Design of Computer-aided Teaching Network Management System for College Physical Education

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Abstract. According to the actual situation of physical education, this paper studies the auxiliary network system of physical education teaching, applies network technology to realize the auxiliary physical education teaching, and designs an intelligent physical education teaching system based on the dynamic characteristics of physical education teaching. The system can make teaching more flexible, and the teaching process is not limited by time and place, and can meet the needs of students in different situations. The design and implementation of the physical education teaching module are analyzed. With the Internet application system as a tool to choose network teaching, system functions and database server are built to realize the login of the system. In addition, the system can also realize the online management of students' information and physical education teaching information, so that students can learn in different degrees. Therefore, compared with other systems, this design is more targeted and can achieve better teaching effect.

Keywords: physical education; computer aided; information management; network system.

1 INTRODUCTION

Physical education teaching activities have a certain two-way and practical nature [1-2]. Teachers should carry out action decomposition demonstration while giving lectures, and consolidate students' understanding and memory with the help of intuitive and vivid teaching forms, so as to improve students' Sports literacy and adapt to the more advanced sports and teaching management reform in the future. Murathan and Kaya believe that the intelligent physical

education teaching system is mainly a teaching method to realize teaching by using multimedia [3]. It can be taught by different models according to the learning ability, without fixed teaching time or teaching place [4-5]. It can make the management of physical education more convenient and scientific, and make the teaching of sports more convenient and efficient. Qin et al use information technology to reform the physical education teaching management actively [6]. Therefore, the teaching effect is not ideal, and it is difficult to get supervision and feedback. Students can query relevant information through the visit of teaching system and communicate with teachers.

With the continuous development of multimedia technology and computer technology, computer-assisted instruction (CAI) is widely used. The teaching content of CAI is mainly displayed in the form of graph, text, sound and video. The hypertext technology is used to process the information order to get the hypermedia system which is suitable for learners' associative thinking. With the popularization of Internet, the application scope of computer-aided instruction is gradually expanding [7-8]. The usage rate of computer-based teaching, computer-based learning, online education and online education is gradually increasing. The traditional teaching methods mainly show that teachers teach in person, which has the disadvantages of time and place constraints, and the storage mode of teaching resources is limited. Therefore, modern computer-aided teaching can effectively solve this problem through network and multimedia information technology, and realize the maximum sharing and real-time interaction of physical education teaching resources. Cai is a kind of modern teaching technology that makes traditional physical education teaching content media and digital processing, and then uses computer network technology to release and share teaching resources. Therefore, this paper designs a computer-aided physical education teaching resource management system to improve the quality of physical education. The intelligent physical education teaching system designed in this paper can stimulate students' active learning and manage their learning situation. The intelligent physical education teaching system designed in this paper can stimulate students' active learning and manage their learning situation.

2 THE DESIGN OF FUNCTION ARCHITECTURE OF PHYSICAL EDUCATION TEACHING INFORMATION MANAGEMENT SYSTEM

For sports network teaching system, as a carrier, it plays an auxiliary role in physical education teaching. Therefore, for sports network teaching system, its design must be based on the needs of users. Compared with the traditional teaching, books become computers in sports network teaching, which has a very important impact on the quality of network courses and the learning effect of learners. Based on the primary teaching principle, Nicolas points out that according to the problem as the core, learners are required to flexibly apply knowledge and realize the integration of knowledge and life, which is actually the embodiment of educational practice [9]. Have feelings about direct experience and indirect experience. The direct sublimation and summary of knowledge are realized from direct experience, but most of what we get is indirect experience. Based on the relationship between direct experience and indirect experience, indirect experience is verified by indirect experience, and indirect experience is obtained from direct experience.
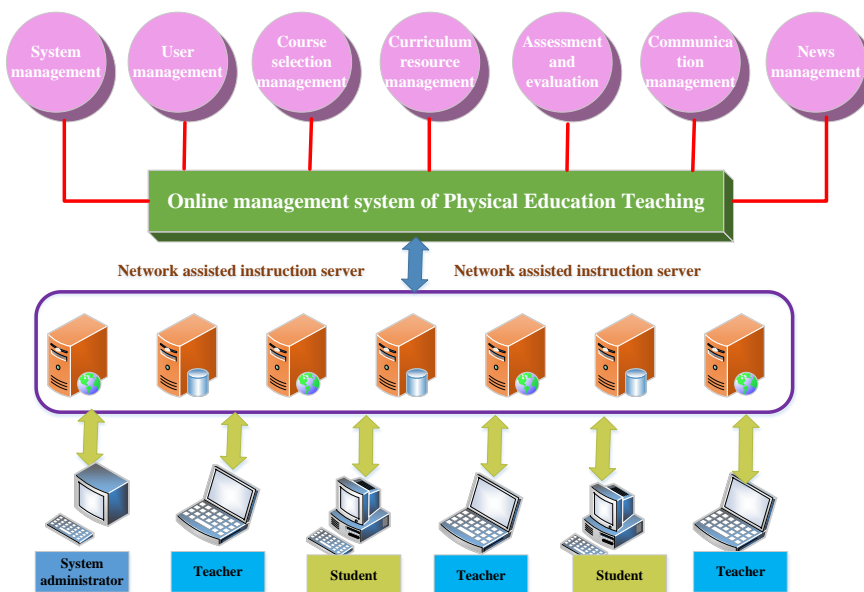
2.1 System Function Design

