

## Retraction

# Retracted: Evaluation Model of Physical Education Teaching Effect Based on AHP Algorithm

### Computational Intelligence and Neuroscience

Received 3 October 2023; Accepted 3 October 2023; Published 4 October 2023

Copyright © 2023 Computational Intelligence and Neuroscience. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] Z. Guo, B. Park, X. Huang, and S. Choi, "Evaluation Model of Physical Education Teaching Effect Based on AHP Algorithm," *Computational Intelligence and Neuroscience*, vol. 2023, Article ID 9363403, 8 pages, 2023.

## Research Article

# Evaluation Model of Physical Education Teaching Effect Based on AHP Algorithm

Ziyi Guo,<sup>1</sup> ByoungKwon Park,<sup>2</sup> Xiaobin Huang,<sup>1</sup> and SeongBeom Choi <sup>1</sup>

<sup>1</sup>College of Arts & Physical Education, Gangneung-Wonju National University, Gangneung-si 25457, Republic of Korea

<sup>2</sup>Department of Rehabilitation Sports, Bucheon University, Bucheon-si 14632, Republic of Korea

Correspondence should be addressed to SeongBeom Choi; 920626-5640017@gwnu.ac.kr

Received 14 June 2022; Accepted 16 August 2022; Published 1 March 2023

Academic Editor: Arpit Bhardwaj

Copyright © 2023 Ziyi Guo et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The multifaceted sources of physical education teaching factors and the uncertainty of evaluation have an impact on the qualitative and quantitative evaluation results of teaching effects. In order to improve the evaluation accuracy of the physical education teaching effect, the evaluation model of the physical education teaching effect was designed based on the AHP algorithm. The evaluation model is based on monitoring the whole process of teaching. Based on the multifaceted sources of physical education teaching factors and the uncertainty of evaluation, the overall objectives and selects three-level evaluation indicators were analyzed. The AHP algorithm was used to establish the hierarchical structure and obtained the total ranking and comprehensive score of the hierarchy. The test results show that the teaching evaluation model designed in this paper has an RMSE mean value of 1.923, which has higher evaluation accuracy and is conducive to the improvement of teaching quality.

## 1. Introduction

“China’s speed” makes China a big country in higher education. However, the coordinated development of scale expansion and quality improvement has become the bottleneck of China’s higher education development. Combining the core literacy system with subject teaching is the main means and path for deepening the curriculum reform and innovation of various subjects in China’s education field [1]. At present, classroom teaching characterized by teachers’ complete teaching still accounts for about 10% in China. Teacher-led teaching weakens students’ dominant position, students passively accept knowledge and lack the initiative to participate in learning. Its root lies in the influence of traditional teacher-centered and content-centered teaching theories [2]. The guarantee and improvement of the teaching effect of physical education have become the focus of research from all walks of life. The state has issued a series of policies requiring the construction of a teaching quality assurance system, and the audit and evaluation also regard the teaching effect as the key investigation content. The teaching effect is the lifeline for the survival and development of physical education. Ensuring

the steady and rapid development of teaching quality has become an important issue to be solved urgently. The curriculum reform of physical education and health in basic education also advocates the learner-centered concept [3]. The teaching of physical education emphasizes the teaching method of independent cooperative inquiry and takes the interaction between learners and content, situation, experience, and knowledge as a necessary condition for learning [4]. The teaching content of physical education mainly focuses on Teachers’ helping students improve the basic ability of physical education major learning. Such as the principle of sports technology and skills; the improvement of sports classroom learning ability, the cultivation of students’ skills, tactics, and movement completion quality; and the cultivation of students’ sports culture, sports knowledge, and sports communication [5]. There are many deviations in the teaching effect of physical education in China. The root cause is that the theoretical research lags behind and starts late, which leads to the theoretical research can not guide the practice well. In addition, there are few quantitative and empirical studies, a lack of specific exploration at the practical level, and poor operability [6]. Reference [7] based on the

