Design of a university aerobics teaching network information platform (ATNIP)

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ABSTRACT: Aerobics has always been an important part of college and university sports education since being introduced into colleges and universities in the 20th Century. However, with the continuing reform of colleges and universities, it has become apparent that aerobics teaching has lagged. In this work, the authors survey the current aerobics teaching situation as it affects teachers and students. The teaching environment and process are probed, including the use of an aerobics teaching network information platform (ATNIP), and the road to aerobics teaching reflecting students' individuality is explored. This work provides a valuable basis for educational reform of college and university aerobics teaching.

INTRODUCTION

In many universities, teaching resources are scarce, and it can be difficult to support a unified sports theory course. This is not a new problem in university physical education. With the popularisation and maturity of Internet-based distance education, building an aerobics theory course network information system, or ATNIP, is an effective way to address this problem.

China's Internet Network Information Centre released the 26th Chinese Internet Development Statistics Report on 15 July 2010. The report showed that as of June 2010, there were 420 million Chinese net citizens or *netizens* and 277 million mobile phone users for an Internet penetration rate of 31.8%. This set of latest data shows that China's information ministry after years of building the Chinese Internet, CNNET, has deeply affected the lives of China's 1.3 billion citizens and has become the main source for ordinary people for accessing or publishing information.

China's education and research network, CERNET, is a national academic computer network with the Ministry of Education responsible for its management and Tsinghua and other universities responsible for its construction and operation. It is mainly targeted at education and research institutions and is the nation's largest nonprofit Internet network. In 1996, it was recognised by the Chinese State Council as one of the four national backbone networks. There are more than 1,000 universities, schools and other educational and research institutes connected to CERNET, of which colleges and universities account for more than 800.

From the above, it can be concluded that, compared to 10 years ago, Internet-based distance education has made a quantitative leap forward, with the education network now covering all Chinese universities. Teachers at domestic higher education institutions, undergraduates, graduate students, doctoral students and researchers have become accustomed to learning and carrying out research work using the educational network or the Internet. The popularity of the Internet and education network ensures the construction and development of Internet-based university physical education systems.

The main issues for basic and advanced aerobics teaching in schools include the following. The theory content of courses has not kept up with the development of the discipline and is old. The relationships of student-to-student and teacher-to-student is not harmonious enough. Teacher availability is uncertain, with little opportunity for ongoing development, and with teachers relying on outside or part-time employment at a lower income.

Most higher education institutions never had a specialised aerobics activity and, hence, there was no publicity concerning aerobics. There are traditional responses to counter these problems: strengthen the respect shown to school aerobics leaders, and increase the funding for aerobics; build teacher resources and raise the activity-level for aerobics

teaching; create a good school environment and cultural atmosphere, as well as respecting teaching theories; renew teacher evaluations and examinations; and improve publicity using the campus news medium.

NECESSITY OF CONSTRUCTING AN AEROBICS TEACHING NETWORK INFORMATION PLATFORM (ATNIP)

Since 1999, when China launched a distance education pilot, 68 universities developed Internet-based real-time education and assessment systems for higher diplomas in courses, such as financial products, including bonds; accounting and others. This move reduces cost and saves on human resources.

Practical teaching of college physical education, including aerobics, has always been viewed as the reliant way to pass on knowledge to students. Hence, the amount and integrity of knowledge acquired cannot be guaranteed. The students often derive scant benefit from the learned aerobics or there are unresolved doubts. Therefore, the construction of a university ATNIP guided by the characteristics of college aerobics courses, with remote delivery of physical theory and assessment function, is justified and also can be adapted to modern information technology education.

OVERALL PLAN FOR ATNIP

Secure Internet Protocol

Based on considerations of network security and to prevent data invasion, the HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) protocol should be used for a college aerobics education system. The HTTPS is the secure version of HTTP [1] formed by adding the SSL layer to HTTP, to encrypt the data. The URIs (Universal Resource Identifiers), which provide an abstract identifier system, are used for secure HTTP data transmission [2]. In HTTPS, there is a default port and an encryption/authentication layer. The services provided by SSL include:

- Authentication of the user and server, ensuring routing integrity;
- Encrypting data to prevent data being stolen;
- Maintaining data integrity during transmission.

