International Journal of Web-Based Learning and Teaching Technologies
Volume 19 • Issue 1

Research on Intelligent Improvement Method of Physical Education Teaching Quality in Universities Based on FAHP Model

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ABSTRACT

With the development of the information age, the quality of physical education teaching in universities has become an important goal of teaching reform. Improving the quality of physical education and significantly improving students' physical fitness is one of the development goals of higher education. Therefore, this article proposes an intelligent improvement method by collecting and analyzing college sports data and using the FAHP model for qualitative and quantitative analysis. This model can evaluate the current situation of students' physical education and propose targeted strategies. By verifying the consistency of the model output, effective teaching strategies are identified to achieve the goal of continuously improving the quality of physical education in universities. Teachers' classroom teaching efficiency, teaching resources, and teaching methods must also meet higher requirements. The intelligent improvement method based on the FAHP model proposed in this article provides new ideas and methods for improving the quality of physical education teaching in universities.

KEYWORDS

Intelligent Method, Improvement Method, Physical Education Quality, Information Age, FAHP

In recent years, more and more people have recognized the importance of sports for students' comprehensive development. Physical education is an essential component of the university curriculum (Al Kumaimm et al., 2021). Physical education can help them form healthy personalities, and improve their cultural literacy, and promote brain development (Dhawale et al., 2021). Through sports, students can get physical exercise, form a good state of mind and character, and cultivate a sense of competition and an enterprising spirit (Almusawi et al., 2021). Therefore, university education must be standardized to cultivate a healthy lifestyle and better prepare students to adapt to society.

In expanding the scale of education, schools' educational capacity and conditions have greatly improved. For example, the quality of teaching facilities in schools is constantly improving, and the application of educational technology is gradually becoming popular. These changes have enabled more

DOI: 10.4018/IJWLTT.336836 *Corresponding Author

students to access educational resources, laying a solid foundation for talent cultivation. However, as the scale gradually expands, teaching quality issues have emerged (Domínguez et al., 2021). Although the physical education curriculum in schools has improved in the past few decades—through increasing the number and quality of sports facilities, enriching physical education courses, and strengthening the quality of physical education teachers, for example—many difficulties remain in the quality of physical education (Piñeiro-Cossio et al., 2021). For example, some schools cannot improve their sports facilities due to financial constraints, resulting in physical education programs that fail to meet the needs of students. Moreover, some students lack interest in sports activities, so their participation is low. Finally, some schools do not have a reasonable scientific evaluation system, which makes it difficult for physical education teaching to be effectively evaluated.

Various strategies to improve teaching quality have emerged with the deepening of teaching reform, but relatively few are truly effective (An et al., 2022). Grassroots physical education teachers often unquestioningly imitate high-quality and demonstration classes but ignore the differences between these high-quality classes and their actual teaching conditions. This leads to some physical education classes being unable to proceed normally, ultimately affecting students' thoughts and emotions (Kraemer & Nitka, 2022). In recent years, urban and rural Chinese students' level of physical development has improved, but their rates of vision impairment and obesity have continued to rise (Cunningham et al., 2022). To this end, the 2020 physical education curriculum standards have undergone significant revisions in terms of design concepts, objectives, content, and evaluation, indicating that the country increasingly values the quality of physical education classroom teaching. This reform should be student-centered and focus on cultivating students' comprehensive development and healthy growth. This not only depends on the training of physical education teachers but also requires students to actively participate and learn (Bao & Yu, 2021).

College students' physical fitness is decreasing year by year, which is closely related to college physical education. Therefore, monitoring the quality of teaching has become a necessity. Teachers' organizational ability, professional quality, and attitude in the classroom are all important (Liu, 2021). They should use sports education strategies and methods to stimulate students' enthusiasm and encourage them to explore their sports skills proactively (Vaquero Solís et al., 2021). Evaluating the quality of physical education teaching also requires more rigorous methods (Bautista & Baniqued, 2021). The reform of physical education teaching has entered a critical period, and only by ensuring the quality of teaching can this reform truly achieve success. Improving the quality of physical education teaching means achieving new curriculum standards, updating teaching content, and continuously optimizing teaching strategies (Horn et al., 2021).

The analytic hierarchy process (AHP) is a systematic analysis method that combines qualitative and quantitative analysis. The AHP has shortcomings, such as difficulty in achieving the consistency index of the judgment matrix and significant differences between the consistency of the judgment matrix and the consistency of human thinking. In response to the shortcomings of the AHP, researchers have also introduced a fuzzy analytical hierarchy process (FAHP) based on an in-depth analysis of AHP theory. FAHP can obtain more satisfactory optimization results in dealing with complex decision-making problems, especially in evaluating options with multiple indicators and fuzziness.

