Evaluation and Improvement of Physical Education Teaching in Colleges and Universities Based on AHP Level Analysis

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Abstract
In order to improve the efficiency of interactive physical education teaching, the paper researches on the evaluation and improvement of physical education teaching in colleges and universities based on AHP level analysis. The problems that the network teaching is faced with in the process of network teaching are put forward. It uses the network teaching system to realize real-time interaction and evaluation, and the system can meet the needs. In this paper, the whole structure model and the whole function module model are put forward. Based on the realization of network education and the characteristics of network education, this paper provides a reference for the evaluation and construction of physical education in Colleges and universities on the network education platform.

Keywords: Evaluation, Physical education teaching, Colleges and Universities, AHP level analysis

1. Introduction

The information age and network technology not only accelerate the process of economic globalization, but also continuously promote the rapid development and application of information technology, and have undergone drastic changes in all fields of economy, social work and life. However, the comprehensive national strength of the country is directly related to the situation and level of modern information education and information utilization, and reflects the comprehensive strength of the country. At present, education and information technology are closely related, and the level of information technology is combined to help improve the level of education, which is also known to all. Therefore, the community has also accelerated the integration of information technology and education and teaching, and the integration of teaching in the present situation. As far as physical exercise is concerned, it is a concern of all circles of society, and it is also a common concern of the society. From the perspective of information technology, how to achieve the promotion role of information technology in sports training will further explore, and draw conclusions will help to guide some reference value and practical significance in physical training. Figure 1 shows a brief map in teaching evaluation in universities.

Since the twenty-first Century, the implementation of the knowledge innovation strategy is considered to be the priority development of all countries, especially in Europe and the United States. Therefore, the investment in the construction of information resources and service guarantee system is increasing year by year. At the same time, the rapid development and application of modern information technology is accelerating the development of information resource sharing system, whether it is quantity or function. Therefore, the performance evaluation of the information resource sharing system has been paid more and more attention in the academia and practice. In Europe and the United States, quantitative analysis and practice of performance evaluation of information resource sharing system is based on extensive practice of teaching performance evaluation and digital performance evaluation. Though similar research in China is only from the beginning, we must explore and evaluate the information resources sharing system of sustainable development, which should conform to the rule set's development and utilization in the digital environment and adapt to our national conditions.

2. Ahp model and algorithm

Analytic Hierarchy Process (AHP) is a decision-making method that decomposes elements that are always related to decisions into goals, criteria and programs. This method is the operational research experts Professor Sarti of the University of Pittsburgh in early 1970s, the U. S. Department of defense research “according to various industrial sectors contribution to the national welfare and power distribution project, the application of network system theory and multi-objective comprehensive evaluation method, a hierarchy of decision analysis method proposed (Wei, 2012; Li, 2014).

The AHP is a complicated multi-objective decision making problem as a system, the target is decomposed into multiple objectives or criteria, and then divided into multi index (or criterion, some constraints) level, through qualitative index fuzzy quantitative method to calculate the level of single sort (weight) and the total order, to as the target (index), system optimization method of multi scheme decision-making.
AHP is a decision problem according to the general goal and sub goals, evaluation criteria of specific investment plans until the preparation of sequential decomposition into different hierarchy, then the judgment matrix eigenvector method is used to solve the weight of each element, the priority of each level to a level of an element, the recursive method and then merge the preparation of the final weight weighted alternatives to the overall goal, the ultimate maximum weight is the optimal solution. The so-called "priority weight" is a relative measure. It shows the relative measurement of alternatives in a certain characteristic evaluation criterion or sub goal, the relative measure of the importance degree of each sub goal to the upper level target. The analytic hierarchy process (AHP) is more suitable for the target system with stratified and interlaced evaluation index, and the target value is difficult to quantify the decision problem. Its usage is to construct a judgment matrix and find out its maximum eigenvalue. And the corresponding eigenvector W, after normalization, is the relative importance weight of a certain level index for the relative index of the previous level.