Through UML use case analysis, the roles of the system are divided into teachers, students, administrators and so on. Therefore, the system functions are divided into system management, user management, course selection management, physical education curriculum resource management, assessment and evaluation, communication module, news management and other different application modules. The specific function design is shown in Figure 1.

Course selection management involves a lot of data and information, and it is also the most complex work in physical education curriculum management. Therefore, in order to ensure the

normal operation of the module, a large number of technologies must be used to ensure the students' choice. In this module, the queuing principle is adopted. When the administrator sets the number of PE course applicants, they will queue according to the time selected by users, so as to ensure that users can choose courses [10].

The evaluation of students mainly includes theoretical answer sheet, student score entry, score query, score modification and result analysis. The summary of students' final scores is based on their usual performance, the number of absenteeism or leave, the positive degree of answering questions in class, the final examination results, and the comprehensive evaluation according to certain score weight. Peer evaluation and expert evaluation are used for comprehensive assessment, so as to understand the information of teachers in preparing lessons, teaching methods and students' reflection. And timely provide information feedback to the majority of teachers, in order to facilitate the timely change of teaching and teaching methods, so as to realize the dynamic assessment and evaluation of teaching management.

**Figure 1:** Function design of network aided teaching system for Physical Education.

The management of physical education curriculum resources includes different sub modules, such as the learning of teachers' teaching resources, the management of excellent courses and examination question bank. Through this module, students can learn different teaching resources and related excellent physical education courses. Teachers can upload relevant sports videos, multimedia courseware materials, etc. at the same time, they can also update and maintain the question bank of physical education theory examination in real time.

Communication module mainly contained the form of BBS module to achieve the network interaction between teachers and students. Module combined with the requirements of physical education curriculum, divided into different mainstream, so as to facilitate students to carry out different exchanges for different topics.

News management is mainly used by teachers and administrators. According to the course arrangement, release the relevant system information and course arrangement information, so as to facilitate users to view and adjust.

2.2 Overall System Architecture

Combined with the practice of system user application, relying on campus network, students can access the system through Internat / Internet, so as to ensure the system access at any time and anywhere. This mode only needs the user to install a web browser to access the system, and realize the access to various functions including course selection, physical examination, physical education learning, etc. For the design of sports teaching information management system, which can be divided into "resource management, teaching quality and operation management" three module structure. The specific architecture is shown in Figure 2.
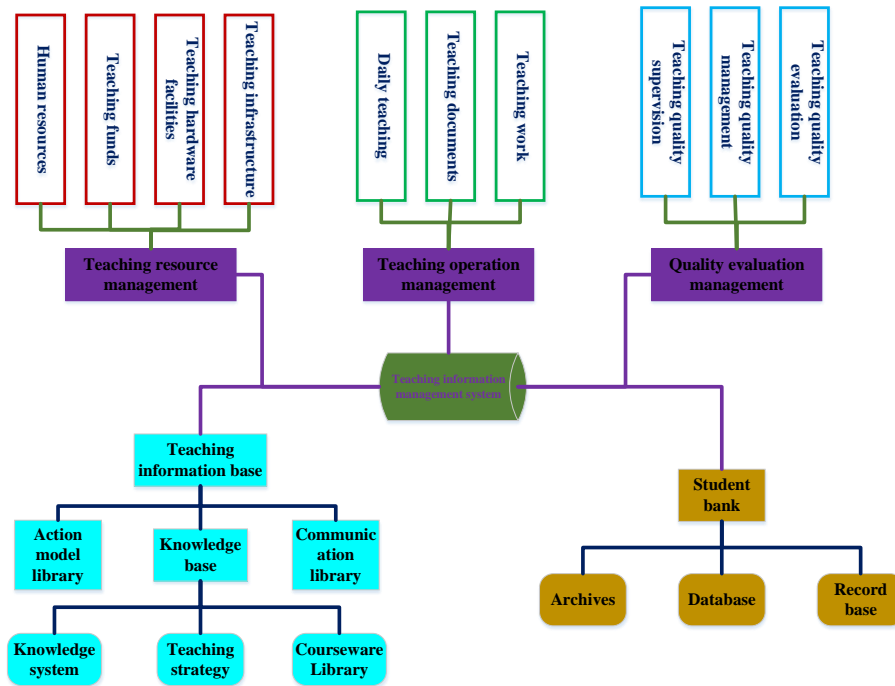