basic concepts and requirements of China's health physical education curriculum model, using the reference method, logical analysis method, and Delphi method, constructed a physical education classroom teaching behavior evaluation index system with 3 first-class indicators, 7 second-class indicators, and 23 third-class indicators as the main content and used the analytic hierarchy process to determine the weight of each index to realize the preliminary quantitative evaluation of physical education classroom teaching behavior; Reference [8] started with the problem analysis, constructed an evaluation system for the connection between college and middle school physical education teaching through two rounds of index screening by Delphi method, and determined the index weight by AHP method. The system includes 4 first-class indicators of top-level design, management, curriculum, and teaching; 10 second-class indicators such as guiding ideology, resource allocation, policy support, and investment; and 27 corresponding third-class indicators. Through the test of the evaluation effect, reliability, and validity of the constructed evaluation system, it is proved that it has high reliability and practicality, and can be used as a quantitative analysis tool to evaluate the connection between college and middle school physical education teaching. On this basis, this paper puts forward some suggestions on the connection between college and middle school physical education teaching. However, the above methods do not take into account that the multifaceted sources of physical education teaching factors and the uncertainty of evaluation have an impact on the qualitative and quantitative evaluation results of teaching effects, and the accuracy of the evaluation results obtained is low.

In order to solve the shortcomings of the above methods and further improve the accuracy of PE effect evaluation results, a PE effect evaluation model based on the AHP algorithm is designed. Based on the monitoring of the whole teaching process, this paper analyzes the physical education teaching mode. Different from the existing methods, according to the physical education teaching mode, considering the multifaceted sources of physical education teaching factors and the uncertainty of evaluation, this paper makes a hierarchical analysis of the overall objectives and selects three-level evaluation indicators. The AHP algorithm is used to establish the index hierarchy, design the evaluation model, get the total ranking and comprehensive score of the hierarchy, and complete the evaluation of the physical education teaching effect. The experimental results show that the contribution of this method is to improve the accuracy of educational effect evaluation. The whole model is practical and operable and has strong practical significance. It can provide a reference for the deviation in the teaching practice of physical education and promote the reform of physical education management.

## 2. Analysis of Teaching Mode of Physical Education

The evaluation of the teaching effect of physical education is based on the monitoring of the whole process of teaching. It should not only extend from simple classroom teaching to other links of teaching but also extend from the main

elements of teaching to the relevant factors of teaching. It makes the teaching quality monitoring run through the whole teaching process and enables the teaching quality to be timely monitored and guaranteed in every stage and link of the teaching process [9]. As the main body of the classroom, teachers must pay full attention to learners' learning when making decisions. Learners' views should be fully respected and encouraged. Learners' needs, abilities, and development differences should also be concerned and respected [10]. The connotation of teaching effect evaluation refers to the further concretization of the original more abstract construction objectives, task requirements, and assessment standards, so as to form a quantitative system that can be operated directly and can be used to investigate, analyze and even accurately measure the development of curriculum teaching [11]. In sports inquiry learning, students should have the consciousness of independent inquiry, the ability of independent thinking, and a positive learning attitude; teachers need to encourage students, create a good learning environment and atmosphere, and choose effective teaching strategies. The core quality of physical education emphasizes the basic, practical, fitness, and comprehensive characteristics of the physical education curriculum. It requires physical education teachers to organize teaching activities from four aspects: sports morality and cultivation, sports interest and ability, healthy behavior and habits, and sports quality and will [12, 13]. At present, the teaching of physical education can be analyzed using the model of teacher belief, teacher practice, and learning effect, as shown in Figure 1.

As shown in Figure 1, the teaching mode of physical education consists of three parts: the belief factors of physical education teachers, the practice of physical education teachers, practice, and physical education achievements. Among them, the belief factors of physical education teachers include self-efficacy, self-support, self-reflection consciousness, universal belief, and learner-centered belief; physical education teachers' practice includes establishing positive interpersonal relationships, respecting students' voices, encouraging high-level thinking, and adapting to students' individual differences. Practice and physical education achievements emphasize ability-based education. The results of practice and physical education can reflect students' core competence. Each core competency corresponds to clear requirements, and each requirement is supported by corresponding courses [14–17]. In the training content of the core quality of physical education, traditional items, and new items are intertwined. As the most mature preponderant specialty of physical education in China, the physical education specialty should actively introduce scientific ideas. The implementation of learner-centered teaching is also conditional, that is, to maintain the consistency between teachers' teaching and students' learning. The beliefs of physical education teachers will affect the practice of physical education teachers, and the practice of physical education teachers will also affect the learning effect of students [18]. The professional structure of physical education teachers requires the knowledge and skills of physical education. The core quality is reflected in the overall requirements and norms for the development of physical

