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Application of web-based multimedia network teaching in the track and field teaching of colleges and universities

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ABSTRACT

Multimedia network teaching, as a bran-new teaching approach, has broken through the restrictions of space and time of traditional education, changed the current situation that the teacher is "speaking the hype" on the podium, but the students are "sleepy" at the desks, and has provided the flexible and free learning environment for students to make students become active from passivity and also makes the teacher no longer prepare lessons and give lessons repeatedly, but makes the teacher focus on improvement of teaching quality. Due to later development of network teaching in our country, especially later starting in aspect of track and field teaching in colleges and universities. This paper focuses on introduction of the inevitability and superiority for application of multimedia network teaching in track and field teaching in colleges and universities.

KEYWORDS

Network teaching; Teaching quality; Resource sharing.

INTRODUCTION

With rapid development and popularization of network, great changes have taken place in educational mode, remote education has become gradually an indispensable teaching method in teaching, and more and more people are starting to select remote education as a major mean for study.

However, the development and popularization of remote education are not perfect due to vast geographic area, a large population in our country, and unbalanced distribution of computer and network resources, problems of this kind or that kind may occur unavoidably in practical application of remote education platform, which needs to be improved and updated. The multimedia network education first appears in the nineteen nineties, high-efficiency arithmetic capability and unlimited capacity of store are the biggest advantages of network technology, so, since the multimedia network teaching has been put forward, more and more people are making research to it. This topic is very the research on advantages and feasibility of application of cloud computing on the remote education platform, through the general argumentation, the application of network in multimedia education platform has been put forward, to well resolve the deficiency of traditional network education platform by the high-efficiency arithmetic capability and unlimited capacity of store[1]. The practice shows that network education platform integrated with multimedia is provided with a large degree of progress in improving teaching quality, sharing teaching resources, lowering educational costs, giving lessons flexibly and other aspects, which is more helpful for large-scale promotion of remote education.

DESIGN PHILOSOPHY OF MULTIMEDIA NETWORK RESOURCE SYSTEM

At present, network speed is not ideal enough in our country, and the network and server cannot bear centralized access, the schools carry out remote education often build several sets of shunt servers of the learning centre outside the school, most of them are adopted with B/S mode, with over-all structure as shown in Figure 1. The central learning centre servers are set up in the main campus, other learning centers are built with teaching resource servers respectively, and all backend servers of the system have been stored with learning resources, including documentation resources and video resources, for free use of users. Currently, judging from the application effect of the system, there are two evident deficiencies for this running mode[2]: (1) most learning resources in educational system are provided with huge cubage, the resources with large data volume can be transmitted quickly by the network speed in our country, therefore the resources in some servers of the platform fail to be synchronous with other servers due to causes of network transmission, resulting in incompleteness of learning resources in some servers or not to be the latest, thus learners often cannot learn the latest knowledge in time; (2) the students are required to register for several times under this composite pattern, the account number between the servers cannot be shared, that is to say the account number registered in this server cannot be used to study and download the resources in that server, if the student replace another server to study, he or she must register again, which is very troublesome.

The new educational platform put forward in this paper is fully adopted with the advantage of cloud computing, to store the resources in each central server into large storage, automatic search and the best path for data transmission selected intelligently function are provided on remote educational platform, and servers can be reserved each other, and switched over each other, once a server breaks down, the platform system can be switched to another adjacent server automatically, and this process cannot be felt by the user, this design allows student no longer register again for several times when using different servers, with all resources in servers available for once registering on the platform, to realize the resource sharing in large extent; meanwhile, the reliability of the whole platform system is enabled to be improved greatly. The system is adopted with modularization design philosophy, with clear logical structure.

BASIC STRUCTURAL MODE OF MULTIMEDIA NETWORK RESOURCE SYSTEM

The overall structure of multimedia network educational platform designed in this topic is composed of base layer, service layer and application layer, is divided into five modules in total,

including: data treatment, monitoring, process procedure, decision, base module, etc. among them the resource database of base layer platform system is required ensure the reliability and stability of base resource database by hardware, software, virtuality and other multiple technologies. The base layer provides base support for service layer and application layer, such as providing computing and processing capability and memory function, the base layer can be said to be like the resource database of the platform system. Because the service processing module of the system is located in application layer, the core of the platform system belongs to the application layer, the service processing module is continued to be detailed to: comprehensive monitoring, right and power distribution, service processing procedure, signing in of the system automatically, document processing, information collecting, searching and other submodules. The application mainly provides interactive interface for students and other programs. Various service functions of the platform system are included in the service layer, such as document transmission service, data retrieval service, etc., the next section will focus on introduction of design for the system core module.

