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Improvement Method of College Students' Physical Training Decision-Making Based on Fuzzy Analytic Hierarchy Process

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ABSTRACT

The training of physical education and training students is an important part of the education of physical education students in my country. The talents trained are an important supporting force to improve the quality of physical education and sports training and to promote the scientific and effective development of national fitness. The quality level of physical education and training students has a decisive influence on improving the physical quality of the people, promoting the progress of sports science and developing the sports cause. Therefore, on the basis of analyzing the concept of quality, quality structure, and quality evaluation, this paper uses the fuzzy judgment method to judge the physical quality of college students and focuses on the difference between the physical quality after the two-year physical education class and when entering the school in order to improve the physical education class.

KEYWORDS

Fuzzy Analytic Hierarchy Process, Judgment Matrix, Physical Training

INTRODUCTION

In today's world, science and technology are developing rapidly, the knowledge economy is becoming more and more mature, and the competition between countries is becoming increasingly fierce. From a macro-perspective, the competition of a country is the competition of economic, technological, military, political, and other comprehensive national strengths. From a micro-perspective, the competition of an organization is the competition of resources and products, and people are the main body of resource allocation management and product production (Rathleff et al., 2022). Therefore, the competition between countries is, in the final analysis, the competition of talents, and talents are the basis and guarantee for gaining an advantage in the fierce competition (Irwansyah et al., 2024). To take the initiative in future competition, we must rely on more and better high-quality innovative talents. College students are typical representatives of high-quality talents and are an important supporting force for building a national innovation system and seizing the commanding heights of

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the world's knowledge economy in the future (Ali et al., 2024). The growth of the human body will be affected by various factors, such as sports, nutrition, and genetics. Physical exercise can promote the growth of the body's bones, play a certain role in improving the cardiopulmonary function of college students, improve the various functions and system structures of the body, and make the body have comprehensive coordination. College student quality will directly affect a country's future economic and scientific development (Rønnestad et al., 2020). It is no exaggeration to say that the level of college students in a country is often regarded as a symbol of the level of scientific and technological development in that country.

In order to further promote the high-quality development of China's sports undertakings in the new era according to law, the thirty-fifth meeting of the Standing Committee of the 13th National People's Congress revised and adopted the sports law of the People's Republic of China on June 24, 2022, to come into force on January 1, 2023. The revision of sports law enriches and improves the basic system of sports rule of law and is an important milestone in the construction of sports rule of law in China. From the perspective of sports, the take-off of a country's competitive sports, the progress of sports science, and the prosperity of sports are inseparable from many high-quality sports professionals (Ivens et al., 2020). In 2009, at the National Sports Work Conference, Yuan Weimin, director of the State Sports General Administration, pointed out that it is necessary to speed up the training and introduction of various sports talents, including competition organization talents, sports technology, and education talents, sports foreign affairs talents, and coaching talents (Agarwal et al., 2021). In the same year, at the first national sports work conference held by the State Council, Vice Premier Li Lanqing of the State Council pointed out that efforts should be made to improve the level of sports scientific research, meet the needs of modern society and sports development, and cultivate a large number of qualified sports management, training, education, scientific research talents (Shaikh et al., 2024). It can be seen that high-level professional sports talents are an important part of the sports cause (Rajpoot & Dwivedi, 2021). In order to realize the sustainable development of the sports cause, the education of physical education students must be placed in a strategic position of priority development, and the training quality of physical education students must be persistent (Shukla et al., 2021).

The major of physical education mainly cultivates high-level professionals who can adapt to the needs of the development of China's sports undertakings, and can engage in sports teaching, extracurricular sports training and competitions, extracurricular sports activities, etc., in secondary schools, and engage in school sports management, sports scientific research, social sports guidance, etc. Physical education and training major is the earliest and largest in the education of physical education college students in China and has cultivated the largest number of majors so far (Kumar et al., 2021). The talents it cultivates are widely distributed in various fields such as physical education, training, scientific research, and management in China (Simion et al., 2020). Talented people are an important support force for improving the quality of physical education and sports training in China and promoting the scientific and effective development of national fitness and sports (Ginis, 2020). It can be said that the training of college students majoring in physical education and training is in the basic position of the education of physical education college students in China (Gu et al., 2019). Sports literacy and physical education are closely related. Sports literacy runs through the whole life of people. Although the emphasis of people's sports literacy in each period is different, it is equally important. Sports literacy needs to be cultivated from an early age. Sports education plays an important role in the cultivation of people's sports literacy. Sports teachers are the foundation of sports education and the most core and active sports education resources.