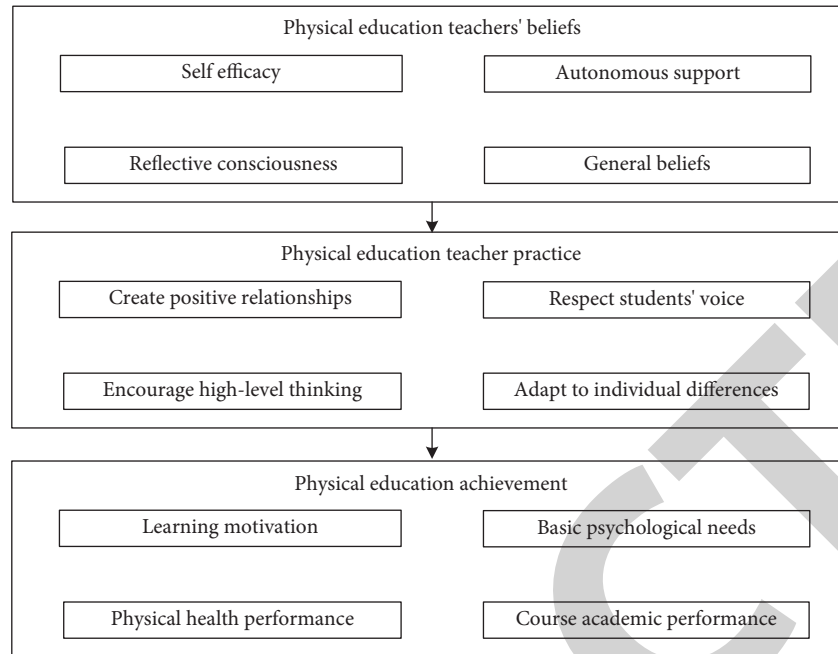


FIGURE 1: Teaching mode of physical education.

education teaching activities. The correct understanding of it is the comprehensive embodiment of physical education teachers' teaching theory quality and professional acumen, and its essence is a kind of professional consciousness [19, 20]. The intersection of extracurricular sports knowledge and in-class teaching knowledge is as follows: the interaction of various sports technologies and diversified exercise methods. Students' psychological needs include independent needs, ability needs, and relationship needs; students' learning motivation includes self-efficacy, situational cognition, performance orientation, independent inquiry, and goal orientation; students' academic performance includes physical health performance and physical education academic performance [21]. Physical education teaching establishes a curriculum system, implements teaching organization, and conducts self-reference evaluation on students' learning achievements (including knowledge, ability, skills, and quality), so as to measure the training effect and the achievement of training objectives and form continuous improvement [22, 23]. This requires that the professional structure of physical education teachers should also be updated, and the professional development mode must also be followed up. Only by constantly optimizing the external environment for the research and implementation of the core literacy of physical education, can we improve and strengthen the teaching level.

### 3. Selecting Evaluation Indicators for the Teaching Effect of Physical Education

In order to improve the teaching effect of physical education, we must first build a scientific, systematic, and reasonable evaluation index system to reflect the overall goal of the teaching effect evaluation model. The physical education theory course adheres to the idea of serving the profession,

combines professional characteristics, scientifically sets up courses, standardizes the syllabus and teaching content, and ensures that the professional theory courses, class hours and credits set up meet the requirements for the cultivation of physical education professionals [24–27]. The evaluation index is centered on the teaching of physical education. Attention should be paid not only to the teaching process and teaching effect but also to the teaching preparation and teaching environmental conditions [28]. The evaluation content is mainly the key elements and factors that affect the running state of the sport's major, which need not be too many and complex, so as not to bring unnecessary burden to the daily work of the major; the purpose of the evaluation is to help standardize the development of the specialty, guide the specialty to strengthen the quality awareness, pay attention to the education quality and quality monitoring, and continuously improve the specialty construction level from the theoretical perspective of education evaluation [29, 30]. The teaching effect evaluation of physical education can be divided into multiple dimensions and elements according to the internal logical relationship and essential attributes, and the index system to concretize these elements. All indicators shall be organically combined and linked with each other at all levels to ensure that there is no repetition or contradiction in the indicators, so as to form a comprehensive system and make a reasonable and comprehensive assessment of the assessment object. The construction of the index system needs a logical dialectical process of "concrete abstract concrete." Through the layer-by-layer analysis of the overall goal, the logical structure constitutes a tree index system. This paper selects evaluation indicators from the theoretical content and definition of physical education routines, as shown in Table 1.