System Architecture

The system uses a B/S (browser/server) three-layer architecture, composed of a Web browser and server (including Web application and database server) [3]. In this architecture, the user's interface is realised by the WWW browser. The business logic does not reside on the front-end browser; the business logic is realised on the server side, including database access.

The biggest advantage of using such a structure is that it guarantees centralised processing services, with programs and databases on the server. The client or browser only requires the installation of the operating system to start work. This greatly simplifies the client configuration process. The ATNIP architecture is shown in Figure 1 and is based upon various Microsoft products, i.e. SQL Server (Structured Query Language), ASP.NET (Active Server Pages), IIS (Internet Information Services).
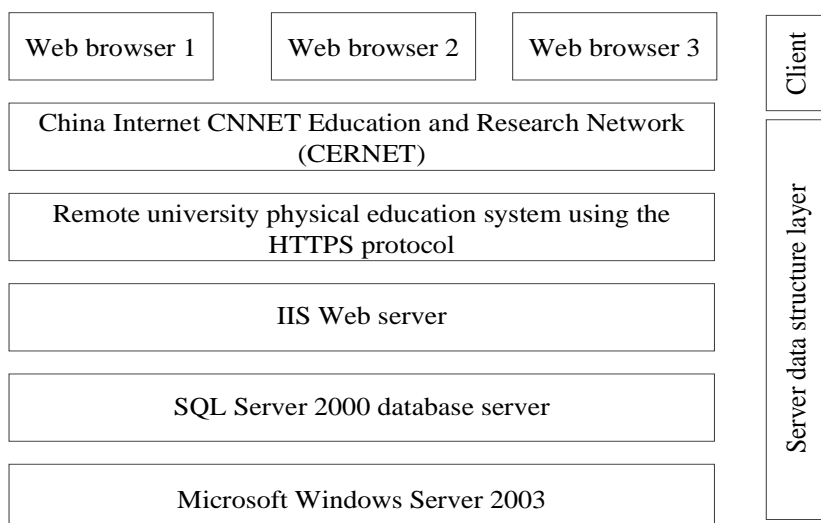

Figure 1: ATNIP architecture.

The system structure is divided into six layers. The first is the operating system layer, using Microsoft's Windows Server 2003 as the network operating system or server operating system. Windows Server 2003 provides high

performance, high reliability and high security. The second is the database system layer using SQL Server 2000, which takes full advantage of Windows Server strengths, and supports local and remote system management and configuration. It provides basic database and analysis functions, as well as test databases. The third layer is the IIS Web Server, which provides the database interface layer. The fourth is the application service layer; the university aerobics network information platform uses ASP.NET and HTTPS to exchange information with the database server on the one hand or the front-end browser using the China Internet (CNNET) or China education and research network (CERNET). The fifth is the interactive network layer supporting the China Internet (CNNET) and the China education and research network (CERNET). The sixth is the user layer or client, oriented to terminal users (teachers and students) to provide an operational interface through a Web browser. This layer supports exchange of information with the server data structure layer [4].