However, China does not pay enough attention to the research on the quality assessment of physical education and training students (Zhao & Zheng, 2021). People are concerned about how to evaluate the comprehensive quality of physical education and training students, what indicators to use to evaluate the comprehensive quality of physical education and training students, and how much each indicator should account for (Ramadhan et al., 2020). The proportions are in the stage of

guessing and subjective judgment (Yang et al., 2021). This kind of uncertain evaluation method is not conducive to the improvement of the quality of physical education and training students (Wang, 2021). Therefore, this paper systematically analyzes the definition, structure, and characteristics of the comprehensive quality of students majoring in physical education and training according to the training objectives of students majoring in physical education and training. On this basis, using the methods of literature, expert interviews, analytic hierarchy process, and multi-level fuzzy mathematics evaluation, the comprehensive quality evaluation index system of students majoring in physical education and training is constructed, which provides a theoretical and practical basis for further research in the future.

MATERIALS AND METHODS

Overview of Quality Assessment

Student quality assessment is an important part of the education evaluation system in colleges and universities. It is a research work involving many disciplines, such as pedagogy, educational measurement, educational evaluation, and educational statistics. The development of theory, quality education theory, and education evaluation theory are inseparable (Chengar et al., 2020). Therefore, it is necessary to summarize the relevant research results from the level of education evaluation and postgraduate education of physical education, so as to provide a theoretical basis for the research of this topic.

The content and purpose of quality assessment are gradually enriched with the development of the concept of quality education. Education in China has gone through the transition from exam-oriented education to quality education. In *exam-oriented education*, the evaluation of student quality mainly focuses on cognitive fields such as knowledge mastery and intellectual development, and the criterion for judging the level of student quality is only their academic performance (Zhou et al., 2020). The purpose of quality assessment of students is often to distinguish, screen, and select, only pay attention to the results of education without asking about the education process, and use pure result assessment and summative assessment (Rahimianzarif & Moradi, 2018).

In *quality education*, understanding of the objectives and functions of education evaluation is deepening, and the content of quality evaluation is increasingly comprehensive. It not only assesses student cognitive development in knowledge, skills, intelligence, and ability, but also assesses non-cognitive factors such as emotion, will, personality, and personality. The purpose of quality evaluation also pays more attention to the educational and developmental functions of education evaluation. It strives to provide timely feedback through process evaluation and formative evaluation, understand the defects and shortcomings of educational activities, and enable students to continuously improve and perfect themselves (Tang et al., 2021). It reflects the educational and motivating functions of quality assessment.

Quality assessment is a scientific talent selection method based on psychology, management, measurement, examination, system, behavioral science, and computer science. The development of quality assessment techniques and methods is closely related to management and measurement. Advances in science, including those involving computers, are inextricably linked. The research on the evaluation method of talent quality in Western countries started earlier, and a series of practical and effective evaluation methods have been formed.

Chinese Quality Assessment Methods

The research on personnel quality assessment in China started relatively late. The previous evaluation mainly focused on the measurement of knowledge and ability and used examination, interview, observation, and other methods to make comments and qualitative quality evaluation. It was highly subjective and lacked fairness, scientificity, and accuracy. With the introduction of statistical science

and fuzzy mathematics, Chinese personnel quality evaluation technology has gradually become scientific, and many theories and methods have been formed, including multi-index weighted evaluation method, principal component analysis evaluation method, and fuzzy comprehensive evaluation method (Ponsiglione et al., 2022).

Multi-Index Weighted Evaluation Method

The weighted evaluation method is to weight and sum the index values of the evaluated object to obtain the comprehensive index value and compare the comprehensive value to distinguish the pros and cons of the evaluated object, such as Li Bingkuan's *Comprehensive Quality Evaluation of Civil Engineering College Students*, Liu Wei's *Research on the Comprehensive Quality Evaluation System of College Students*, and Xie Changyong's *Research on the Comprehensive Quality Evaluation System of Military Medical Undergraduates* (Ponsiglione et al., 2022).