The indicator system consists of primary indicators (assessment elements), secondary indicators (assessment

TABLE 1: Evaluation index of teaching effect of physical education.

Primary index	Secondary index	Tertiary indicators
Teaching objectives	Course objectives and positioning	Course objectives Course orientation
Training program	Training program	Basis of scheme design
	Training objectives	Goal setting Fit with sports knowledge, ability, and quality Architecture
	Curriculum system	Degree of support for physical education Class hour ratio Credit proportion
Teaching process	Content of courses	Content design Organization and arrangement
	Teaching method	Instructional design Teaching devices
	Course assessment	Assessment content Assessment form
Teaching conditions	Teaching facilities	Modern teaching equipment Teaching laboratory Sports equipment
	Equipment	Equipment use benefit Sports area
	Site facilities	Management system
Teaching quality	Professional management system	Implementation of teaching plan
	Teaching management operation	Teaching quality monitoring
	Teaching management effect	Teaching quality feedback
Teaching effectiveness	Teaching effect	Analysis of examination results Sports training quality
	Sports consciousness	Develop awareness of exercise and fitness Have the ability to exercise yourself

projects), and tertiary indicators (main observation points) of assessment projects. The evaluation index is a specific goal, which guides the school to pay attention to the contents involved in the evaluation index and develop towards the goal of correct and consistent professional comprehensive construction and optimization of curriculum construction. If we analyze the specific teaching practice, if we can build a good platform and ensure sufficient resources in the teaching course resources of physical education, the whole teaching activities can be spread and promoted smoothly and naturally. So that the teaching content of the platform is basically consistent with the teaching objectives and teaching tasks of other teachers. Deepen the teaching reform, on the basis of realizing the improvement of students' theoretical knowledge, thought, and ability in the professional theory courses, scientifically integrate and innovate the classical knowledge and professional needs so that the teaching content can better meet the needs of students and Society for the physical education major [31]. If standard teaching documents are provided, a relatively standard environment can be built for specific teaching activities, making online and offline teaching possible. Abundant guidance materials can effectively overcome the problems of insufficient knowledge expansion and insufficient practical teaching brought by online teaching. Improve students' sports theory level and sports ability. We will improve the teaching

incentive system and give greater support to teachers of professional theoretical courses in the development of teaching and scientific research work and teaching incentives. Improve the teacher evaluation system, take teaching as an important part of teacher examination, guide teachers to put their main energy into teaching, and constantly improve the quality of curriculum teaching [32]. Internal curriculum resources are closely related to teaching activities, mainly pointing to teaching materials, syllabus, etc.; the external curriculum resources mainly point to the resources that can provide corresponding assistance for students' physical exercise, which can be network resources, social resources, and so on. Create a good atmosphere for scientific research, create more opportunities for teachers to participate in scientific research, and enhance teachers' attention to scientific research. Encourage teachers to participate in academic activities, establish a teaching team that combines teaching and scientific research, and improve the level of teaching and scientific research through team driving.

#### 4. Design Evaluation Model Based on AHP Algorithm

Using the concept of a scientific system to strengthen the construction of a teaching management system and create a coordinated and stable teaching order is the fundamental