This article considers and integrates various qualitative and quantitative information related to college physical education teaching quality, using AHP to assign weights and then using a fuzzy comprehensive evaluation to establish a college physical education teaching quality model. It collects and analyzes college physical education data, inputs it into the FAHP model, and then tests the consistency of the model output to obtain methods and paths to improve physical education level. The article's findings can be used to reflect on the teaching mode and level of physical education teachers. Moreover, using this evaluation system, schools can quickly and accurately identify defects in teaching work, effectively promoting school teaching work. Based on evaluation feedback information, teachers can clearly understand the shortcomings in classroom teaching and continuously improve.

RELATED WORKS

Modern teaching evaluation methods originated in the United States. In terms of education and teaching evaluation, American universities have proposed various innovative and pragmatic reforms (Yu, 2021). The evaluation results are mainly influenced by the degree of consistency of opinions among evaluation participants rather than determined by how well they reflect the objective reality. Therefore, teaching evaluation should pay more attention to the evaluation process. The three main contents of the evaluation system of curriculum and teaching quality in American universities include the evaluation of the rationality of curriculum design, the teaching methods of teachers, and the effectiveness of content allocation (Gao, 2022). This relatively flexible evaluation method can fully stimulate students' enthusiasm and initiative to learn, effectively cultivating an innovative spirit (Liu et al., 2021).

School physical education has long been carried out in developed countries, and various distinctive teaching systems have formed. Regarding theory, relatively comprehensive research has been carried out on teaching objectives, selection of teaching content, curriculum implementation, and teaching evaluation (Li et al., 2022). For example, in the United States, the evaluation index system for the quality of physical education teaching in universities presents a diversified feature, and many universities generally consider students' evaluation of courses as the most important indicator for evaluating teaching quality. In Japan, school sports are essentially a means to cultivate students' overall quality; thus, they have established a comprehensive model in which school sports are the main body and club activities, or recreational sports are supplementary.

Scholars have used AHP to evaluate the quality of physical education teaching based on the characteristics of physical education courses. In specific course evaluations, Zhang et al. (2021) used the maximum frequency method to obtain the weight vector of major items and the weight matrix of sub-items. Stockinger et al. (2021) used AHP to evaluate remote education and the fuzzy comprehensive evaluation method to reduce the impact of uncertain factors. They used a calculation model for operator "O" to avoid mainstream evaluation results being submerged, fully reflecting various evaluation opinions. The above studies mainly introduce the AHP and fuzzy evaluation methods to calculate the weight of indicators and clarify the hierarchical structure of the curriculum system. However, combining the two methods is rare. We believe that to achieve more comprehensive and objective evaluation results for different course systems, it is necessary to accurately select mathematical methods and comprehensively analyze data models (Naidoo & Naidoo, 2021). The abovementioned scholars conducted research separately from the theoretical perspective of evaluation standards, the construction of indicator systems, and the independent evaluation of mathematical methods. However, indicators are primarily determined based on the subjective experience of experts, and their accuracy and coverage affect the evaluation results (Sun & Gao, 2021). This article utilizes the fuzzy comprehensive evaluation method to fully leverage the advantages of expert evaluation, integrating fuzzy mathematics with hierarchical structure and trade-off comparison, significantly improving the objectivity and accuracy of the evaluation results.

In FAHP, the core issue is determining whether the fuzzy matrix has consistency. If the fuzzy matrix does not have complete consistency, improving its consistency is necessary. Jia and Li (2021) transformed the initial judgment matrix into a judgment matrix with complete consistency using a mathematical transformation. Yang and Chen (2022) constructed the harmonic matrix of the fuzzy judgment matrix and provided the calculation steps to improve it into a satisfactory consistency matrix. Karanja (2021) constructed a derived matrix and provided the necessary and sufficient conditions for determining fuzzy consistent matrices. Based on the above approaches, the current article studies the evaluation of physical education teaching quality in universities by constructing a FAHP derived matrix, determines the weights of various indicators in the evaluation system of classroom teaching quality in universities, establishes a fuzzy analytic hierarchy process evaluation

model for the quality of physical education teaching in universities, and improves the reliability of classroom teaching quality evaluation.

The framework we used to demonstrate our established methods is shown in Figure 1.

