyball distance

teaching system has various functions and types, it is necessary to further standardize the content of the networked volleyball distance teaching model form, as shown in Table 1.

Based on the data in the table above, students can upload their learning needs through this module. For example, there is a theme in the system: the course you want to learn most. Users can add what they want to learn to this topic. This system mainly includes the modules of course data management, course development management, course content editing and teaching management. On this basis, administrators and students can upload training related information to the platform of volleyball distance teaching system for sharing, and the administrator has the right to review and manage the information uploaded by students [18]. The teaching materials of this course are presented in the form of documents, including word, PPT, Excel, PDF, txt and other mainstream formats, which can be downloaded by students themselves. Establish and develop internal personal training courses, university culture, new teacher training, vocational skills training, etc. This course management includes course

development, course creation, course tracking, etc. Administrators can transfer internal course records and exam questions to the volleyball distance teaching system. It mainly includes two parts: learning content and course content. The whole module is mainly to operate the corresponding table. Through the use of data courses, students can systematically obtain the relevant information of the course and realize the integrated management of the curriculum. According to the actual situation, multiple queries can be carried out to improve the effectiveness of processing. Based on this, further optimize the operation process of the network volleyball distance teaching system, the specific steps are shown in Figure 7.

Table 1. Volleyball distance teaching model teaching information

| Order	Content	Name	Function
1	Teaching content table	XJ-XXNRB	Complete the record of teaching content in the system
2	Teaching list	X-XXMLB	Complete the teaching content list information record
3	Landing schedule	XJ-DLSB	Complete user login record
4	Preparation of teaching schedule	XJ-HYWJB	Store teaching data of probationary party members
5	Registration form	X-BMSHB	Complete the record of audit data
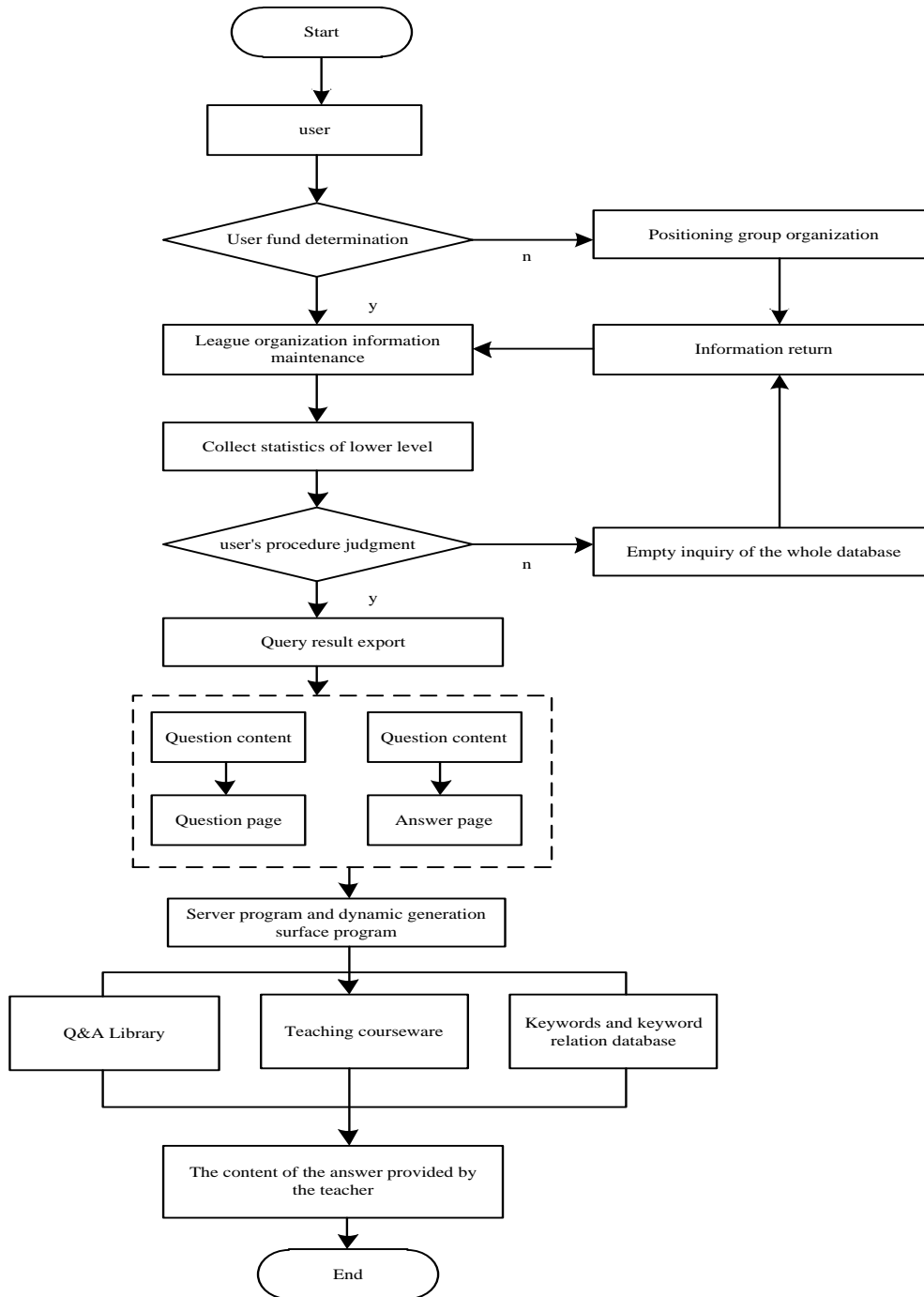
Figure 7 Operation process of network volleyball distance teaching system