Figure 2: Schematic diagram of overall structure.

The overall data flow of the system is to register or not to register, click on different functions through web browser, respond to the application server through ASP.NET after clicking, and assign the user's needs to different functional modules through the logic processing function of the application server. The application function uses COM.NET component to realize the interaction with the data layer, and through the ADO component in the user layer, the results of data search and query are fed back to the user, so as to realize the flow direction of the whole system data. For this design of physical education teaching, the main functions of the system should retain management, query, statistics three major functions.

1) Management function: managers can release sports related news and sports teaching notice. We can also arrange classes for physical education teachers and students, and make physical education teaching plans.

2) Query function: managers, teachers and students in the system can query the information related to their respective permissions in the system.

For this design of physical education teaching information management system, the system is constructed into three-tier structure, to ensure that the system users can practice the application of the system. Ensure that users can rely on the campus network, ensure that students can through the Internet, real-time through the user key anti-counterfeiting system. The specific architecture of the system is shown in Figure 3.
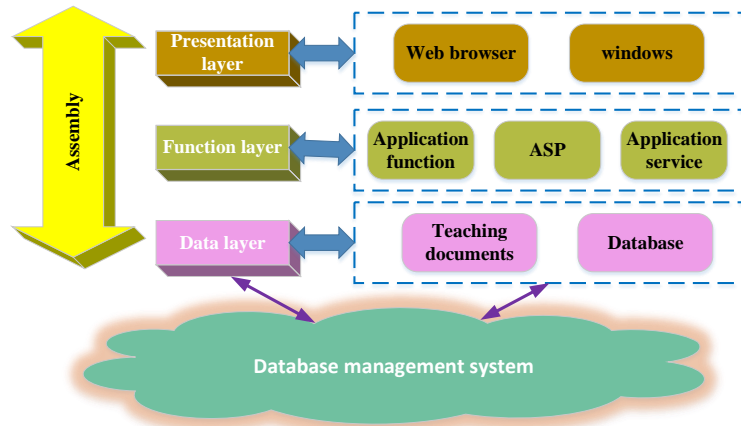
Figure 3: Overall design architecture of the system.

For the architecture of the system, ensure that users can click on different functions of the system through web browser, and then can respond based on ASP.NET and application server. User requirements are assigned to different system function modules to ensure that the system can feed back the results of user requirements to users.

3   DESIGN AND IMPLEMENTATION OF SYSTEM MANAGEMENT MODULE

3.1   System Database Design

In this physical education teaching information is mainly composed of data access components (MTS) and SQL Server database software. In practice, MTS can perform the operation of accessing database, and can use ADO to process data object, and use data interface to access control database SQL server, the main database table design is as follows:

1) First of all, it is the administrator table 1 in the system. For this Table 1, if there are multiple different administrators in the master of the system, it is necessary to set different operation access permissions in the system for different administrator information, so as to distinguish administrators.

Describe	Listing	Data type	Length	Describe	Listing	Data type	Length
User name	ID	Char	30	Name	MN	Char	60
Password	PD	Char	30	Department	MD	Char	60
Permission flag	PF	Char	30	Telephone	MP	Char	60

Table 1: Administrator table.

2) Secondly, there is a teacher user table in the system data. In the design of the Table 2, the necessary information of the table should be retained. It can use the teacher number as the user name of the object, and can ensure the uniqueness of the table data.

Describe	Listing	Data type	Length
Teacher	TID	Char	30
Password	PWD	Char	30
Name	NM	Char	50
Telephone	TPH	Char	50

Table 2: Teacher user table.