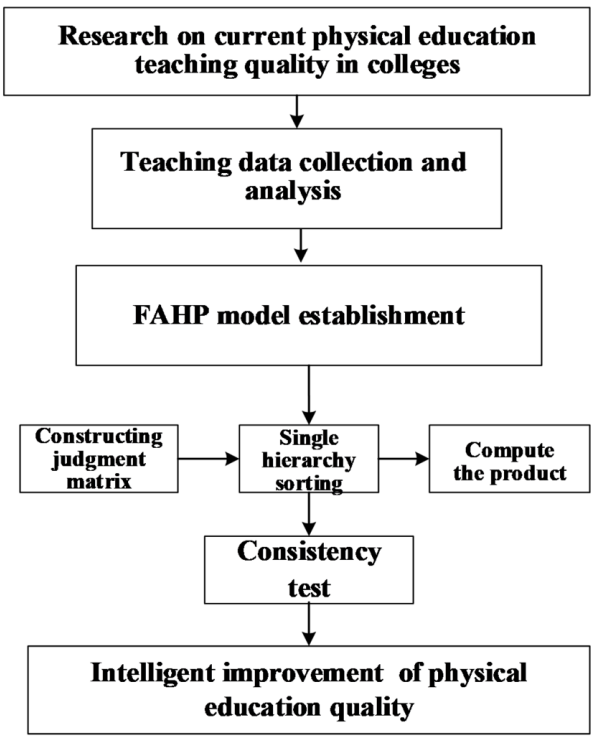
Firstly, collecting relevant data on physical education teaching in universities is necessary to identify the current problems and shortcomings faced by physical education teaching in universities. Secondly, a model is established for FAHP. This is a hierarchical analysis method based on fuzzy mathematics, which constructs a judgment matrix to evaluate the relative importance of indicators in order to evaluate the quality of physical education teaching in universities accurately and effectively. Thirdly, the judgment matrix is a vital part of the FAHP model. This step requires comparing each indicator in pairs and then determining their relative weights based on expert opinions and other factors. Each indicator is ranked using the judgment matrix constructed in the previous step. The weight of each indicator is multiplied by the corresponding data, and then the results are added to obtain the final comprehensive score. Fourthly, by comparing the eigenvectors of the matrix with the random consistency index, it can be determined whether the matrix has sufficient consistency and reliability. Finally, intelligent means, such as artificial intelligence and big data technology, can be combined to improve the quality of college physical education teaching to better serve student groups and society.

IMPROVEMENT OF PHYSICAL EDUCATION QUALITY IN COLLEGES BASED ON FAHP

Fuzzy Analytical Hierarchy Process

FAHP is a method that applies fuzzy mathematics theory to safety evaluation. Using fuzzy set theory, FAHP can reflect the system's security status. In practical applications, a system is highly complex,

Figure 1. Research framework



with multiple factors, variables, and levels. Therefore, in the research process, it is necessary to consider the influence of various factors, such as teaching content, teachers' teaching level, and students' comprehensive quality, and develop corresponding indicator systems. Only in this way can the effectiveness and reliability of the FAHP method be ensured in other courses, providing strong support for improving teaching and training quality. Various universities have formulated corresponding evaluation methods for classroom teaching quality to improve teaching quality. Although the evaluation standards and content vary from school to school, classroom teaching quality evaluation includes indicators such as teaching attitude, content, methods, and effectiveness.

The FAHP model proceeds as follows:

1) Establish the FAHP model. The FAHP model places the decision to be made at the highest level, the factors to be considered in the process of decision criteria at the middle level, and the alternative scheme at the lowest level. Notably, according to the principles of FAHP, the model only includes three layers: the target layer, the rule layer, and the indicator layer, as shown in Figure 2.

The input of the FAHP model comprises physical education course data. Based on the structure of the FAHP model given in Figure 2, the best results can be achieved by the current FAHP.

2) Constructing judgment matrix. The judgment matrix constructed by FAHP does not compare all factors together. It obtains the importance of each indicator. Using the same scale in the comparison process solves the difficulty of comparing indicators with different properties, thus improving the accuracy of the judgment matrix. The paired judgment matrix that satisfies consistency conditions is constructed from the variable scoring scale, as shown in Table 1.

We assume that two indicators, Bi and Bj, at the same level, are determined to be more important through an investigation of experts, and a certain value, b_{ij}, is assigned. Taking the 5-level quantitative method as an example, the corresponding values are 1, 3, 5, 7, and 9, respectively, indicating the importance of indicator B_i relative to indicator B_j. By contrast, the importance of indicator B_j relative to indicator B_i is expressed by the reciprocal b_{ji} of 1, 3, 5, 7, and 9. In order to improve accuracy, the values 2, 4, 6, and 8 can also be interpolated to form a 9-level quantitative method.