This system optimizes the volleyball teaching process, improves the teaching effect, and combines with certain teaching strategies, has the advantages of optimized combination, complementary advantages, synchronous implementation, integration of the overall teaching effect and so on. Therefore, it is very important to improve the quality of students, cultivate sound personality and achieve the purpose of cognition. The application of this system to a certain extent reduces the repeated work of teachers, integrates the teaching resources of network volleyball, realizes the natural optimization and optimal combination of teaching objectives such as teachers, students, venues, equipment, etc., embodies the educational concept of optimizing the teaching process, and fully develops the human resources of network teaching. Through the combination of network 2.0 technology and distributed virtual reality technology based on mobile communication technology, a brand-new volleyball distance education environment is created for the new network technology. The distance learners can obtain the learning resources they need through various ways,

and have dialogue and communication with teachers and other distance learners, so as to promote students' learning and mastering of volleyball technology Improve the quality of teaching effectively.

2.2. Analysis of Experimental Results

In order to verify the actual application effect of the networked volleyball distance teaching system based on big data mining, combined with the actual situation, the experiment was tested compared with the traditional teaching system. Through interviews, letters and other forms, senior volleyball teachers, coaches and referees were consulted about teaching content, teaching methods and teaching means, and invited multimedia technology and web page production Experts in the field participated. Inspired by teachers, multimedia volleyball teaching system has been applied in volleyball teaching. Through the video and multi-dimensional animation stunt, this paper makes a comprehensive and in-depth simulation and demonstration of the space-time characteristics of the venue, equipment and various fouls in the volleyball match, so that students have a clear and profound understanding of the concept of competition rules and referee methods, so as to better grasp and use these concepts. Sixty students were selected to participate in the experiment. Among them, 40 were male and 20 were female. Each month, the number of video teaching for volleyball teachers and students is set at 5, 10, 20, 30 and 30, while the number of students teaching volleyball through the network is 10, 30, 50 and 70, and the number of teachers teaching through the network is 20, 20, 20 and 20 respectively. Display the specific settings in the Table 2.

