Application of Stochastic Simulation Algorithm in Evaluation of PE Training

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Abstract. At present, there are many studies on the evaluation of primary physical education teaching ability, but most of them are constructed before the implementation of the new curriculum standard. This relatively old evaluation system is difficult to objectively and accurately evaluate the teaching ability of physical education teachers at this stage. Due to the inaccurate evaluation, teachers may lead to psychological imbalance and can not devote more energy to the improvement of teaching ability. Therefore, in order to improve the scientificity and objectivity of physical education teachers'teaching ability evaluation, this paper studies the application of random simulation algorithm in physical education teaching evaluation.

Keywords: Random simulation algorithm · Physical education · Teaching evaluation

1 Introduction

Physical education teachers' classroom teaching ability is the core ability in physical education, because physical education teachers'comprehensive classroom teaching ability determines students'learning effect, so as to determine the core quality of the whole physical education teaching, which is also the fundamental task and main goal of physical education teaching. The evaluation of physical education teaching ability can promote physical education teachers to improve teaching methods and teaching quality, and it is also an important basis for assessing the performance of physical education teachers. However, from the current situation of the evaluation of physical education teachers'teaching ability, various educational units often ignore the evaluation of Physical Education Teachers' teaching ability; From the research results, the evaluation of physical education teaching ability by scholars is mostly limited to the overview of theory, and there is no specific operation model of evaluation [1]. The evaluation of PE Teachers' teaching ability belongs to the research category of uncertain content of fuzzy theory. Only through fuzziness, PE Teachers' teaching ability belongs to a certain area of the set level.

Therefore, this paper constructs an independent advantage evaluation method that "highlights its own advantages". In the evaluation, a probability based random simulation

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algorithm is used to evaluate the advantages of the evaluation objects by calculating the degree of superiority between the evaluation objects. This method can produce evaluation conclusions in the form of probability (reliability) and have stronger explicability to practical problems. This method is proposed from the perspective of innovation The comprehensive evaluation method of "from base to top" has high independence. The evaluation link is added in the form of "component" to convert the information of the evaluation data. An example is given to verify the effectiveness of the method.

2 Stochastic Simulation Algorithm

2.1 Concept of Stochastic Process

In nature, the change process can be broadly divided into two types: one is deterministic process, and the other is uncertain process, also known as random process. Generally speaking, the so-called process is a change related to time. For example, for the motion of a free falling body in a vacuum, assuming that the initial velocity is 0 and the falling time of the object is t, the falling height $X(t) = \frac{1}{2}gt^2$ is determined by this functional relationship There is a certain causal relationship when leaving the exact position of the initial point at any time. Obviously, the falling height x is related to the time t, forming a process, which is called a deterministic process. The other kind of process has no definite change form and no inevitable change law. For example, the total daily turnover m of the mall is obviously an uncertain quantity, that is, a random variable, which is further improved The analysis shows that M is also related to time t, thus forming a process m(T), which is also called a random process. For example, the number of times x received by the paging team of the paging station every day is obviously uncertain, that is, it is a random variable. Further analysis shows that x is also related to time 1, so x(T) Similarly, air temperature, air pressure and daily customer flow of stores constitute a random process.

$$\begin{cases} E(t)\dot{x}_k(t) = f(t, x_k(t)) + B(t)u_k(t) \\ y_k(t) = C(t)x_k(t) \end{cases} \tag{1}$$

3 Development History of Stochastic Process

Stochastic process theory was born in the early 20th century. It is closely related to other branches of mathematics. It is an important tool to study stochastic phenomena in the fields of social science, natural science and so on. In the study of random processes, people measure the inevitable internal laws through the superficial view of contingency, and describe these laws in the form of probability. The greatest charm of this discipline is to realize necessity through contingency.

The development of stochastic process theory has a history of more than 100 years, which originated from the study of physics. Every new theory has its historical opportunity, and random process is no exception [2]. The earliest scientists paid attention to a part of the stochastic process associated with other disciplines, such as the characteristics of the independent incremental process discovered by Bachelier when analyzing

the fluctuation of the stock market in 1900, the Markov chain studied by Markov, the findings of Gibbs et al. On statistical mechanics and Einstein et al. On Brownian motion. But in the real sense, the systematic and rigorous research on stochastic process theory began in the 1930s.

In the 1960s, on the basis of Markov process and potential theory, French scholars used some of their ideas and results to further expand the general theory of random process to a great extent, including section theorem, projection theory of process and so on.

In the development history of stochastic process, Chinese scholars have also done a lot of work and achieved good results. Theory comes from practice. In the development history of stochastic process, we study the actual phenomena deeply, put forward the theory to explain the phenomena, and finally verify the theory with phenomena, which is also the development process of most theories from special cases to general theories. In fact, many research directions have their practical background. When these directions are deeply studied and verified, they are used to guide practice and further expand and deepen the scope of application.

4 Construction of Evaluation Index System of Physical Education Teachers' Teaching Ability

4.1 Basic Principles of Constructing Evaluation Index System

When constructing the evaluation index system, we should strictly screen the selected indexes on the basis of following the theoretical knowledge of physical education, pedagogy, psychology and new curriculum standards. At the same time, the construction of evaluation index system must follow certain guidelines and principles.

First, the principle of integrity: that is, the constructed evaluation index system should be able to comprehensively evaluate the teaching ability of primary physical education teachers, and ensure that the selected indexes will not reappear, so as to construct hierarchical indexes at all levels, and then form a complete evaluation index system. In addition, in the process of constructing the evaluation index system, we should not only follow the commonness of the teaching ability of PE teachers in junior middle schools in the teaching process, but also highlight the characteristics of this special stage of junior middle schools.