Figure 2. Main structure of FAHP model

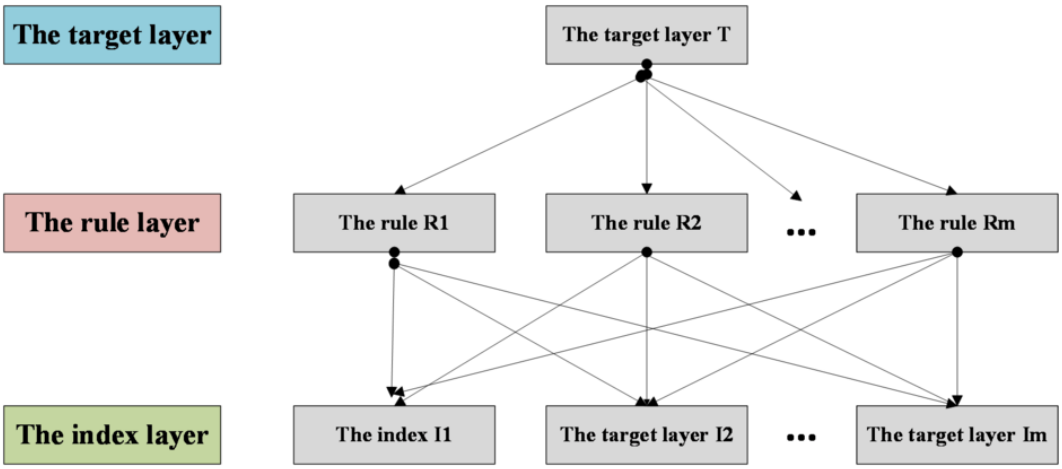


Table 1. Paired judgment matrix for FAHP

Affecting Factors	B_1	B_2	···	B_n
B_1	b_{11}	b_{12}	…	b_{1n}
B_2	b_{21}	b_{22}	…	b_{2n}
…	…	…	…	
B_n	b_{n1}	b_{n2}	…	b_{nn}

3) Single hierarchy sorting. Eigenvectors are obtained through the normalization of eigenvectors:

$$W=W\left(W_1,W_2,\ldots,W_n\right) \tag{1}$$

Where W_1 is the weight value of factors at this level to factors at the previous level.

4) Below, we present the calculation procedure for conformance checks and compute the product of each row of the judgment matrix:

$$M_i = a_{i1} * a_{i2} 2^{*\cdots} * a_{in} \tag{2}$$

where

$$i = 1,2,\ldots,n \tag{3}$$

Calculate the geometric mean of the judgment matrix:

$$G_i = \sqrt{M_i} \tag{4}$$

Calculate the eigenvector of the judgment matrix (i.e., weight):

$$W_i = G_i / \left(G_1 + G_2 + \ldots + G_n\right) \tag{5}$$

Calculate the eigenvalues of the judgment matrix as follows:

$$AW_i = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \cdots & & \cdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix} \left(w_1, w_2, \ldots, w_n\right)^T \tag{6}$$

Then, the maximum eigenvalues of the judgment matrix are calculated:

$$\lambda \max = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} \tag{7}$$

The consistency test indexes CI and CR are calculated as follows:

$$CI = (\lambda \max - n) / (n - 1) \tag{8}$$

In addition, to ensure the reliability of the matrix consistency test, the consistency proportional coefficient CR value should be calculated as follows:

$$CR=CI/RI \tag{9}$$

In general, when CR < 0.1, we can consider that the judgment matrix passes the consistency test. Otherwise, the consistency test fails. Finally, the residual between CR and CI is defined as:

$$R = CR - CI \tag{10}$$

Analysis of Factors Influencing the Quality of Physical Education Teaching Based on FAHP

Four methods are typically used to determine the weight coefficient: the Delphi method, the subjective empirical judgment method, the analytic hierarchy process, and the expert group collective discussion voting method. To ensure the objectivity and scientific integrity of the weight coefficient evaluation, this article combines the supervisor experience judgment method and the Delphi method to determine the weights of the evaluation element indicators at all levels.

Regarding the weight system of classroom teaching quality evaluation indicators, the weight of teaching content is the highest. As for the second-level indicators of the classroom teaching quality evaluation index weight system, students' mastery of knowledge and skills, the attractiveness of the classroom, and the improvement of students' abilities and qualities have the highest weight. Therefore, to improve the quality of classroom teaching, attention should be paid to ensuring students' mastery of knowledge and skills, making the classroom attractive, and enhancing students' abilities and qualities.

RESULTS AND ANALYSIS

We used the expert survey method to conduct the evaluation work. To ensure the effectiveness and reliability of the questionnaire, we followed specific principles and methods when designing the questionnaire content. Firstly, we ensured a thorough understanding of the research topic to identify critical issues and details related to the topic. Subsequently, we compiled these findings into a list of questions, and we invited experts in school sports theory and different types of school sports to participate in the evaluation to confirm the accuracy and completeness of the list of questions. After receiving feedback from experts, we revised and improved the problem list based on their suggestions and opinions. Subsequently, we used questionnaire survey software to establish a formal questionnaire, which we sent to 100 experts in school sports theory and various school sports for investigation.

During the questionnaire survey process, we carefully collected and statistically analyzed respondents' answers in order to evaluate key indicators such as the validity and reliability of the questionnaire. In the end, the correlation of the questionnaire was as high as 0.89, proving its reliability. This is because we used professional methods and processes to identify issues closely related to the research topic, as well as expert evaluation and data analysis to further improve the effectiveness and reliability of the questionnaire.

