Construction and Implementation of Physical Education Teaching Evaluation System Based on Stochastic Simulation Algorithm

Hongxing Xu¹, Xiujun Zhang²

¹ Hebei University of Technology Department of Physical Education, Tianjin 300401, China
² Undergraduate School of Hebut, Tianjin 300401, China

Abstract

Teaching evaluation is a very important link in college teaching, and is an indispensable part of modern education activities. Only scientific evaluation of teaching can make teaching more scientific and avoid blind teaching. Physical education is one of the basic courses in college teaching. The fundamental purpose of setting up physical education discipline is to train more excellent persons in all-round development of virtue, intelligence, physique, art and labor, enable students to better become qualified successors of socialism in the future, and it is very necessary to carry out evaluation of physical education teaching. However, with different evaluation methods in the current physical teaching evaluation, this leads to the inconsistency of multi-evaluation conclusions, making it difficult to judge the absolute advantages and disadvantages of physical education teaching. For this purpose, a stochastic simulation algorithm is proposed in this paper to calculate the superiority of different evaluation objects, so as to scientifically evaluate the advantages of the objects. In addition, based on stochastic simulation algorithm, in combination with modern information technology, a physical education teaching evaluation system based on stochastic simulation algorithm is constructed, and the specific implementation of the evaluation system is studied deeply on this basis.

Keywords: Stochastic Simulation Algorithm, Physical Education Teaching, Evaluation System, System Construction.

1. RESEARCH BACKGROUND

1.1 Research overview

The development of modern information technology indicates that the 21st century is an era of knowledge-driven economy with distinctive knowledge innovation and application characteristics. This has also made the various countries in the world pay more attention to the cultivation of talents, and talent education has been upgraded to the national strategic level. In recent years, with the constantly deepening of the education reform process, the cultivation of students' comprehensive quality and professional theory is directly related to the development of society in the future, and more directly determines the future strength of the country. The evaluation of teaching quality has become an important part of management work in colleges. Only scientific evaluation of teaching quality can avoid the blindness of teaching, thus to improve students' comprehensive quality and theoretical knowledge more effectively. It is because of the importance of teaching evaluation that makes teaching evaluation has become a hot research topic of numerous scholars for a long time, and many teaching evaluation methods are studied out from different points of view to evaluate the teaching quality, greatly improving the scientificity of teaching evaluation (Li and Wang, 2017). At present, China has been developing for a long time in the theory of physical education teaching evaluation. Theoretically speaking, for teaching evaluation, even if the method of evaluation is different in mechanism and solution, it should be the same in teaching evaluation conclusions. However, this is not the case, even if the evaluation method used in the same evaluation is different, it may lead to different evaluation conclusions, thus causing difference in multi-evaluation conclusions. Therefore, it is difficult to judge the absolute advantages and disadvantages of physical education teaching. This may also cause big deviations between the evaluation results of physical education teaching and the actual evaluation results (Gao and Zhao, 2014). Although most of scholars agree that the use of combination evaluation method can well solve the problem of difference, in fact the combination evaluation method is just a compromise, and it has not fundamentally solved the practical problems. Therefore, it is very necessary to find out a way to evaluate the physical education teaching scientifically, so as to solve the problem of difference.
1.2 Research purpose

The research purpose of this paper is to build a physical education teaching evaluation system based on stochastic simulation algorithm to evaluate the physical education teaching scientifically, solve the difference of evaluation conclusions between multi-evaluation methods, and highlight the advantages of physical education teaching so that physical education teaching can be adjusted according to the evaluation conclusions of stochastic simulation algorithm, thus to ensure physical education teaching more targeted and scientific. For this purpose, a stochastic simulation algorithm is proposed in this paper. The algorithm is able to calculate the superiority of all evaluation objects, so as to evaluate the advantages of the objects and generate evaluation conclusions by the probability form to better explain the actual problems. For better application of stochastic simulation algorithm, the algorithm is embedded in the physical education teaching evaluation system, the related application of the stochastic simulation algorithm is discussed, the physical education teaching evaluation system based on stochastic simulation algorithm is built on this basis, and the functional requirements, construction objectives and overall design of the system are clearly defined. Then, the specific implementation of the system is analyzed, and the interface development of physical education teaching evaluation system and the specific algorithm flow of stochastic simulation algorithm in the system are discussed.