Principal Component Analysis Evaluation Method

The principal component analysis method is a multivariate statistical method used in mathematical statistics. In the application of quality evaluation, principal component analysis first utilizes the principles of principal component analysis in statistics to extract the principal component quality that has a significant impact on the quality level of the evaluated object. Then, a comprehensive quality evaluation function expression is established, and finally, the evaluation quality is sorted based on the calculation results. Articles using this method include Liu Jian and Su Jun's *Application of Factor Analysis in Comprehensive Quality Evaluation*, Zhang Yanna's *Study on Comprehensive Quality Evaluation of Shandong University of Finance and Economics*, Liu Jian and Yuan Chunhua's *Research on Comprehensive Quality Evaluation Model Based on Nonlinear Principal Component Analysis* (Ponsiglione et al., 2022).

Overview of Physical Training

The Concept of Sports Training

Sports training is the main component of competitive sports. It is a planned and step-by-step sports activity specially organized under the cooperation of coaches and relevant personnel to improve the sports ability and performance of athletes. It is also the most important way to achieve the goal of competitive sports. The main body of sports training is the coaches and athletes, the direct purpose is to create excellent sports performance, improve the athletic ability of athletes, and then through participating in sports competitions, an educational process specially organized to achieve excellent results in the competition (Maak et al., 2020). The exercise training process is relatively difficult and boring, and the exercise intensity is high with high injury. At the same time, training managers, sports training researchers, and training team doctors are also active participants in sports training activities.

The Concept of Extracurricular Physical Training

Extracurricular physical fitness training refers to coaches using their spare time to systematically train some students with certain talents in sports, enabling them to develop their bodies comprehensively and continuously improve their specialized sports performance (Jost et al., 2022). It is an important part of school sports and an intermediate link for the popularization and improvement of sports in China.

According to the principle of voluntariness, without affecting the learning tasks, students can use their spare time (after the cultural class every afternoon, during winter and summer holidays and other holidays, etc.) Fundamentally, extracurricular training is the primary training form of China's three-level training system.

The Concept of Extracurricular Physical Exercise

Extracurricular physical exercise refers to the physical activities that students use various sports methods and methods in their spare time to enhance their physical fitness, promote physical and mental health, and enrich their extracurricular cultural life (Burd et al., 2021). Extracurricular physical exercise is mainly a group physical activity for all students. It is mainly carried out in the school before, during, and after class. It can be carried out alone or in an organized group. Students are mainly involved in voluntary participation. It fully reflects the subjectivity of students. Extracurricular physical exercise has a wide space, rich content, and varied forms. Students have greater flexibility in choosing projects, which can attract students to participate, and can better meet the different requirements of students with different basic levels. Extracurricular physical exercise is an important part of school sports work, an indispensable way to achieve school sports goals and tasks, and occupies an important position.

RESULTS AND DISCUSSION

Fuzzy AHP Model

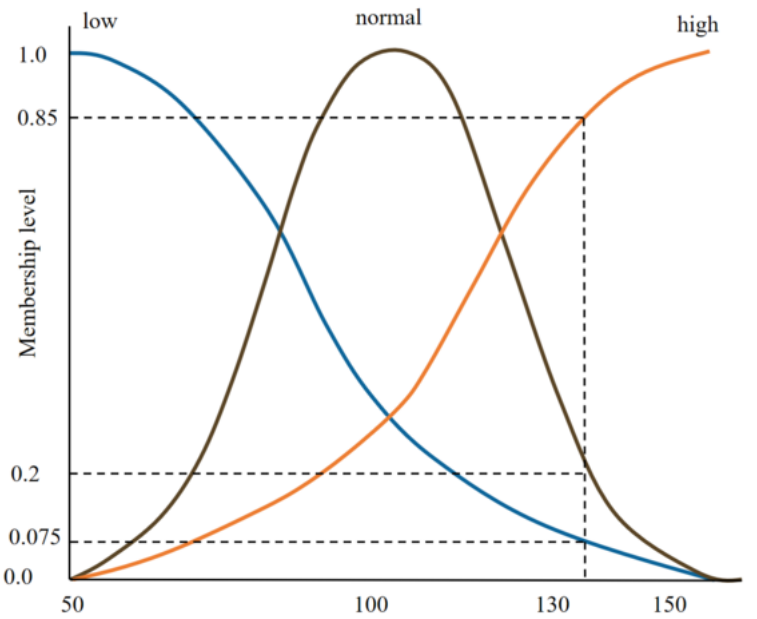
Among the numerous risk assessment methods, AHP (the analytical hierarchy process) is particularly favored by the contractor for its characteristics of combining qualitative and quantitative methods to deal with various assessment factors, as well as its advantages of system, flexibility, and simplicity. Its characteristic is to make people's subjective judgment process mathematical and thinking so that the decision-making basis can be easily accepted by people. Therefore, it is more suitable for the situation in the complex social science field. The biggest challenge of the analytic hierarchy process is that when there are many evaluation indicators at a certain level (such as more than four), it is difficult to ensure the consistency of thinking. In this case, the fuzzy analytic hierarchy process, which combines the advantages of a fuzzy method and an analytic hierarchy process, will solve this problem well. First, an analytic hierarchy process serves to determine the weight values of indicators. Then, through expert scoring, the membership degree of each indicator is determined, and a fuzzy comprehensive evaluation is conducted. Finally, a comprehensive integrated evaluation is formed.