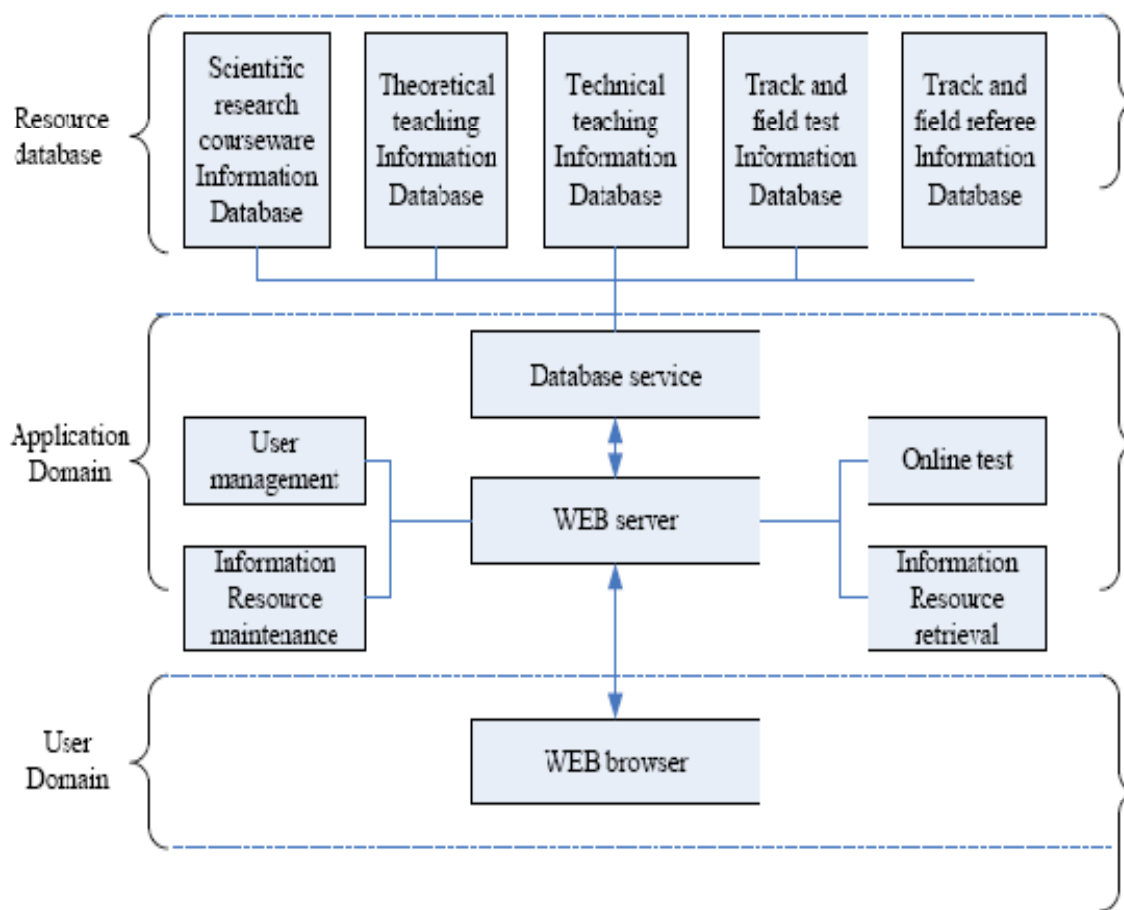The designed structure is as shown in Figure 1.

Figure 1 : Structural Mode of Multimedia Network Resource system

DESIGN AND APPLICATION OF MULTIMEDIA NETWORK RESOURCE SYSTEM

Modularization design of multimedia network teaching system based on network

Answering questions is one of the most important links to improve students' learning efficiency in remote teaching. For the problem of low accuracy and effectiveness of the answers in online answer system at present, this text has put forward the algorithm of fuzzy proximity based on domain value, to strengthen the capability of the system in aspect of intelligent answering and processing. In addition, if the students are not satisfactory for the answer results, the bounding capability of the system with the

teachers' mobile phones is designed in this text, the system can contact with the course teacher for answer in real time directly.