Functional Structure of ATNIP

From the functional point of view, ATNIP is divided into a user management module, a network curriculum management module, test database maintenance management module, real-time examination module, marking audit analysis module, system analysis management module, and user's health information collection analysis module. The system functional structure is shown in Figure 2.
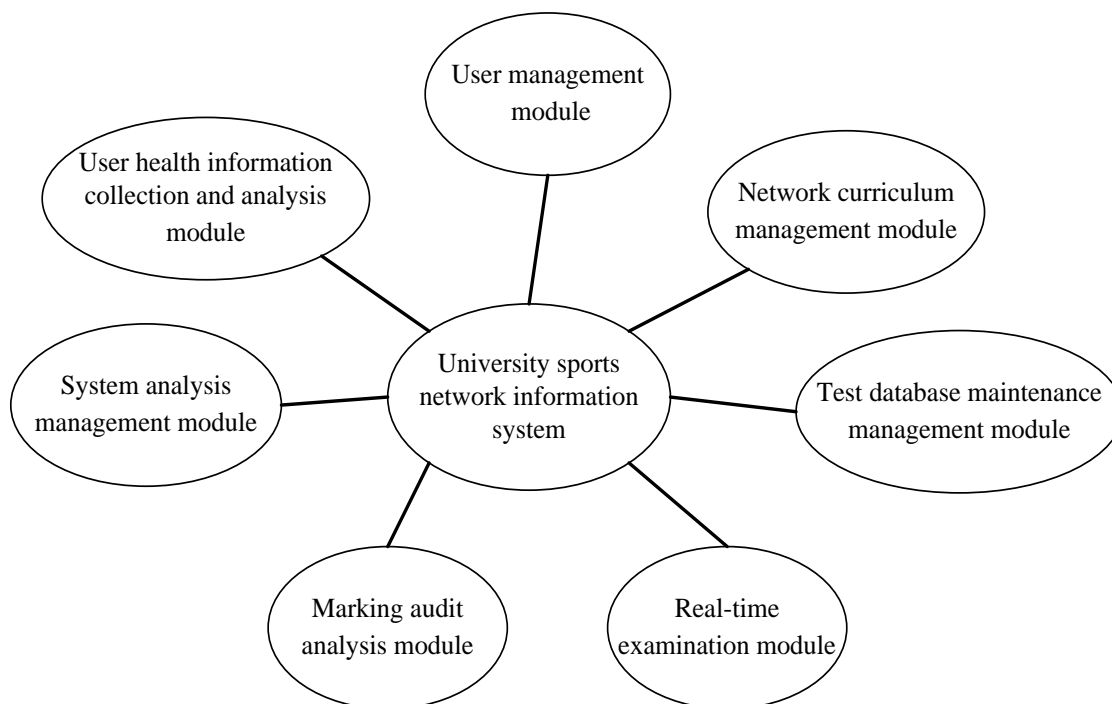

Figure 2: ATNIP system functional structure.

User management: users are divided into three categories, viz. system administrators, teachers and students. The system administrator has the highest permission. Teachers have permissions to manage the progress of students' courses, select banks of questions and other related matters. Students have basic permissions to sign up to classes, and interact with the learning material as organised by the teachers, and to browse theoretical knowledge [5].

Network curriculum management: network curriculum is an important function of distance education. It is interactive, with dynamic update of information and other features. First is the formulation and management of the network curriculum schedule itself, as determined by students' instructors. This should reflect student progress and knowledge acquisition. Second is to develop the multimedia elements of network curriculum content using hypertext and flash animations. Third is to incorporate hyperlinks to aerobics information on the Web. Course topics should focus on the interesting and ornamental, to inspire students' learning [6]. Fourth is the interactive teaching, with a real-time dialogue or message function for teachers and students to interact. The system supports lecturing, tuition and correcting understanding as in traditional teaching.

Question database maintenance management: the question database maintenance management module is the foundation of the examination system. Functions include the establishment and maintenance of the examination question database and includes question addition, modification, insert, store, delete and print.

Real-time examination: teachers activate the generation of tests for each stage of the curriculum. The system randomly generates an examination paper based on the examination question database. Students complete the answer sheet on-line, and at the end of the examination, submit their papers.

Marking audit analysis: the examination scoring system automatically marks examination papers. The system automatically marks questions according to a standard answer and the results are available after the examination.

System analysis management: includes user, permissions and questions management. Specifically, the module is divided into four sub-modules; namely, teacher management, student management, examination question database management and rights management.

User health information collection and analysis: user health information includes student basic physiological data, exercise habits, hobbies, physique test data and psychological test data. These data can be analysed and sorted by ATNIP, to provide material for research.

CONCLUSIONS

Reported in this article are the characteristics and shortcomings of university aerobics education in China. An aerobics teaching network information platform, ATNIP, is described. Functions include student health information data, health information guidance, aerobics theory teaching and aerobics theory assessment. The latter addresses the problem that the proportion of theoretical knowledge in university physical education is insufficient to meet the needs of modern university students eager to learn targeted aerobics theoretical knowledge.

To reform the university aerobics curriculum, a detailed design for an aerobics theory course network information system (ATNIP) is provided. This has practical significance for university aerobics teaching and can also play an important role in research into students' physical health. In addition, physical education teachers, by the use of this system, can improve theoretical aerobics education, with differentiated targeted teaching to improve the quality of education.

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