When determining the weight of features or attributes at the same level in the traditional fuzzy analytic hierarchy process method, the relative importance between them is often found first, and then the weight is given by the normalization method. A scale of scale (such as a number from 1 to 5) is often used in the comparison process to measure their relative importance. Although these discrete numbers are relatively simple to use, they do not consider the uncertainty of mapping an individual's subjective will to specific numbers. For this reason, we can use *equality* (E), *strong* (S), and *very strong* (V) in the evaluation model of college student physical education to represent the three relative importance between the two indicators at the same level. The membership diagram is shown in Figure 1.

According to Equation 1, let the fuzzy number x represent an interval here, and each fuzzy number x can be represented by 3 definite numbers (a_1, a_2, a_3), and its membership function:

$$\mu_A \begin{cases} 0 & \\ \dfrac{x-a}{a_2-a_1} & a_1 \le x < a_2 \\ \dfrac{a_3-x}{a_3-a_2} & a_2 \le x \le a_3 \\ 0 & x > a_3 \end{cases} \tag{1}$$

Figure 1. Fuzzy membership degree of the relative importance of evaluation indicators of college students' physical education



Entropy Value Method

The concept of entropy originated from thermodynamics and was used to describe the irreversible phenomenon of ion or molecular motion. Later, in information theory, entropy was used to represent the uncertainty of the appearance of things, and entropy was used as a measure of uncertainty. In 1957, Khinchin proposed that when the entropy $H(p_1, p_2, \ldots p_n)$ satisfies the following three reasonable and compatible requirements, the entropy has only one form, such as Equations 2–5. If

$$H\left(p_1, p_2, \cdots, p_n\right) \leqslant H\left(1, 1/2 \cdots, 1/n\right), \tag{2}$$

$$H\left(p_1, p_2, \cdots, p_n\right) = H\left(p_1, p_2, \cdots, p_n, 0\right), \text{ and} \tag{3}$$

$$H\left(AB\right) = H\left(A\right) + H\left(B/A\right), \text{ then} \tag{4}$$

$$H\left(p_1, p_2, \cdots, p_n\right) = -\sum_{i=1}^{n} p_i \log_2 pi\,. \tag{5}$$

The application of entropy can measure the amount of information contained in the index data in the evaluation index system and determine the weight of each index accordingly. According

to the definition of information entropy, when an index has an equal probability effect on the research area, the information entropy value is the largest, and at this time $E_j = 1$. The equal probability effect indicates that the amount of information contained by the index is consistent for all research areas, and the existence of the index does not affect the final evaluation result shows that the utility value of the analysis of student physical fitness is zero. Therefore, the information utility value of an indicator depends on the difference between the information entropy E_j of the indicator and 1, such as Equation 6.

$$D_j = 1 - E_j \tag{6}$$

The higher the utility value of an index value, the greater the importance to the evaluation, and the greater the importance of the index value, so the entropy of the *j*th index value is Equation 7.

$$\omega_j^{''} = \frac{D_i}{\sum_{j=1}^{n} D_j} \tag{7}$$

Entropy theory is an objective weighting method. In the fuzzy evaluation of college student PE learning, the weight of each index in PE learning is determined by calculating entropy.