Examination is a one of the most effective evaluation methods for knowledge mastering situation from the teachers to students or the students to themselves. This paper has been designed with online examination module for free use of teachers or students. The module is provided with high degree of automation, the students are just required to take the exam, the operation from scoring to the results being included in the educational files all are completed automatically, not requiring manual intervention.

Doing exercises is an effective method to master and consolidate the curriculum knowledge, this system is equipped with online practice module, the module gives exercises by chapters and sections, and provides the detailed answers for the exercises, and is also provided with function of practice test, the function is similar with the function of online examination, what is different is the exam results are not included in the educational files, just for student's self evaluation.

The remote tutoring system is easily subject to baleful or harmful attack due to opening features, this paper has taken full consideration of safety and reliability of the system, the system is designed and developed strictly based on relevant standards of safety and reliability (the specific standards are introduced in detail in the text), to ensure safe and reliable operating of the system. Besides, requirement has been made on the maintainability of the system in the text, for updating and maintenance in application in future. The relations between educational system modules are as shown Figure 2.
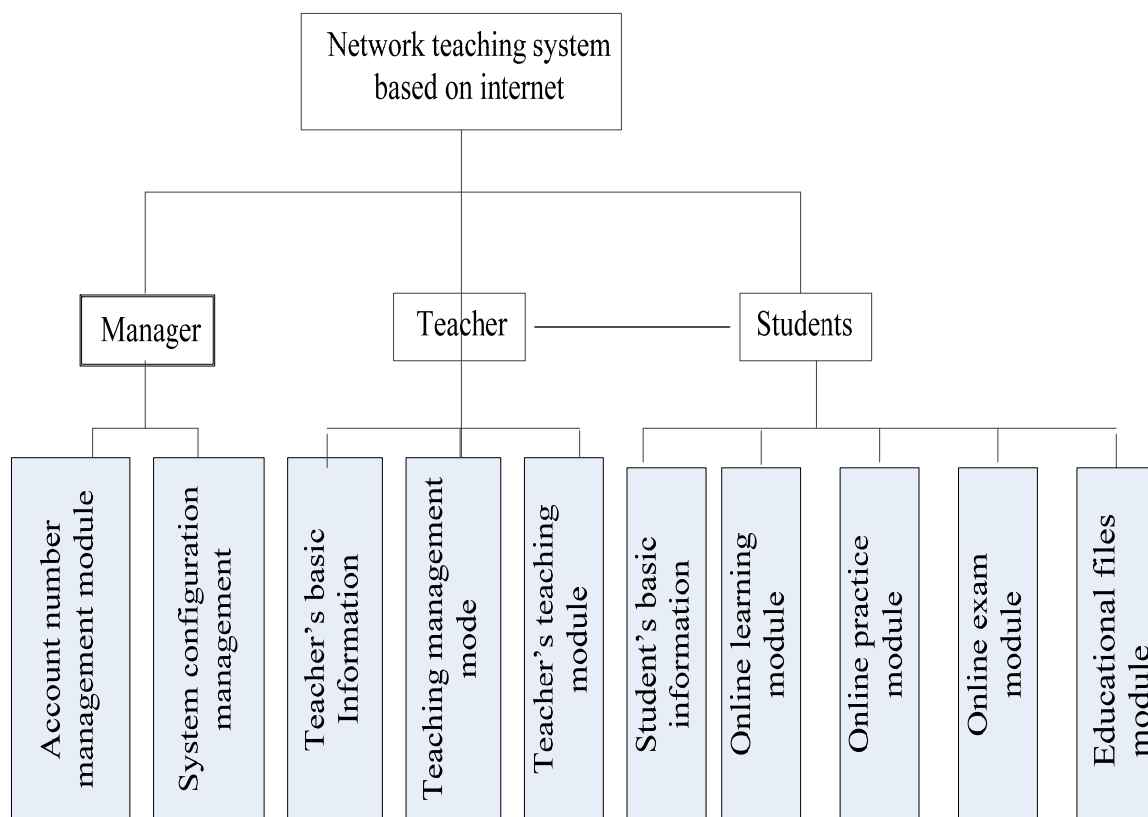

Figure 2 : Module Structure Chart

Performance index of multimedia network teaching system based on internet

With the continuous development and growing of the software development technique, people have more and more request on the quality of software and are satisfied with the demand of the basic functions of the software no longer. Especially, the information leakage event happening frequently in recent years and safety accident resulted from software system failure make people pay more and more attention to the safe reliability of the software system.