Because teachers are the main drivers of college physical education, in order to study how to improve the level of college physical education, it is necessary to analyze the main factors that affect their teaching ability. This article has achieved good results by applying the FAHP model to physical education teaching in universities. This article aims to demonstrate the effectiveness of the FAHP model in college physical education teaching, so it does not consider other comparative algorithms.

As seen in Figure 3, college physical education teachers' abilities include professional, basic, and extended competencies. Basic abilities include adaptability and working ability, core professional abilities include professional knowledge and teaching skills, and extended competencies include the ability to cooperate, compete, and innovate.

Figure 4 shows the factors most related to physical education teaching for college students of different grades, providing direction for enhancing the level of physical education. As seen in the figure, these factors are classroom atmosphere, teaching means, teaching methods, and available time. More specifically, the factors for improving the quality of physical education have different effects on freshmen, sophomores, juniors, and seniors. Among them, freshman students have the greatest impact; because they have just entered the university, they are most sensitive to the improvement of physical education. As the grade increases, this sensitivity gradually decreases.

In addition, we compared the traditional teaching method and the improved teaching scheme for overlaps, as shown in Figure 5. As can be seen from the figure, we found some overlaps and crossovers between traditional teaching methods and intelligent teaching methods. Therefore, to improve the quality of physical education in colleges and universities, it is necessary to consider the advantages

Figure 3. Main factors affecting college physical education teachers' abilities by FAHP