1. Systematic analysis method
   Analytic hierarchy process (AHP) takes the research object as a system and makes decisions according to the way of thinking of decomposition, comparison, judgment and synthesis. It has become an important tool for systematic analysis after the mechanism analysis and statistical analysis. The idea is to cut off all influence factors on the results, and the AHP weights of each layer finally will directly or indirectly affect the results, and the degree of each factor in each level of influence on the results are quantified, very clear. This method can be used especially for systematic evaluation of unstructured characteristics and system evaluation of multi-objective, multi criteria, multi period and so on (Das, 2016; Petrushov, 2015).

2. Simple and practical decision making method
   This method is not simply the pursuit of advanced mathematics, and not one-sided focus on behavior, logic and reasoning, but the qualitative method and quantitative methods organically, make the complex system decomposition, can the process of mathematical thinking, system of people, for people to accept, and can take multiple criteria decision problems and to all quantization processing for multi-level single objective problem, through 22 comparison determine the quantitative relationship between the same level of elements relative level elements, then simple mathematical operations. Even a middle school student can understand the basic principles of analytic hierarchy process and grasp its basic steps. Computation is often simple and the result is simple and clear, which is easy for decision-makers to understand and master.

3. The required quantitative data are less information (Song, 2017)
   The analytic hierarchy process (AHP) is mainly based on the understanding of the essence and elements of the evaluation problem by the evaluator, and more qualitative analysis and judgment than the general quantitative method. Analytic hierarchy process (AHP) is a way of simulating the way of thinking in people's decision making process. Analytic hierarchy process (AHP) leaves the steps of determining the relative importance of each factor to the brain, retaining the impression of human brain on elements, and simplifying the calculation of weights. This idea can deal with many practical problems that cannot be started with traditional optimization techniques.

3. System design
   The design and development process of the system, the system is divided into modules, such as system management module, teaching module, student learning module, communication module, cooperation and so
on, and provides the concept of software engineering courseware with the rich, using modular design methods, information and other related resources. Through the system constraints in time and space, the learners achieve breakthrough that provides a new platform for learning and learning platform design and research of network teaching learning for other network courses providing a reference and learning way for learners.

3.1. System management module

In order to prevent the illegal user from entering the system operating system of illegal content, from a security point of view, system design and user management platform (teachers and students) of the platform, only the administrator can any information management platform, the operating system including add, delete, modify and check. This is confidential to the user. The design and implementation of the management platform of network teaching system is a key. The system will provide maintenance management program based on demand, and facilitate the management of webmasters, so that management can be completed at a certain point and reduce the complexity of management.

The management module is provided to the administrators of the entire teaching system to manage and set up the interface and enjoy the highest control of the whole system. The system administrator can enter the system to realize the management and maintenance of the whole system. Its main functions are shown in Figure 2.

1) User management: administrators can be teachers, students assign permissions, users add, modify, delete and query operations.
2) Attention management: the administrator has the right to review, add, edit, delete and publish various announcements.
3) Data management: administrators can manage various types of data, including teaching, examination, communication, resource class, database data maintenance, backup and so on.
4) Resource management: including the management of the upload and download of public and personal resources (Wideman, 2016).

![Management Module Diagram](image)

**Figure 2. The module of management**

3.2. Teacher teaching module

Through this module, teachers can complete the daily teaching of the various activities required, that is, the teaching module to achieve the "teaching" function, but also with curriculum management capabilities, the main function as shown in Figure 3.

1) Curriculum management: main management, including (add, delete, modify, preview, release, etc.) course plan, homework, paper, courseware and so on.
2) Notice management: can edit, add and delete related teaching bulletins at any time.
3) Teaching guidance, Q & A function: help teachers to guide the problems and answers between teachers and students on some difficult and difficult problems.
4) Upload and download: teachers can upload or download textbooks for their own or students to use.
5) Online communication: real-time communication through forum, chat room and so on.
6) Evaluation and evaluation function: teachers can evaluate the students and make an objective assessment of the situation.
7) Personal information management: teachers can change their personal information at any time (Schultz, 2016; Wang, 2017).