3) At the same time, in the system database, it also contains teaching resource table, which is mainly used to store all kinds of teaching resources, as shown in Table 3. It can not only store "pictures, audio, documents", but also store the physical education teaching resources uploaded by teachers. At the same time, in the database of the system, it can also automatically record this information to download, query and browse these files according to their learning needs.

Describe	Listing	Data type	Length
Brief introduction	RM	Char	120
Resource name	RN	Char	50
Storage address	RA	Char	100
Resource number	RID	Char	50
Type	TP	Char	50

Table 3: Teacher resource table.

3.2 Sub Module Design

(1) Login control

The user enters the first mock exam to make corresponding actions, prompting to enter user name and password, inquiring whether the database is legal or not, such as the legal setting of the corresponding interface parameters to enter the next module. The flow chart is shown in Figure 4.

(2) Teacher management

Only the system administrator has the authority to manage the teacher user. It is mainly to add, delete and modify the teacher table in the system database. Due to the introduction of user confirmation mechanism, there is also a user confirmation module, as shown in Figure 5.

(3) Student management

Only teacher users have the right to manage students. In the student management, it is mainly to add, modify and delete the student tables in the system database.

1) Increase students

The personal information of students (including the class and student number information not recorded in the student table) is input by the teacher. If the user name is not the same as the user name of the existing student, it will be added to the student table.

2) Modify students

The teacher can modify the information except the user name in the student table of his class. Since the personal information in the student table does not include the class and student number information, the student number of the class is modified by modifying the corresponding record of the student in the student class table.
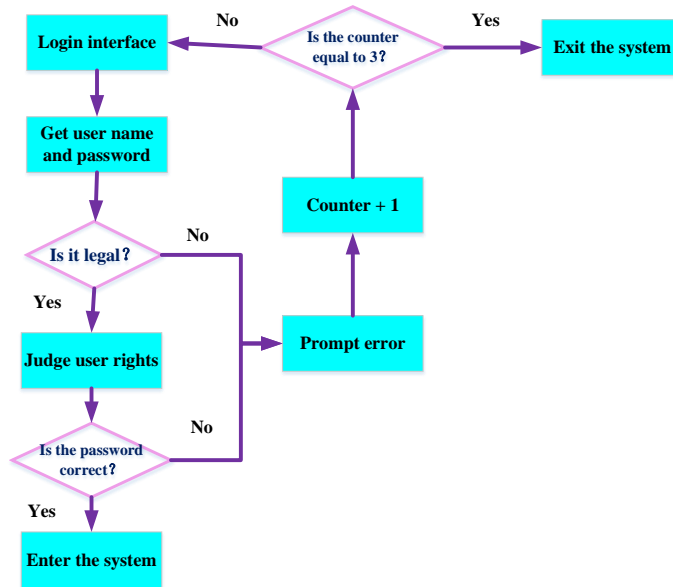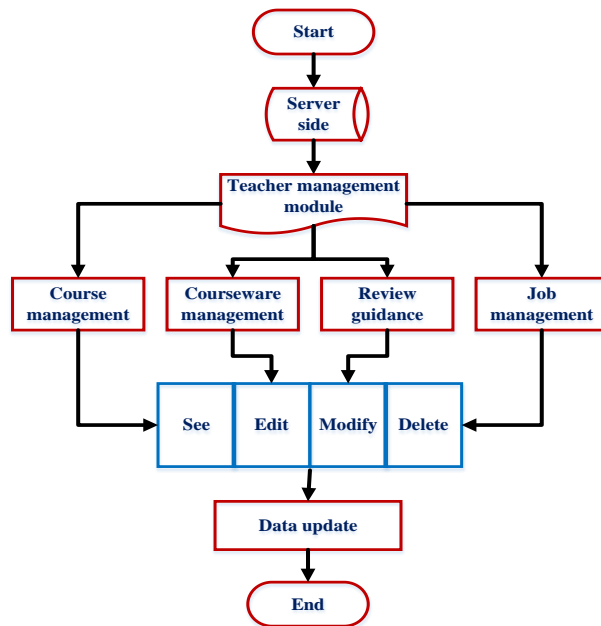

Figure 4: Login control flow chart.

Figure 5: Flow chart of teacher management.

(4) Class management

   System administrators and teachers can manage classes, but administrators can manage all classes, while teachers can only manage classes related to themselves. Its function is to add, delete and modify the class table and teacher class table in the database.