Safe reliability of the system has been taken full consideration in this paper, the system is designed and developed strictly based on relevant standards of safety and reliability (the specific standards are introduced in detail in the paper), to ensure safe and reliable operating of the system. Besides, requirement has been made on the maintainability of the system in the paper.

The index requirement of reliability index of software is shown as TABLE 1; The data safety index requirement is shown as TABLE 2; The network safety index requirement is shown as TABLE 3.

TABLE 1 : Index Requirement of Reliability Index of Software

Index	Index Description	Index Content
Maturity	The software product for the purpose to avoid capacity disabled due to failure in the software;	• The system is provided with functions of limitation or reminding when operated illegally or input illegally; • The system may not occur abnormality when operated illegally or input illegally; • The system may not lose data when operated illegally or input illegally;
Fault tolerance	The capability the system remains the specified performance grade when the system occurs failure or violates the specified interface;	• The system cannot occur breakdown, or data loss, even system halted when the software occurs fault; • The system cannot occur breakdown, or data loss, even system halted when the software interface is not correct;
Recoverability	The software product is provided with the capability to restore normal running status and recover the data affected directly in the case of efficacy lost;	• The software can run normally after restarted and the data processed normally will not lose in case of software failure; • The software is equipped with function of recovering automatically;
Stability	The software product is equipped with continuous and stable running capability within a long period of time;	• The system occurs no big abnormality with the server been operated continuously for 6*30*24 hours.

TABLE 2 : Data Safety Index Requirement

Index	Index Description	Index Content
Weak password	Maximum threat for safe users logging in;	• High requirement for strength of user password of system database; • The period of validity of system database user password shall not be more than 15 days;
PL-spl injection flaws	The system code grade gives opportunity to the attacker;	• The system cannot occur Sql injection flaws;
Access control	Mainly including: denial of service, version resource management fault, version design error, format string flaws, etc.	• The system shall not occur denial of service, version resource management fault, version design error, format string flaws and other defects;
Access permission bypassing flaws	Mainly including: illegal highly authorized operation, privilege, arbitrary code is allowed to be executed, bypassing safely and other flaws;	• The system cannot occur access permission bypassing flaws;

The maintainability is the basic features of the software product, there are absolutely perfect things in the world, software product is unexceptional, questions of this kind or that kind may occur in the application of the system, especially in the early application of the system, which requires that our system must be provided with strong maintainability, the specific index requirement is as shown in TABLE 4.