guarantee for the school to promote scientific management, form school running characteristics, and cultivate high-quality talents for the country. Only by maintaining a high degree of rational consciousness and self-reflection can teachers better adapt to the new teaching form. The important form and way of teachers' self-reflection are through PE classroom practice. Physical education teaching is the essential feature that each element is composed according to certain laws and procedures, which can guarantee and improve the quality of professional teaching. It also makes clear that the teaching quality assurance system of physical education major includes the extension characteristics of organizational management, development service, monitoring and measurement, and other elements. The process of PE Teachers' reflection is an important way to improve teachers' beliefs. Schools should fully provide teachers with a harmonious and cooperative school culture, and promote professional dialog, interaction, exchange, and communication among teachers. Through the cooperation and support between teachers, teachers' isolated behavior can be reduced, so as to provide effective support for teachers' professional development. The formulation of training objectives, training programs, professional planning, curriculum, and textbook selection of physical education professionals are complex and multi-level contents. In order to fully reflect the current situation of physical education teaching, learning, and management, it is necessary to consider that physical education teaching evaluation has the characteristics of multiple sources of factors and uncertainty of evaluation. These characteristics have an impact on the qualitative and quantitative evaluation results of teaching effects. Therefore, it is necessary to establish the matrix hierarchy of each factor and quantify the evaluation influencing factors. The AHP algorithm can solve the quantitative problem of qualitative problems. The main feature of AHP is to establish a hierarchical structure to compare the importance of several factors, so as to convert the difficult qualitative judgment into an operable importance comparison and improve the effectiveness, reliability, and feasibility of the evaluation. Therefore, the AHP algorithm is used to establish the hierarchical structure of evaluation indexes. The first level is the general objective level, which is the final goal of the evaluation of the teaching effect of physical education. The second layer is the criterion layer, which divides the elements into four aspects: target category, input category, process category, and output category, mainly in the form of "primary indicators." The third layer is the specific content of the indicators, which meets the degree of consistency of the sampling of the content range of the indicators of the previous layer. The structure of the AHP algorithm corresponds to the index level. All factors are not compared together, but compared with each other; In this regard, the relative scale is adopted to minimize the difficulty of comparing different factors of different properties to improve the accuracy [33]. In the assessment objective, each standard requirement in the standard set and each measure in the measure layer describe different definitions and represent different positions and roles in the criteria layer. In other words, various standards or measures occupy different proportions in the comprehensive evaluation, which constitutes the judgment matrix. In this step, experts need to answer a question repeatedly about which of the two scheme layers is more important for the criterion layer and

give a certain value for the importance. Each standard of the standard set is scored according to the experience or requirements of experts, and each measure of the measure layer is scored relative to the standard layer. It should be pointed out that the expert scoring proposed here is not only the score given by the expert but also the price value, time value, etc. The following formula can be used to judge the comparison of two factors  $x$  and  $y$ :

$$A_{xy} = \frac{1}{A_{yx}}. \quad (1)$$

In formula (1),  $A_{xy}$  represents the judgment of comparing factors  $x$  and  $y$ ;  $A_{yx}$  indicates the judgment of comparing factor  $y$  with  $x$ . The judgment matrix is obtained through the above calculation, which is expressed as follows:

$$A = \begin{bmatrix} A_{11} & A_{12} & \cdots & A_{1m} \\ A_{21} & A_{22} & \cdots & A_{2m} \\ \vdots & \vdots & \cdots & \vdots \\ A_{n1} & A_{n2} & \cdots & A_{nm} \end{bmatrix}. \quad (2)$$

In formula (2),  $A$  is the judgment matrix;  $m$  and  $n$  is the number of rows and columns of the index judgment matrix. Normalize each column of the judgment matrix, as shown in the following formula:

$$D_{xy} = \frac{A_{xy}}{\sum_{x=1}^n A_{xy}}. \quad (3)$$

In formula (3),  $D_{xy}$  is the column normalization vector. The normalized judgment matrix of each column is added by rows, which is expressed as follows:

$$P_{xy} = \sum_{y=1}^m D_{xy}. \quad (4)$$

In formula (4),  $P_{xy}$  represents the added row vector. We normalized  $P_{xy}$  to obtain the eigenvector.

$$Q_{xy} = \frac{P_{xy}}{\sum_{x=1}^n P_{xy}}. \quad (5)$$

In formula (5),  $Q_{xy}$  is the eigenvector. The maximum eigenvalue of the judgment matrix is calculated as follows:

$$\tau = \sum_{x=1}^n \frac{A}{mQ_{xy}}. \quad (6)$$

In formula (6),  $\tau$  is the maximum characteristic root. We conducted a consistency test on the judgment matrix, that is, we calculated the consistency index.

$$\chi = \frac{\tau - m}{m - 1}. \quad (7)$$

In formula (7),  $\chi$  is the consistency index. After comparing the composition of the judgment matrix, the corresponding random consistency index can be obtained by looking up the table, and the consistency ratio can be calculated as follows:

$$\gamma = \frac{\lambda}{\varphi}. \quad (8)$$

In formula (8),  $\varphi$  represents the random consistency index;  $\gamma$  is the consistency ratio. If  $\gamma < 0.1$ , the normalized eigenvector can be used as the weight vector through the consistency test. When the relative weights of each level are obtained, the combined weights of the implementation level are calculated, which is the total ranking of the levels. Finally, the evaluation order is sorted according to the size of  $m$  components of the comprehensive score. So far, the design of the teaching effect evaluation model of physical education based on the AHP algorithm has been completed.