2. RELATED APPLICATION OF STOCHASTIC SIMULATION ALGORITHM IN PHYSICAL EDUCATION TEACHING EVALUATION SYSTEM

If there are \( n \) objects needing to be evaluated, i.e., \( a_1, a_2, \ldots, a_n \), and there are \( m \) evaluation indexes, i.e., \( k_1, k_2, \ldots, k_m \), in these objects to be evaluated, the observed value of the \( k_i \)-th evaluation index in the object \( a_j \) to be evaluated can be expressed as \( k_{ij} = k(k)(i=1,2,\ldots,j=1,2,\ldots,m) \), and its decision matrix can be expressed as follows: 

\[
S = \begin{bmatrix}
k_{11} & k_{12} & \cdots & k_{1m} \\
k_{21} & k_{22} & \cdots & k_{2m} \\
\vdots & \vdots & \ddots & \vdots \\
k_{n1} & k_{n2} & \cdots & k_{nm}
\end{bmatrix}
\]

Preprocessed, both \( m \) and \( n \) are not less than 3, and the physical education teaching evaluation process can be described as \( z_i = f(k_{ij}, k_{ij}, \ldots, k_{ij}), i \in N \). In the formula, the positive transformation function is expressed by \( f \), and the comprehensive evaluation value of the object \( a_i \) to be evaluated that is produced after evaluation is expressed by \( z_i \). Then, all the objects, i.e., \( a_1, a_2, \ldots, a_n \) needing to be evaluated will be ranked by the comprehensive evaluation value after evaluation, thus to realize the comparison of advantages and disadvantages of all the objects needing to be evaluated (Wei, 2016).

3. CONSTRUCTION OF PHYSICAL EDUCATION TEACHING EVALUATION SYSTEM BASED ON STOCHASTIC SIMULATION ALGORITHM

3.1 Analysis of functional requirements of physical education teaching evaluation system

Before the construction of the physical education teaching evaluation system, the functions and requirements of the system need to be analyzed. Only the functions and requirements of the system are analyzed scientifically and reasonably, so as to lay a good foundation for the development of the system, which is also the key link to ensure the stable operation and efficient service of the system (Liu and Li, 2016). The design of the system requires the automatic, systematized and standardized management of all information in physical education teaching, which is also its overall task. The analysis of requirements and functions of the system is completed under the premise of clarifying the overall task. According to the above functional characteristics of the system, the physical education teaching evaluation system should have the following functions: The first is to manage users' privileges. The second is to manage the basic information of students. The third is to determine the associated index system of evaluation process. The fourth is to determine the degree of superiority. The fifth is to determine the evaluation conclusion feedback of stochastic simulation algorithm and its specific function. The sixth is that the system should have information retrieval function and statistical function of student information (Xie and Liang, 2016).

In the construction of physical education teaching evaluation system, it is necessary to ensure that the system can realize the automatic evaluation of physical education teaching. At the same time, it is also necessary to deal with and manage students' information, including the input function of physical education curriculum, input and output function of scores and other data, and other forms output and display function in charts and other forms, data printing function and students' basic information management function, etc. On the basis of ensuring the implementation of the above functions, the functional requirements of the physical education teaching evaluation system should also have the following characteristics: The first is security, the second is flexibility, and the third is operability. When the system is authenticating to users, they need to pass the double authentication of database...
and Window SNT. Only after the double authentication is passed can the users access the system (Xu, 2016). At the same time, the system classifies users, respectively course teachers, system administrators and students. The rights and functions of these three types of users are different. Among them, course teachers can evaluate students in physical education teaching, take charge of the management of students’ information, and check, modify and print the students’ scores. System administrators can monitor the physical education teaching through the system, and take charge of the management of students’ information and scores modification, and can also arrange the class, while students can use the system to evaluate themselves and other students, and have the operating rights, such as score inquiry (Wang and Jin, 2015).