TABLE 3 : Network Safety Index Requirement

Index	Index Description	Index Content
Access control	The control capability from the network system to the users;	• The perimeter network equipment controls the data flow according to session state information, control granularity is the port level; • The perimeter network filters the content of network information, to achieve the control to corresponding layer HTTP, FTP, SMTP, POP3 and other agreement command levels; • The perimeter network is provided with time of inactive session, or the configuration that the network connection will stop automatically after the end of the session; • The perimeter and main network equipment is taken with measures of bounding of the network address with data link address at important network sections; • Whether the perimeter network equipment may takes a certain technical mean to prevent the address spoofing at important network sections; • The limitation of perimeter network equipment is provided with the quantity of users of dial-up access permission;
Safety auditing	Safety auditing is the important guarantee measures for network safety;	• For boundary and main network equipment, the auditing strategy includes the operation situation of the equipment in network system, network flow, user behavior, etc. ; • For boundary and network equipment, the event audit records include event, users, event type, success situation of the event and other information related to audit. • For boundary and network equipment, provide the special-purpose audit tools to authorized user for browsing and analyzing audit data, and can generate audit report according to the demand; • The audit records are intended to be deleted, modified or overlapped by logging in the system through a certain non-audit user, the protection of safety audit shall be consistent with the requirement,
Boundary completeness inspection	The reliability of equipment for completeness inspection;	• The setting of the perimeter completeness inspection equipment can monitor the behaviors of connection with inner network illegally and connection with the outer network illegally and can block up the configuration effectively; • The perimeter completeness inspection equipment can determine the location of the equipment with illegal outer connection, and block up it effectively; • The perimeter completeness inspection equipment can inspect the behavior of the unauthorized equipment's connection with the inner network privately and determine its location, and block up it effectively.
Intrusion prevention	Important measures for network safety protection;	• The network intrusion prevention equipment can check the following attacks: port scanning, strong attack, backdoor attach of the Trojan, attack of denial of service, buffer overflow attacks, IP fragment attacks, network worm attack, etc. ; • The rule base of network intrusion prevention equipment is the latest; • Whether the inspection policy of network intrusion prevention equipment is effective; • The boundary and key network equipment configuration can identify the function of processing unsuccessfully;
Network equipment protection	The base for network safety protection;	• The appraisal perimeter and key network equipment and configuration can carry out the function of identity authentication to the user logging in, and the command setting is required for complexity and being modified periodically; • The perimeter and key equipment configuration can protect the authentication information resulted from remote management of the equipment; • The perimeter and key network can limit the logging in address of the network equipment manager;

TABLE 4 : The maintainability index requirement of the system

Inspection Index	Index Description	Inspection Content and Method
Analyzability	The attribute is the workload consumed in the process of the predict maintainers' intending to diagnose the software defects and failure cause;	• Contents in aspect of function: cyclomatic complexity of the function, executable number of sentence in the function, mean information quantity born by the sentence, comment ratio of the function;
Changeability	The attribute is used to predict the workload consumed in the maintainer' modification to the software product;	• Content in aspect of the function: the quantity unstructured sentences in the function, vocabulary frequency, quantity of variable defined in the function, quantity of the function parameter;
Stability	The group of attribute is used to predict the stability after any repair of the software product;	• Content in aspect of function: variable of function parameter, amount of other functions called in the function, quantity of the function output, quantity of other kinds of data member used in the function;
Testability	This group of attributes are used to predict the total number of the auxiliary function for automatic test designed and achieved in the software product;	• Content in aspect of function: amount of other functions called in the function, the maximum nesting layer of the control structure with nest plus 1 in the function, quantity of execution path in the function, quantity of the function parameter;

The above indexes can control the maintainability of the system from code level to achieve early discovering, and early prevention so as to lower the maintenance cost of the system.

It is discovered from the test and verification of the platform that the remote educational system is provided with the following advantages: first of all, the system is provided with strong over-all service capability, especially for the capability of store, and computing power for complex questions; the advantages of the multimedia technology have been fully embodied in the system to make that the resource sharing capability and computing power of the network education have been improved largely. Secondly, the system makes it possible to set up unified national remote educational platform, and unified deployment and resource built for remote education center in different areas can be achieved, to avoid resources effectively and lower the educational cost greatly. Finally, the system can configurate learning resources flexibly according to different needs of the users, the learning system can be made according to user demand without changing the code function, and independent deployment of the system is not needed. The system can achieve specifically after implementation:

Liberalization for attending the class: the students can study at any places with network, without limited by place and time;

Diversification for teaching: the teachers can teach in real time, and can also upload video for teaching, and can start the online communication function to communicate with the students by video when necessary;

Automation for examination: the system can extract randomly to form paper automatically from the question bank, and check and score automatically, and include them into the students' educational files;

Intelligentization for question answering: the system is adopted with algorithm of fuzzy proximity and mobile phone bounding function to achieve the intelligentization of the answering.

CONCLUSIONS

This paper describes the application of the multimedia network teaching based on the network in track and field teaching in colleges and universities, and has provided the demand of the teaching system and technical difficulty realized in the system evaluation. A brand-new design scheme has been designed thorough deep research, the scheme has innovated while carrying on the advantages of the traditional system, designed a set of teaching system conforming with the latest need of the modern

multimedia network education, the test and verification in the application shows that the system has been improved greatly in teaching service, learning resource sharing and flexibility compared with the traditional teaching system,

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