## 5. Experiment

*5.1. Experimental Preparation.* Taking the students and teachers who teach physical education in colleges in a city as the research object, collect the data related to the evaluation indicators. According to the analytical process of the AHP algorithm, the index level of evaluation research is constructed, and the weight value is calculated. The  $X$  value and  $P$  value can be obtained by the non-parametric test of multiple associated samples in SPSS17.0. If  $P < 0.05$ , it can be considered that the coordination coefficient of expert opinions is significant. The evaluation results of the experts on the indicators are consistent, and the experts' opinions are of nonaccidental coordination with high reliability. According to this method, the composite weight values of other evaluation indexes relative to the total evaluation indexes are calculated in turn. After calculating the matrix of physical education teaching effect, the consistency index is 0.01, that is, it has passed the consistency test.

*5.2. Experimental Results and Analysis.* In order to verify the application effect of the teaching effect evaluation model of physical education based on the AHP algorithm, the reference [7] method and reference [8] method were selected as the control group for comparative experiments. The RMSE of the evaluation results of each model is shown in Table 2.

According to the results in Table 2, the mean value of RMSE of the physical education teaching effect evaluation model based on the AHP algorithm is 1.923, which is 2.426 and 3.755 lower than the other two methods, respectively. Therefore, the design model has higher evaluation accuracy and is suitable for the evaluation of the physical education teaching effect. This is because according to the physical education teaching mode, this method fully considers the multifaceted sources of physical education teaching factors and the uncertainty of evaluation results, and makes a hierarchical analysis of the overall goal; the AHP algorithm is used to establish the index level, design the evaluation model, and obtain more accurate evaluation results of physical education teaching effect. After the physical education teaching is evaluated, relevant conclusions are formed, the deficiencies in the curriculum objectives,

TABLE 2: RMSE comparison of evaluation results.

Number of tests	Evaluation model of physical education teaching effect based on AHP algorithm	The reference [7] method	The reference [8] method
1	1.726	3.644	5.468
2	1.804	4.458	6.152
3	1.958	5.866	5.069
4	1.889	3.605	7.248
5	1.846	4.254	5.527
6	1.957	3.587	4.312
7	1.864	4.361	5.636
8	2.133	3.532	6.950
9	1.972	4.758	5.528
10	2.085	5.426	4.891

curriculum content, and curriculum implementation are analyzed, and suggestions for improvement are put forward to improve the teaching quality.

## 6. Conclusion

The evaluation of the physical education teaching effect is an important way to reflect on whether the teaching objectives are achieved or not and whether the curriculum is valuable. It is a reflection and guidance link of the curriculum to give feedback to the curriculum through evaluation and promote the improvement and scientization of the curriculum. Physical education teachers must change the tendency of inaccurate curriculum role orientation and negative attitude towards the core quality of physical education discipline, and form the internalization of the cognition of the core quality of physical education discipline to the externalization of self-professional teaching practice creation. It realizes the correct cognition, rational participation, and positive change of physical education teaching under the guidance of the core quality of physical education. The connotation of teaching effect evaluation is to further concretize the original abstract construction objectives, task requirements, and assessment standards, so as to form a quantitative system that can be directly operated, used to investigate, analyze and even accurately measure the development of curriculum teaching. In order to improve the accuracy of the evaluation results of the physical education teaching effect, this paper designs an evaluation model of the physical education teaching effect based on the analytic hierarchy process. Analyzing the teaching mode of physical education; Considering the uncertainty of the evaluation factors of physical education teaching, this paper analyzes the overall objectives and selects the evaluation indicators; the AHP algorithm is used to establish the index hierarchy, design the evaluation model, and realize the evaluation of physical education teaching effect. The experimental results show that this method improves the effect of teaching evaluation. Based on this result, teachers' enthusiasm and sense of responsibility can be stimulated. However, due to the limited conditions, the evaluation system of this method is not mature enough. In the future research, the algorithm can be further optimized and multiple schemes can be selected to apply the evaluation indicators to make the evaluation system more complete.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## References