Fuzzy Analytic Hierarchy Process Based on Entropy

The steps of entropy-based fuzzy AHP are summarized as follows. First, construct the AHP model, then use fuzzy numbers 1, 3, 5, 7, and 9 to identify the element values in the judgment matrix. The pairwise comparison in AHP is now changed to the comparison of different students under the same criterion. The student who is far worse than the student is set to 1, and the others are set to 3, 5, 7, and 9 according to the size of the gap. Next, multiply each element in the judgment matrix A by the relative weight W_i of each criterion. This results in a new matrix, such as in Equation 8.

$$A = \begin{Bmatrix} W_1 \cdot x_{11} & W_2 \cdot x_{12} & \cdots & W_n \cdot x_{1n} \\ W_1 \cdot x_{21} & W_{22} \cdot x_{22} & \cdots & W_n \cdot_{2n} \\ \vdots & \vdots & & \vdots \\ W_1 \cdot x_{n1} & W2 \cdot x_{2n} & \cdots & W_n \cdot x_n \end{Bmatrix} \tag{8}$$

Then transform A into Equation 9.

$$Aa = \left[\left[a_{111}^{\alpha}, a_{11R}^{\alpha}\right]\left[a_{121}^{\alpha}, a_{12R}^{\alpha}\right]\right] \tag{9}$$

Next, let the optimism index be λ, where λ represents the optimism of the evaluator about the evaluation result. The larger λ is, the smaller the interval represented by the elements in $A\alpha$ is. Use λ to convert $A\alpha$ into fuzzy judgment matrix, such as Equation 10.

$$A = \begin{bmatrix} \alpha & \alpha & & a_{1n}^{\alpha} \\ a_{11} & a_{12} & \cdots & a_{2n} \\ a_{21} & a_{22} & \cdots & a_{22} \\ \vdots & \vdots & & \vdots \\ a_{n1} & a_{n1} & \cdots & a_{nn} \end{bmatrix} \tag{10}$$

where

$$a_{ij}^{\alpha} = \lambda a_{ijl}^{\alpha} + \left(1-\lambda\right) a_{ijl}^{\alpha} \tag{11}$$

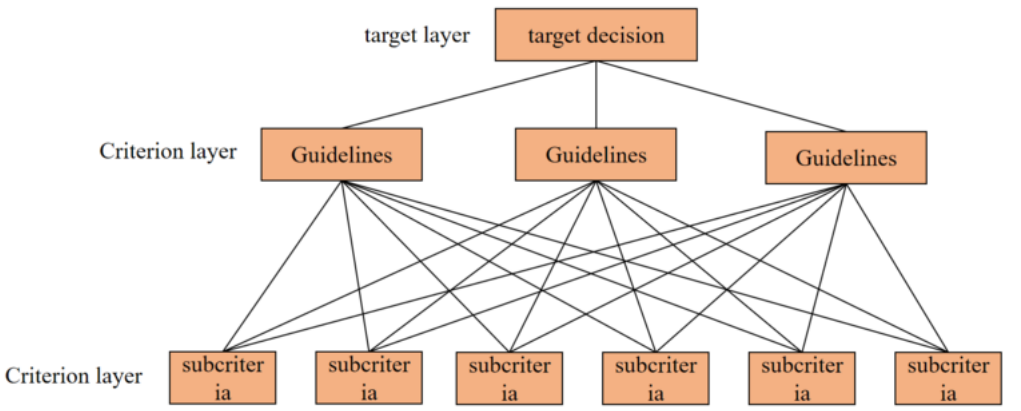
Next, calculate the entropy H according to Equation 11 to obtain the evaluation result, then decompose complex problems into multiple parts composed of different elements. These elements are divided into multiple parts according to their attributes to form different levels. Generally, they can be divided into the highest level (target level), the middle level (criteria level), and the lowest level (scheme layer), as shown in Figure 2.