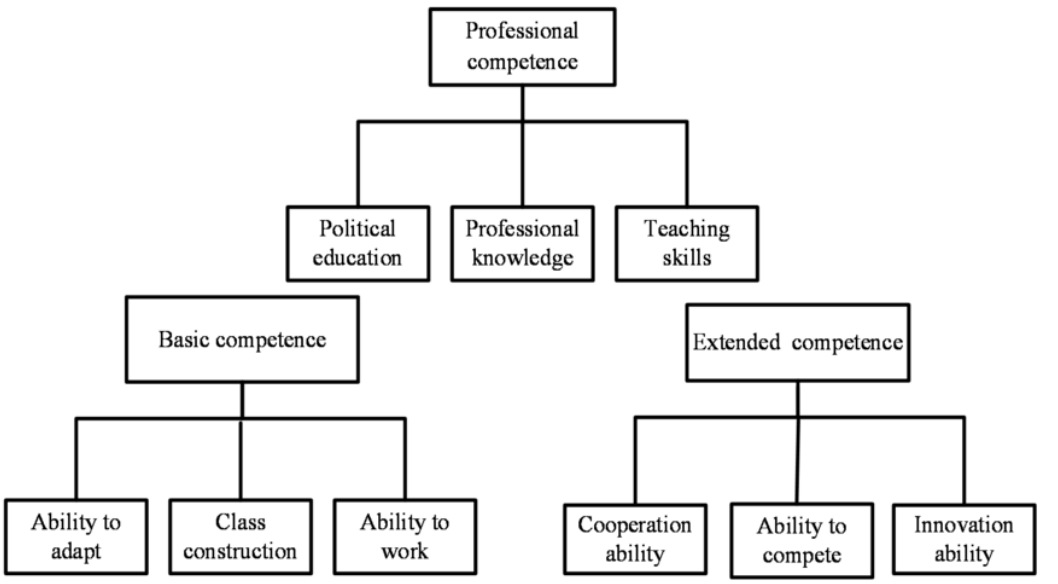


Figure 4. Factors related to physical education teaching of different grades

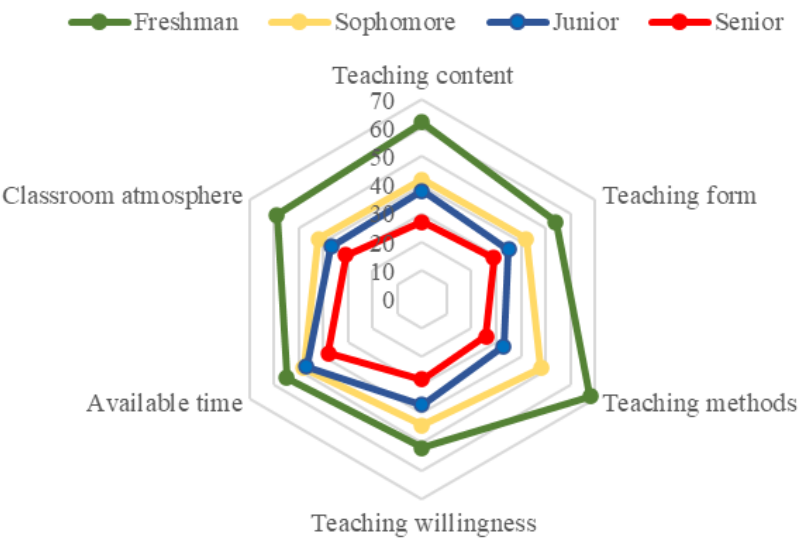
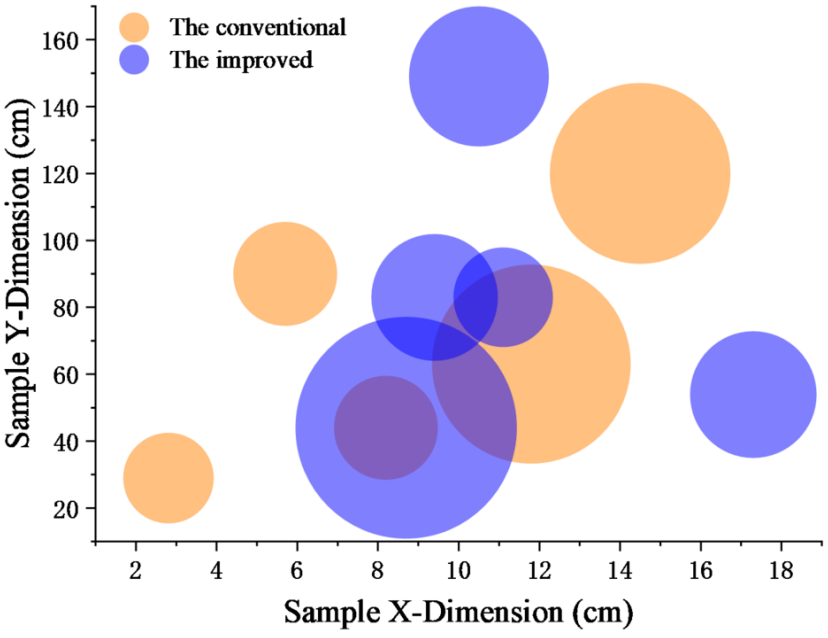


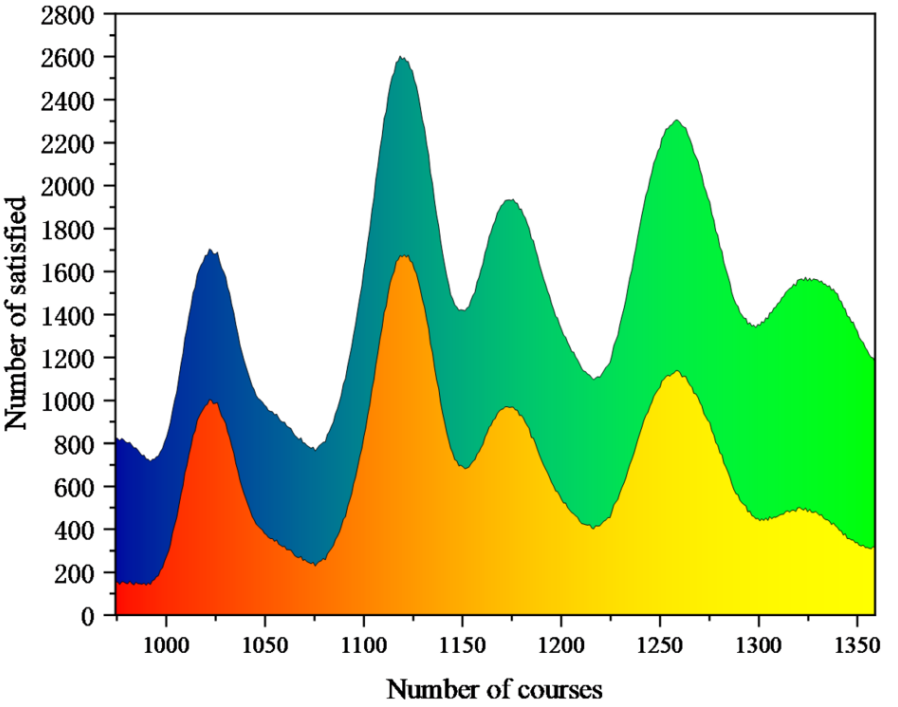
Figure 5. Distribution histogram of instructor ability measurement results



and disadvantages of the two kinds of methods. Different teaching methods can be chosen for different occasions, and the two methods can even be used together.

Figure 6 shows the number of students satisfied with teaching before and after using intelligent teaching methods; the green part represents satisfaction after improvement and the yellow part before improvement. As can be seen from the figure, students' degree of satisfaction after improving teaching quality through informational means is obviously higher than that without improving teaching

Figure 6. A survey of professional conformity of counselors



quality, and this trend is maintained. As the number of courses increases to a certain extent, students' satisfaction tends to decline, mainly due to students' adaptability to courses. However, no matter the circumstances, students' satisfaction after the improvement in physical education is higher than before the improvement.