- [1] H. Gao, "Analysis on the diversification model of college physical education evaluation," *Bulletin of Sport Science & Technology*, vol. 28, no. 4, pp. 82–84, 2020.
- [2] D. Dupri, N. Nazirun, and O. Candra, "Creative thinking learning of physical education: can be enhanced using discovery learning model," *Journal Sport Area*, vol. 6, no. 1, pp. 37–47, 2021.
- [3] B. M. Kim, "The relationship between the selection attributes of the physical education academy, the education service quality, and recommendation intention: moderating effect of gender," *Korean Journal of Sports Science*, vol. 30, no. 3, pp. 621–637, 2021.
- [4] M. Litsa, A. Bekiari, and K. Spanou, "Social network analysis in physical education classes: attractiveness of individuals and targets of verbal aggressiveness," *The International Journal of Interdisciplinary Educational Studies*, vol. 16, no. 1, pp. 151–162, 2021.
- [5] I. Lindsey, S. Metcalfe, A. Gemar, J. Alderman, and J. Armstrong, "Simplistic policy, skewed consequences: Taking stock of English physical education, school sport and physical activity policy since 2013," *European Physical Education Review*, vol. 27, no. 2, pp. 278–296, 2021.
- [6] S. Kurtipek and T. A. Durhan, "The predictive effect of curiosity and exploration tendencies of physical education teacher candidates on leisure literacy," *International Journal of Education Technology and Scientific Researches*, vol. 6, no. 14, pp. 624–656, 2021.
- [7] C. Liu, C. X. Dong, L. Tian, S. M. Fan, and L. Ji, "Construction of evaluation index system of physical education class teaching behavior based on physical education and health curriculum model in China," *Journal of Tianjin University of Sport*, vol. 36, no. 4, pp. 427–434, 2021.
- [8] L. Zhou, G. L. Chen, B. Wu, and S. L. Zhang, "Construction of evaluation system of PE teaching convergence between university and middle school," *Journal of Tianjin University of Sport*, vol. 36, no. 6, pp. 658–665, 2021.
- [9] J. W. Kim, M. S. Kim, and M. J. Ku, "A narrative study on the practical problems of sports instructors for elementary school physical education classes," *Journal of the Korean society for Wellness*, vol. 16, no. 2, pp. 43–51, 2021.
- [10] X. X. Zhang, "Study on the indexes of the scale of students' evaluation of physical education in colleges and universities," *Journal of Pingxiang University*, vol. 37, no. 1, pp. 103–106, 2020.
- [11] S. M. Um and J. H. Shon, "The Effects of interpersonal relationships on physical self-efficacy and self-esteem in mixed classes of physical education subjects due to COVID-19," *Korean Journal of Sports Science*, vol. 30, no. 3, pp. 801–814, 2021.
- [12] A. Abdulla, P. R. Whipp, and T. Teo, "Teaching physical education in 'paradise': activity levels, lesson context and barriers to quality implementation," *European Physical Education Review*, vol. 28, no. 1, pp. 225–243, 2022.
- [13] H. Jumareng, E. Setiawan, W. Mongsidi, I. A. Patah, A. Rahadian, and R. A. Gani, "Introvert and extrovert personality: is it correlated with academic achievement of Physical Education, Health and Recreation students at university level," *Journal Sport Area*, vol. 6, no. 2, pp. 140–146, 2021.
- [14] W. Zheng, Y. Xun, X. Wu, Z. Deng, X. Chen, and Y. Sui, "A comparative study of class rebalancing methods for security bug report classification," *IEEE Transactions on Reliability*, vol. 70, no. 4, pp. 1658–1670, 2021.
- [15] G. M. Chen, P. R. Chen, W. X. Huang, and J. Zhai, "Continuance intention mechanism of middle school student users on online learning platform based on qualitative comparative analysis method," *Mathematical Problems in Engineering*, vol. 2022, pp. 1–12, 2022.
- [16] C. Zheng, Y. An, Z. Wang et al., "Knowledge-based engineering approach for defining robotic manufacturing system architectures," *International Journal of Production Research*, pp. 1–19, 2022.
- [17] W. Zheng, Y. Zhou, S. Liu, J. Tian, B. Yang, and L. Yin, "A deep fusion matching network semantic reasoning model," *Applied Sciences*, vol. 12, no. 7, p. 3416, 2022.
- [18] L. Tang and Y. Xu, "Evaluation of physical education teaching quality based on back propagation neural network optimized by golden sine algorithm," *Modern Scientific Instruments*, vol. 38, no. 5, pp. 260–264, 2021.
- [19] I. Yuwono, "Evaluation of physical education in slb-c of south kalimantan province," *Kinestetik Jurnal Ilmiah Pendidikan Jasmani*, vol. 5, no. 1, pp. 198–203, 2021.
- [20] H. Ulukan and M. Ulukan, "Investigation of the relationship between psychological Resilience, Patience and Happiness levels of physical education teachers," *International Journal of Educational Methodology*, vol. 7, no. 2, pp. 335–351, 2021.
- [21] G. Escriva-Boulley, L. Haerens, D. Tessier, and P. Sarrazin, "Antecedents of primary school teachers' need-supportive and need-thwarting styles in physical education," *European Physical Education Review*, vol. 27, no. 4, pp. 961–980, 2021.
- [22] M. Adamakis and A. Dania, "Validity and reliability of the emotional intelligence scale in pre-service physical education teachers," *Journal of Physical Education and Sport*, vol. 21, no. 1, pp. 54–59, 2021.
- [23] D. Sanz-Martín, G. Ruiz-Tendero, and E. Fernández-García, "Contribution of physical education classes to daily physical activity levels of adolescents," *Physical Activity Review*, vol. 9, no. 2, pp. 18–26, 2021.
- [24] W. Zheng and L. Yin, "Characterization inference based on joint-optimization of multi-layer semantics and deep fusion matching network," *PeerJ Computer Science*, vol. 8, p. e908, 2022.
- [25] W. Zheng, X. Tian, B. Yang et al., "A few Shot classification methods based on Multiscale relational networks," *Applied Sciences*, vol. 12, no. 8, p. 4059, 2022.
- [26] J. Li, K. Xu, S. Chaudhuri, E. Yumer, H. Zhang, and L. Guibas, "GRASS: generative recursive autoencoders for shape structures," *ACM Transactions on Graphics*, vol. 36, no. 4, pp. 1–14, 2017.
- [27] Z. Xiong, Q. Liu, and X. Huang, "The influence of digital educational games on preschool Children's creative thinking fluencc of digital educational games on preschool Children's creative thinking," *Computers & Education*, vol. 189, Article ID 104578, 2022.
- [28] A. Gråstén, S. Yli-Piipari, M. Huhtiniemi, K. Salin, H. Hakonen, and T. Jaakkola, "A one-year follow-up of basic psychological need satisfactions in physical education and