3.2 Construction objectives of physical education teaching evaluation system

The construction objectives of physical education teaching evaluation system based on stochastic simulation algorithm take information management and student score entry as the core, which is a system developed for providing high-quality information services to users and colleges (Duan and Yan, 2014). The construction purpose of this system is to utilize modern information technology, combine office automation technology and computer technology, and embed stochastic simulation algorithm in the system, so that the teaching evaluation and teaching affair administration work can be completed more efficiently, thus to enable administrative staff, teachers and students to achieve physical education teaching evaluation and information management through the system (Zhou, 2015).

3.3 Overall design of physical education teaching evaluation system

In this paper, the physical education teaching evaluation system based on stochastic simulation algorithm is developed in the VB environment, and the system development work is carried out through Visual Basic6.0 software. The system database uses SQL Server2000. In this system, all functions are completed by six basic modules. These six basic modules include database maintenance module, students’ information management module, comprehensive assessment module, user management module, score entry module and query print module (Chen, 2015). Figure 1 shows the schematic diagram of functional structure of physical education teaching evaluation system based on stochastic simulation algorithm.

4. IMPLEMENTATION OF PHYSICAL EDUCATION TEACHING EVALUATION SYSTEM BASED ON STOCHASTIC SIMULATION ALGORITHM

4.1 Interface of physical education teaching evaluation system

To make the physical education teaching evaluation system based on stochastic simulation algorithm better play its functions and realize the scientific evaluation of physical education teaching, it is necessary to design the
interface of physical education teaching evaluation system (Zhang, 2014). In the design of main interface of the system, different operating privileges are set according to type of users so that users can access the system through user name and password input. In the design of the interface after students log in, self-evaluation, score inquiry, personal information management and mutual evaluation should be provided to ensure that students are able to choose these functions. In the design of teachers' login interface, score entry, score management, information modification, student management and other functions must be provided (Ling, 2016). In the design of login interface of system administrator, as the system administrator has the maximum authority, the functions of teacher deployment, system maintenance, data printing, class assignment and student score management should be set in the design of login interface (Shi and Zhang, 2014).

4.2 Algorithm flow of stochastic simulation algorithm

In the physical education teaching evaluation system based on stochastic simulation algorithm, the stochastic simulation algorithm is applied to realize the comprehensive evaluation of physical education teaching. The self-evaluation and mutual evaluation of students and teachers' evaluation are taken as basis of evaluation, and the evaluation function of physical education teaching can be achieved through the entry of scores. These data entered are conducted with system evaluation by stochastic simulation algorithm (Mao et al, 2015). The following is an analysis of the specific algorithm flow in the system. Firstly, the competitive target coefficient \( \alpha \) and the developmental objective coefficient \( \beta \) are set, and the independent dominance quantity \( \delta_{ij} \) is calculated, so that the independent dominance matrix is obtained, i.e. \( B = [\delta_{ij}]_{n \times n} \). Then, the index dominance sequence group is determined, and the variable parameters are set, so that the dominance vectors in the index dominance sequence group are calculated and obtained respectively. After that, the objects to be evaluated are constructed by random dominance vectors with every two advantages and disadvantages, and the superiority matrix of these objects to be evaluated is calculated. Next, the objects to be evaluated are derived from the superiority matrix, and finally the final sequence is carried out (Tang, 2015).

5. CONCLUSION

To sum up, the system is used to comprehensively evaluate the physical education teaching through the stochastic simulation algorithm. The construction and implementation of physical education teaching evaluation system based on stochastic simulation algorithm are analyzed, the inconsistency of evaluation conclusions of multiple evaluation methods is effectively solved, and stronger interpretability has been given for practical problems in physical education teaching. At the same time, the stochastic simulation algorithm also has high independence. According to practice, the physical education teaching evaluation system based on stochastic simulation algorithm is able to calculate the superiority of the objects to be evaluated, so as to evaluate the advantages of the objects. The evaluation conclusions are generated by probability, which makes the evaluation conclusions of physical education teaching become more objective and scientific. This also makes the system have high application value in the physical education teaching evaluation.

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