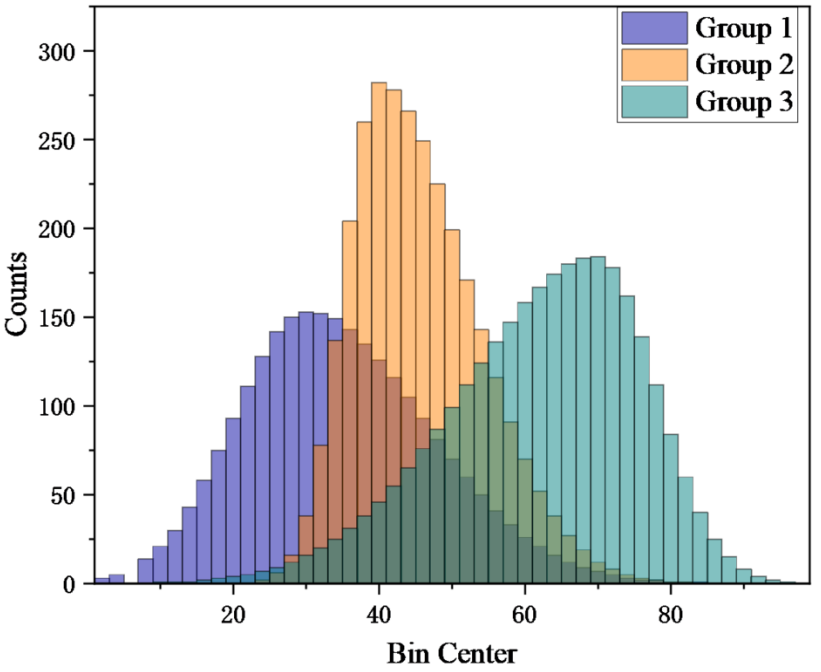
Finally, we collected feedback to verify the improvement in physical education teaching quality methods in colleges, and the specific results are shown in Figure 7. Specifically, we divided the selected students randomly into three groups to ensure the stability of the method verification. As seen in the figure, the three student groups' satisfaction with the improved college physical education quality improvement method shows a positive distribution, thus proving the effectiveness of the proposed method in improving the quality of college physical education.

From the above discussions, the FAHP combines AHP and fuzzy evaluation. AHP is a method of calculating weights, while fuzzy comprehensive evaluation involves the comprehensive evaluation of problems. In fuzzy comprehensive evaluation, AHP can be used to assign weights to each factor. Thus, it is the better model performance.

CONCLUSION

This article uses the FAHP model to analyze the main factors that affect the quality of physical education teaching in universities and proposes targeted improvement methods. In the weight system, indicators for evaluating the quality of classroom teaching, students' mastery of knowledge and skills, the attractiveness of the classroom, and the improvement of students' ability and quality have the highest weight. Therefore, to improve the quality of classroom teaching, teachers must pay attention to helping students master knowledge and skills, making the classroom attractive, and improving students' abilities and qualities. In addition, the study compared students' satisfaction

Figure 7. Feedback on the improved physical education teaching quality methods



with traditional teaching methods and improved teaching methods. The experimental results show that students' satisfaction with the improved method of developing the quality of college physical education teaching based on the FAHP model is positively distributed, thus proving the effectiveness of this method in improving the quality of college physical education teaching. Therefore, the FAHP model is a feasible method to improve the quality of physical education teaching in universities.

DATA AVAILABILITY

The figures used to support the findings of this study are included in the article.

COMPETING INTERESTS

The authors of this publication declare there are no competing interests.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Funding for this research was covered by the authors of the article.

ACKNOWLEDGMENT

The authors would like to show sincere thanks to those whose techniques have contributed to this research.

REFERENCES

Al-Kumaim, N. H., Alhazmi, A. K., Mohammed, F., Gazem, N. A., Shabbir, M. S., & Fazea, Y. (2021). Exploring the impact of the COVID-19 pandemic on university students' learning life: An integrated conceptual motivational model for sustainable and healthy online learning. *Sustainability (Basel)*, *13*(5), 2546. doi:10.3390/su13052546

Almusawi, H. A., Durugbo, C. M., & Bugawa, A. M. (2021). Innovation in physical education: Teachers' perspectives on readiness for wearable technology integration. *Computers & Education*, *167*, 104185. doi:10.1016/j.compedu.2021.104185

An, Y., Yang, J., Niu, S. J., & Wang, J. (2022). Health first: The sustainable development of physical education in Chinese schools. *Sustainability (Basel)*, *14*(5), 3133. doi:10.3390/su14053133

Bao, L., & Yu, P. (2021). Evaluation method of online and offline hybrid teaching quality of physical education based on mobile edge computing. *Mobile Networks and Applications*, *26*(5), 2188–2198. doi:10.1007/s11036-021-01774-w

Bautista, R. G., & Baniqued, W. B. (2021). From competition to collaboration: Unraveling teachers' lesson study experiences. *International Journal of Evaluation and Research in Education*, *10*(3), 921–929. doi:10.11591/ijere.v10i3.21101

Cunningham, C., Hill, S., & Zhang, W. (2022). Gender equality and educational leadership in Chinese schools. *Power and Education*, *14*(1), 66–81. doi:10.1177/17577438211058965

Dhawale, A. K., Wolff, S. B., Ko, R., & Ölveczky, B. P. (2021). The basal ganglia control the detailed kinematics of learned motor skills. *Nature Neuroscience*, *24*(9), 1256–1269. doi:10.1038/s41593-021-00889-3 PMID:34267392

Domínguez, B. N., Cerrada Nogales, J. A., Abad Robles, M. T., & Giménez Fuentes-Guerra, F. J. (2021). The development of fair play in physical education and school sports: A systematic review. *European Journal of Contemporary Education*, *10*(2), 308–323.