The 78 undergraduates from the Department of Physical Education, Humanities and Social Sports in a physical education college are the research objects. It is divided into experimental type and control type. The experimental class adopts network teaching, and the control class adopts traditional volleyball teaching. Using flash, firework, and other software, a network-based multimedia volleyball teaching system was developed on the windows XP system. Finally, it was uploaded to the campus network of a sports college through FTP. Before the experiment, cognitive testing was carried out on this system and the traditional system by cognitive testing, and statistical analysis was carried out according to the test results to ensure its homogeneity. The two systems use questionnaires and cognitive testing methods for experimental research. Through the above parameter settings, using the form of questionnaire survey, compare the teacher and student satisfaction levels under the traditional teaching system and the teaching system of this article, and record, as shown in Table 3.

According to the data in Table3, the application of this system can make the students' satisfaction level reach 80%, and the teacher's satisfaction level can reach 100%, while the traditional system's teacher and student satisfaction levels are low. Volleyball teaching is very popular among students in terms of courseware design, learning interest, teachers' teaching methods, and teaching organization forms. Compared with the traditional teacher-centered and textbook-based teaching model, online volleyball has obvious advantages in teaching content, interaction, and communication, and can cultivate students' autonomous learning awareness, cooperative learning ability, and willingness to explore independently and habits.

In order to further verify the effectiveness of the system, this paper compares and analyzes the network volleyball distance teaching efficiency between this system and the traditional system, and the results are shown in Figure 8.

Table 2. Parameter setting

Subjects	Teaching times	Number of Teachers	Attendance	Comparison of video frequency between teachers and students
Experimental data	5	10	10	1: 1
Experimental data	10	20	30	2: 3
Experimental data	15	30	50	3: 5
Experimental data	20	40	70	4: 7

Table 3. Comparison of satisfaction of volleyball distance teaching under different systems

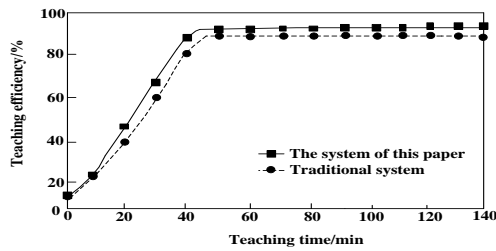| Behavior object	Traditional teaching system	Text teaching system
Number of teachers online	10-15	15-20
Number of students online	20-45	50-75
Student satisfaction	40%	80%
Teacher satisfaction	20%	100%

Figure 8 Comparison of the efficiency of network volleyball distance teaching

According to figure 8, the network-based volleyball distance teaching efficiency of this system can reach up to 90%, while that of the traditional system is only 89%. This shows that the network-based volleyball distance teaching efficiency of this system is higher, and the application of this system can improve the effect of network volleyball distance teaching.

3. CONCLUSION

With the rapid development of modern information technology, online distance education is a new form of education. Because of its strong advantages, more and more people pay attention to it. Distance education provides convenience for online learning and teaching, but also exposes many problems. In the distance teaching of volleyball, most of the teaching behaviors are realized through technical media, and learners can also complete their learning with the help of various technical media. In the traditional classroom teaching, the social psychological environment for acquiring knowledge has disappeared from the media space constructed by technology. The effect of distance education is restricted by various factors. As the main carrier of teaching content, network course must be carefully designed to realize the effective transfer of knowledge. Therefore, it is very necessary to study and explore the interactive mechanism in Volleyball distance teaching. Based on this, this paper puts forward the design method of network volleyball distance teaching system based on big data mining. Through the good design of teaching and learning interaction, it realizes the re-integration of distance teaching and maximizes the effect of volleyball distance teaching. At present, there are many theoretical and empirical studies on the interaction of volleyball distance teaching at home and abroad, but there is still a lack of operable interaction design framework. On the basis of analyzing the interactive characteristics of volleyball distance teaching at home and abroad, and summarizing practical experience, this paper tries to put forward the frame model of interactive design of volleyball distance teaching.

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