Second, the principle of scientificity: scientificity means that the indicators should be selected on the basis of theoretical knowledge such as pedagogy and physical education. The selected indicators should not only conform to the objective truth, but also stand the test of practice [3]. They cannot be selected arbitrarily according to subjective judgment. The construction of evaluation index system is mainly to guide the teaching process scientifically and systematically, so as to improve the overall physical education teaching quality and improve teachers'teaching ability. Therefore, when constructing the evaluation index system, we should fully combine the characteristics of sports events and the actual situation of students to select the indexes at all levels.

Third, the principle of testability: testability means that the selection of indicators should be able to carry out specific operation and quantitative analysis, and make accurate judgment on the tested object through indicators. Therefore, when constructing the

evaluation index system, the selection of indicators must be easy to understand and measure, reduce some vague indicators, and make each indicator reflect teachers'teaching ability in essence.

4.2 Basic Process of Constructing Evaluation Index System

The construction of evaluation index system has guiding significance for improving the teaching ability of physical education teachers and the judgment of school managers on Teachers' teaching ability. Therefore, when constructing the evaluation system, in addition to the above principles, we should also follow the strict sequence and process, so as to ensure the rationality of the evaluation system.

As shown in Fig. 1, the basic steps of constructing the evaluation index system are: (1) determine the object and goal to be evaluated; (2) Determine indicators at all levels; (3) The indexes were screened by Delphi method; (4) Calculate the weight ratio of indicators at all levels (analytic hierarchy process); (5) Complete the evaluation index system; (6) Verify the evaluation index system.

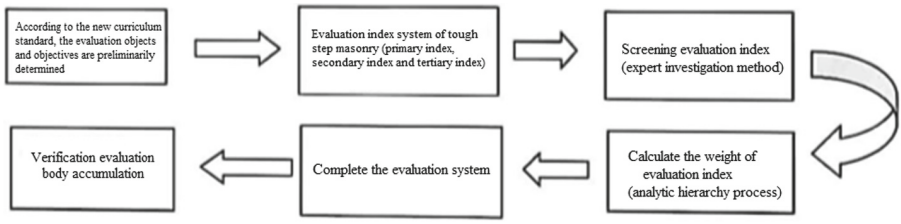

Fig. 1. Basic steps of establishing evaluation indicators

5 Application of Random Simulation Algorithm in Physical Education Teaching Evaluation

5.1 Random Simulation Algorithm is the Most Appropriate Method to Evaluate PE Teachers' Teaching Ability

The evaluation of PE Teachers' teaching ability belongs to the research category of social science, unlike the fixed data support in the evaluation standards of natural disciplines. Moreover, there is no obvious boundary for the evaluation level of physical education classroom teaching ability. In the ordinary physical education classroom evaluation, most of them make self judgment based on the evaluator's overall feeling of the main physical education classroom teaching, and sometimes there is a large gap in the evaluation level. The fuzzy matter-element clustering method solves the subjective defect in the evaluation through the qualitative and quantitative dimensions of physical education teachers'teaching ability. Therefore, the method of random simulation mathematics is feasible and the evaluation result is more reasonable.

In the calculation method, the sum of the simple difference and weight product of the two related matter elements is used as the distance between the matter element to be evaluated and the evaluation grade " In principle, the grade of the matter element to be evaluated is judged and clustered, so the calculation method is simple and easy to operate [4]. At the same time, the clustering ranking is arranged according to the distance from small to large, which makes it easy to compare the position of each physical education teacher's teaching ability in the whole and the ranks of the grade, so as to position the ability of education and teaching workers, and provide a good way to better promote the improvement of physical education teaching ability Evaluation method.

5.2 Suggestions for Model Improvement

(1) Appropriately increase the number and grade of evaluation indicators of physical education teachers'classroom teaching ability.

In this study, the author only designs the evaluation indexes of one level dimension. However, in the actual social science evaluation model, in order to better reflect the scientificity and authenticity of the evaluation model, multi-level evaluation indexes can be designed to form an interrelated evaluation index system, and then calculated by using the method of progressive from low level to high level. Such a fuzzy evaluation model, with the refinement of indexes, On the one hand, it is more conducive to the quantitative scoring of evaluators. On the other hand, the evaluation results will be more objective. For example, under the primary index of action demonstration ability, secondary indicators such as action accuracy, action effectiveness and action economy can be set. The weight of each level of index is a key step, and the method of obtaining index weight can also be based on the expert weighted statistics method in this model, or Analytic hierarchy process (AHP).

(2) Try to increase the number of experts who obtain the index weight.

In fuzzy evaluation, the index weight is obtained by human subjective scoring, with strong personal subjective judgment, but the weight is a key link in the implementation and operation of the evaluation model and a data-based performance that directly affects the evaluation results. In the method of obtaining the weight, first try to select well-known experts with deep academic attainments to obtain a relatively reasonable weight value. Secondly, in the number of experts It is better to select more than 30, and the more the number, the more reasonable the index weight value tends to be.

6 Conclusion

Teachers and students are the two necessary factors to constitute the physical education classroom. The role of physical education teachers has become the leader of the physical education classroom. It can even be said that the words and deeds of physical education teachers will have a profound impact on all aspects of students. This impact is reflected through the teaching ability of physical education teachers, so the teaching ability of physical education teachers is the guarantee A reasonable and sound evaluation index system can not only promote the progress of PE Teachers' teaching ability in all aspects,

but also facilitate school managers to accurately judge PE Teachers' teaching ability, so as to complete the evaluation of PE Teachers' teaching ability under the new curriculum standard New requirements of physical education in junior middle schools.

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