Gao, P. (2022). VIKOR method for intuitionistic fuzzy multi-attribute group decision-making and its application to teaching quality evaluation of college English. *Journal of Intelligent & Fuzzy Systems*, (Preprint), 1–9.

Horn, S. S., Avrahami, J., Kareev, Y., & Hertwig, R. (2021). Age-related differences in strategic competition. *Scientific Reports*, *11*(1), 1–12. doi:10.1038/s41598-021-94626-2 PMID:34321493

Jia, R., & Li, H. (2021). Just above the exam cutoff score: Elite college admission and wages in China. *Journal of Public Economics*, *196*, 104371. doi:10.1016/j.jpubeco.2021.104371

Karanja, L. (2021). Teaching critical thinking in a college-level writing course: A critical reflection. *International Online Journal of Education & Teaching*, *8*(1), 229–249.

Kraemer, W. J., & Nitka, M. (2022). Development of the high school sports performance program: Simple, safe, and successful. *Strength and Conditioning Journal*, *44*(2), 131–133. doi:10.1519/SSC.0000000000000646

Li, H., Cui, C., & Jiang, S. (2022). Strategy for improving the football teaching quality by AI and metaverse-empowered in mobile internet environment. *Wireless Networks*, ●●●, 1–10. doi:10.1007/s11276-022-03000-1

Liu, H., Chen, R., Cao, S., & Lv, H. (2021). Evaluation of college English teaching quality based on grey clustering analysis. *International Journal of Emerging Technologies in Learning*, *16*(2), 173–187. doi:10.3991/ijet.v16i02.19727

Liu, S. (2021). Research on the teaching quality evaluation of physical education with intuitionistic fuzzy TOPSIS method. *Journal of Intelligent & Fuzzy Systems*, *40*(5), 9227–9236. doi:10.3233/JIFS-201672

Naidoo, K., & Naidoo, L. J. (2021). Designing teaching and reflection experiences to develop candidates' science teaching self-efficacy. *Research in Science & Technological Education*, ●●●, 1–21.

Piñeiro-Cossio, J., Fernández-Martínez, A., Nuviala, A., & Pérez-Ordás, R. (2021). Psychological wellbeing in physical education and school sports: A systematic review. *International Journal of Environmental Research and Public Health*, *18*(3), 864. doi:10.3390/ijerph18030864 PMID:33498317

Stockinger, K., Dresel, M., Dickhäuser, O., & Daumiller, M. (2021). University instructors' implicit theories of intelligence, achievement goals for teaching, and teaching quality. *Educational Psychology*, *41*(10), 1280–1299. doi:10.1080/01443410.2021.1937575

Sun, W., & Gao, Y. (2021). The design of university physical education management framework based on edge computing and data analysis. *Wireless Communications and Mobile Computing*, *2021*, 1–8. doi:10.1155/2021/2460916

Vaquero-Solís, M., Tapia-Serrano, M. A., Hortigüela-Alcalá, D., Sierra-Díaz, M. J., & Sánchez-Miguel, P. A. (2021). Physical activity and quality of life in high school students: Proposals for improving the self-concept in physical education. *International Journal of Environmental Research and Public Health*, *18*(13), 7185. doi:10.3390/ijerph18137185 PMID:34281121

White, R. L., Bennie, A., Vasconcellos, D., Cinelli, R., Hilland, T., Owen, K. B., & Lonsdale, C. (2021). Self-determination theory in physical education: A systematic review of qualitative studies. *Teaching and Teacher Education*, *99*, 103247. doi:10.1016/j.tate.2020.103247

Yang, J., & Chen, M. (2022). Construction of sports and health data resources and transformation of teachers' orientation based on web database. *Journal of Healthcare Engineering*, *32*(1), 65–77. doi:10.1155/2022/4372406 PMID:35178228

Yu, S. (2021). Application of artificial intelligence in physical education. *International Journal of Electrical Engineering Education*.

Zhang, H., Xiao, B., Li, J., & Hou, M. (2021). An improved genetic algorithm and neural network-based evaluation model of classroom teaching quality in colleges and universities. *Wireless Communications and Mobile Computing*, *2021*, 1–7. doi:10.1155/2021/4059784

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