3.3. Student learning module
In the network teaching, the students mainly take the way of self-study, which requires the system to provide the students with the independent learning needs of all the environment and resources. Therefore, the student learning module enables students to self organize, develop and implement learning plans, choose learning strategies independently, and control the whole learning process, and self evaluate learning. The main function is shown in Figure 4.
1) learning function: students choose relevant courses, presenting courses related to learning information and learning contents, including courseware courses, teaching instructors, teachers, and increase courses related to learning resources.
2) access, inquiry function: students can access notifications, learn some related learning materials, but also study problems.
3) examination, work function: the examination is the self-examination way of the student's own learning effect. The student extracts the corresponding test questions from the problem bank, and after completing the test, it can be fed back to the teacher for evaluation. Students who do homework on the Internet or use online problem banks can understand whether they have met the teachers' learning requirements.
4) communication function: students can communicate through the forum, chat room and teacher, understand the teacher's communication, and get the teacher's guidance.
5) upload and download function: students can download the learning materials provided by teachers, or download their own learning experience, learning methods and other information for other people's reference.
6) personal information management function: students can change their personal information at any time.
system provides a variety of cooperation and communication as much as possible to achieve more convenient online learning. The main ways of cooperation are as follows (Remigijus, 2016; Li, 2015):

1) Network mode
The use of web pages to transmit information to users is the most common way of teaching online interaction. In network teaching, users can enter teaching pages through browser based on their needs, and click on the information needed to operate, so you can search and link other information needed. For example, in order to test the degree of knowledge, online examination, online answer, submission, and system can give results and explanations quickly. Teachers can also make requests, or teachers can answer and answer in time. In general, direct or indirect interaction between teachers and students can browse web pages to achieve related operations.

2) Forum model
The electronic bulletin board system is the abbreviation of the electronic bulletin board system. It is an electronic space devoted to issuing electronic bulletins or public discussions, and rapidly passing a lot of information. The process of teaching is also the process of information exchange. BBS provides a suitable platform for communication.

3) Chat room
Chatting room also likes to enter a space network. We can talk here, a relaxed and comfortable environment, and also a good place to learn and communicate.

4) E-mail
You can collect many related questions by sending e-mail to each other, so that you can see your questions at that time or after that, and answer in time, which is a familiar exchange tool. BBS and chat rooms can enable more people to communicate instantly. Especially for students, learning online is difficult to understand or controversial issues, and then answer by teachers, teachers can also use BBS and chat room bulletin boards to publish relevant information about courses.

4. System implementation

4.1. System architecture
Most of the pages are directly through the ASP script to access the database and file system, some programs (such as job upload) through the upload components to access the database and file system.

The system architecture is the process of breaking down the system into the corresponding components and reassembling them into a system. In order to better achieve the purpose of software use, we need a clear architecture to improve the system's packaging and reliability, so the system is divided into three layers: the user interface layer, business logic layer and data layer. Correspondingly, the division of the user interface layer component, the business logic layer component, and the data layer component corresponds to the function performed by the user interface layer. The core layer of the system is the business logic layer, which is the design focus in the software architecture. The business logic layer components continue to be divided into business logic entity components, user security and rights management components, and provide access to database interface components to achieve better results. The implementation techniques of online system architecture are showing in Figure 5.

![Figure 5. The implementation techniques of online system architecture.](image-url)
The user interface layer provides the user with an application interface that provides information to the user and collects user information. It also handles the basic processing of user information, interacts with the business logic layer, and completes the basic processing of input information and the call of the business logic layer.