4   SYSTEM TESTING

4.1   System Function Test

In order to cover all functional requirements, the first work to be done should be based on the sorted functional requirements and establish corresponding functional test cases. The tester is the implementer of the test case, and the tester and designer constitute the evaluator of the test results. There are two methods for functional test cases: boundary value and equivalence partition. In this paper, through the establishment of functional friendly and performance management function cases to study the generation of test cases. Take the course assignment module as an example to test the function of the system. In the experiment, 20 users are specially invited to experience the computer-aided physical education teaching resource management system. The survey results of the system resource storage application are shown in Table 4.

Investigation questions	Results statistics
Average daily usage	About 6 times on average
Average daily usage	The upload was very timely
Convenience of operation	Easy to use
Resource storage capacity	Large resource storage capacity
Do you want to continue using it	Simple operation fast upload

Table 4: Survey results of system resource storage application.

According to Table 1, it can be seen that this system is more convenient to operate in the storage of teaching resources, and is loved by users.
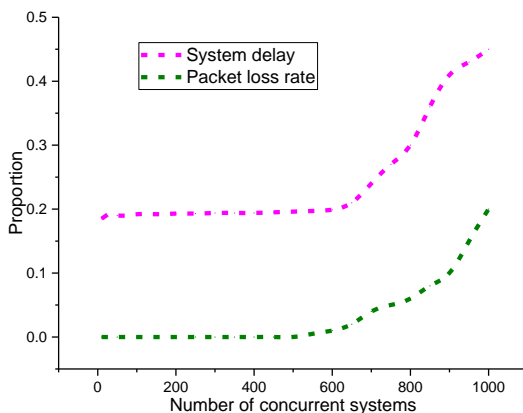
4.2   System Performance Test

Generally speaking, performance testing mainly focuses on stress and load testing, in short, the ability of concurrent users. If the number of users is increasing, how should the system deal with the business to ensure that there will be no collapse or bottleneck phenomenon. For concurrent testing, we should focus on testing the important business and core functions under abnormal and normal conditions, so as to verify the stability and security of the system. In the specific test process, we must select the test module and input the formal business data. Through the simulation of the actual application environment, we can realize the accurate evaluation of the system performance. The results of performance test can judge the bearing capacity of current network equipment, server and operating system, and determine whether they are suitable for the system requirements, and whether the system will face the load bottleneck in this running state. Generally, user concurrency is an important way to measure the performance index. It can not only increase the user usage, but also test the response time and speed of the system.

   The speed of the system can be reflected by the number of access processes. Therefore, the experiment implements pressure detection on the computer-aided physical education teaching resource management system, and sends large-scale short messages through concurrent login operation in a certain period of time to detect the performance load capacity and information

processing ability teaching resource management system. In this paper, the receiving situation of the receiving end of the system and the integrity of the system sending are detected by counting the content and quantity of the SMS sent. The experimental results show that the system performance test results are shown in Figure 6. The accuracy of test equipment is shown in Figure 6.

Figure 6: System performance test results.

According to Figure 7, it can be seen that the system still has no obvious packet loss phenomenon when the amount of data concurrency increases, which proves that the system can run normally even under the pressure of many users, and fully meets the rigid requirements of physical education teaching application. To detect the page performance parameters, we need to carry out parameter statistics and Analysis on the page running situation of this system, and get the summary of page operation in this paper, as shown in Table 5.

Figure 7: Accuracy test results of running equipment.

Abstract	Result
Active users	15
Total number of users	20

Computer	All hosts
Time consuming	18
Running state	6 minutes

Table 5: System page running summary.

When the number of users increases, the CPU time consumption of this system still does not increase significantly, indicating that the system has excellent performance in business processing and data storage.

5   CONCLUSION

The physical education teaching system based on network breaks the limitation of time and space of traditional teaching mode. This design is more targeted than other systems. It realizes the sharing of information resources, makes full use of campus network resources and information management system, and truly realizes the service of information resources for teaching, scientific research and school management. The efficiency and quality of work have been improved. The principle of efficient, reasonable and fair evaluation has been basically achieved. The concept of modern information management of managers and teaching staff has been strengthened, and the level of computer management has been improved. In addition, it can feed back the students' mastering situation in real time, so as to make a more targeted physical education teaching plan. It has the characteristics of interactivity and autonomy. It can feed back the students' mastering situation in real time, so as to formulate a more targeted physical education teaching plan, cultivate students with higher comprehensive quality, and indirectly promote social progress and national development.

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