- associated in-class and total physical activity,” *European Physical Education Review*, vol. 27, no. 3, pp. 436–454, 2021.
- [29] F. J. Martínez-Hita, E. García-Cantó, and M. Gómez-Lopez, “Systematic review of engagement motor time in Physical Education,” *Cultura Ciencia Deporte*, vol. 16, no. 49, pp. 365–378, 2021.
- [30] L. S. Andrade, S. S. Pinto, M. R. Silva et al., “Randomized Clinical Trial of Water-based Aerobic training in Older Women (WATER study): Functional Capacity and quality of Life Outcomes,” *Journal of Physical Activity and Health*, vol. 32, no. 63, pp. 1–9, 2020.
- [31] M. M. Shermamatovich, H. U. Tursunovna, N. I. Zayniddinovich, A. S. Boltayevich, and K. S. Yalgashevich, “Physical education of student youth in modern conditions,” *Academica: An International Multi-disciplinary Research Journal*, vol. 11, no. 2, pp. 1589–1593, 2021.
- [32] M. Yildiz, “The implementations of physical education course in primary and secondary school,” *International Journal of Education Technology and Scientific Researches*, vol. 6, no. 14, pp. 477–519, 2021.
- [33] L. Gorgon, E. Aristide, M. N. M. Deye, G. N. D. Ferrand, and M. Alphonse, “Evaluation of the teaching of physical education and sports activities by students in Physical Education,” *Creative Education*, vol. 11, no. 06, pp. 864–880, 2020.