The main function of the business logic layer is to generate and maintain the system generated by the system specific, and determine the business logic rules, such as user permissions, data access, and other services, to provide other services, such as the completion of user authority to determine access to different information access interface to the database layer. It also includes the definition of each class, such as authentication, user identification function class, personnel management class, etc., so as to realize the operation of data table in database, and the corresponding business logic function corresponds to the corresponding data table operation in the background.

The database layer is responsible for data storage and management. It implements user management, test management, performance management data access operation and other categories through SQL Server data access interface component layer. The data in the database server can improve the security of the data and the speed of data access.

4.2 System function to achieve

After the division of the functional modules, it is necessary to design the appropriate program flow to facilitate the user to meet the user's requirements at the most convenient time. In software engineering, flow chart is mainly used to explain the process, and flow chart is to grasp and reveal the closed system movement of effective way through the graphic expression of the system's view process, information flow or component flow. As a diagnostic tool, a flowchart can help make decision making, let the manager know exactly where the problem is, and determine the choice of action. According to the needs of B / S software development mode, starting from the efficiency principle of the first safety, combined with the actual function of the system, different users carry out the general operation flow chart system operation, as shown in Figure 6.

```
begin
input user’s name and password
  correct or not
  Y
  set roles and permissions
  user interface
    Input request
      permission allow
        Y
        data legal
          Y
          servers process the request
          end
          N
        N
        output request
          permission allow
            Y
            N
begin
  input user’s name and password
  correct or not
  Y
  set roles and permissions
  user interface
    Input request
      permission allow
        Y
        data legal
          Y
          servers process the request
          end
          N
        N
        output request
          permission allow
            Y
            N
```

Figure 6. General program flow chart of module.

The system uses ASP and ADO technology to realize the above functions.

The active server page of Microsoft is what we call ASP, meaning "dynamic server page". It is a simple technology developed by the Microsoft Corp, more specifically, a server-side scripting environment. It interacts with the database and other programs, not the CGI scripting application, and is a convenient and simple programming tool, the ASP web page file format. Asp, now commonly used in a variety of dynamic website, it can be used to produce and implement dynamic, interactive, high performance Web service applications, in the Asp environment, dynamic interactive Web pages and powerful Web applications can be created through server-
side scripting, and Asp scripts and ActiveX language and related client script, Java applet and other mixed writing, greatly enrich and expand the functions of Asp applications.

ADO (Active X Data Objects) is the Active X server component, built in the ASP within the new data access model, Microsoft is a unified data access object technology, used to replace DAO and RDO and other different series Data access object, mainly for database access. It allows the client application to access and manipulate the data in the database server through any OLE DB provider, making it easy to access the Internet database. ASP and ADO can be combined to create a database of information to provide the contents of the database information, you can query, insert, update, delete the database data operations, you can use VBSnScript, Java Script and other scripting language control database access and query results output, Use the Record Set object to manipulate the database and connect to a variety of databases through ODBC system data sources. ADO has the ability to provide ASP program users with any ODBC-compliant database and to create full-featured database applications.

4.3. System testing

System testing is based on the software development stages of the specification and program internal structure and specifically designed some test cases (input data and its expected output results), and use these test cases to complete the operation of the program. In order to find the wrong process the System testing is carried out throughout the software development process, constantly testing, evaluation and review. The purpose is the first time to find software products in the problems (including user needs, pre-defined inconsistencies). Through the system test, the developer can analyses the cause, distribution and characteristics of the system error, find the defect or error, modify the software, and finally design the system test and the concept of system quality is inseparable, the system test is to ensure system quality An important part of it is as important as software development.

In order to accurately and scientifically evaluate the design scheme of this system, strengthen the advantages, defects, by the teachers and students after the trial, reflection is currently running in good condition, which is convenient for teachers, students. That can get the guidance of teachers, solve academic problems, improve their autonomous learning ability, and promote the development of personalized. It can help them from "want to learn" to "learn", to increase the interest in learning. Through multi evaluation, the system can run normally, basically meet the needs of daily teaching work, to achieve the desired design requirements.

References