This step is based on n elements b_1, b_2, … b_n for the judgment matrix of the target layer A, and find their relative weight w for A, such as Equation 12.

$$w_i = \frac{\left(\prod_{j=1}^{n} b_{ij}\right)^{1/n}}{\sum_{k=1}^{n}\left(\prod_{j=1}^{n} b_{kj}\right)^{1/n}} \tag{12}$$

Hierarchical single ordering Hierarchical single ordering is to determine the weight value of the importance order of each element related to the element in the upper level. The task of single-level sorting can be reduced to calculating the eigenvalues and eigenvectors of the judgment matrix, that is, the judgment matrix B satisfies Equation 13:

Figure 2. Schematic diagram of the hierarchical structure of AHP decision analysis method



$$BW = \lambda \max W \tag{13}$$

The testing of the five indicators of physical fitness is to explore the characteristics and changes of the physical fitness of Chinese teenagers, check the implementation of the physical education teaching syllabus and the effectiveness of student physical exercise, and lay a foundation for comprehensively improving physical fitness. So Ui is considered insignificant in judgment.

After obtaining each factor of the evaluated object, that is, the comprehensive fuzzy evaluation matrix of the last-level evaluation index, the degree coefficient of each last-level index can be obtained by using the product of the ruler and the transposed matrix of the level parameter, and the degree coefficient matrix, and then multiply it with the weight coefficient of the corresponding index, that is, to obtain the degree coefficient of the previous index, and so on, until the degree coefficient of the final overall goal is obtained, that is, our fuzzy comprehensive evaluation the final result (as Equation 15). Based on the above analysis, the mathematical model of fuzzy evaluation of comprehensive quality established in this paper is as follows:

Formula 14 shows the set of evaluation factors.

$$U = \left\{u_1, u_2 \cdots, u_n,\right\} \tag{14}$$

$$e_j = A_{j+1} E_{j+1}^{'} \tag{15}$$

When performing fuzzy transformation operations, the multiplication and bounded sum operators are used. Among them, R is the comprehensive fuzzy evaluation matrix of the last-level evaluation index, W represents the weight coefficient of various types of personnel, F represents the matrix of various types of personnel evaluation, N is the number of categories of evaluation personnel, e is the degree coefficient of each final-level index, R_i is the degree of membership of the ith factor in the judgment matrix R to each level, D' is the transposed matrix of the level parameter D, m' is the transpose matrix of the degree coefficient matrix of the j+1th level evaluation index, and e is the degree coefficient of each evaluation index of the corresponding previous level. When $j = 0$, the degree coefficient e of the overall goal is obtained. If a grade evaluation is required, the degree coefficient can be compared with the grade parameter. Which grade parameter is closest to the degree coefficient, then the evaluated object belongs to which grade, and the degree coefficient represents its membership degree. That is the final evaluation result.

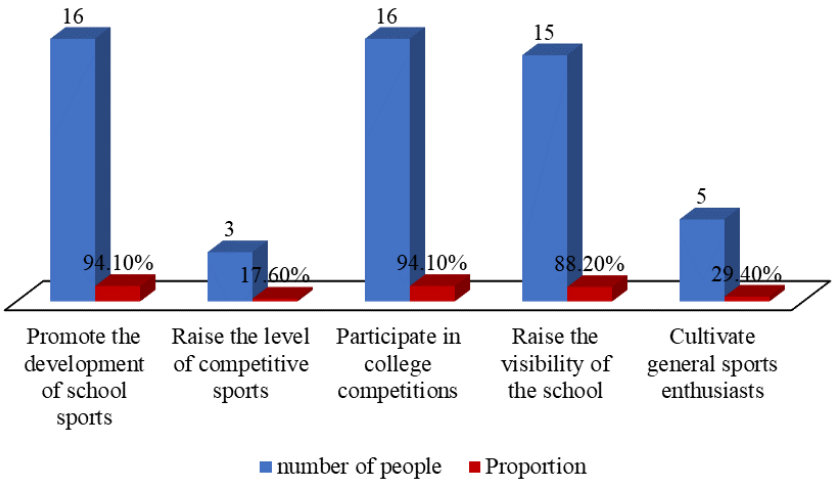
EXPERIMENTAL RESULTS AND ANALYSIS

Positioning of Physical Exercise Goals

The purpose of conducting extracurricular training in schools can, to some extent, reflect the school's attitude and positioning toward this training. After-school training is a process of organizing and planning sports training and competitions for students with certain sports skills in their spare time, based on physical education teaching and extracurricular sports activities, in order to improve the technical level of school sports teams and promote the development of school mass sports. It is an important part of school physical education and an important aspect of school education. Together with physical education teaching and extracurricular mass sports activities, it constitutes the basic way to realize the school sports task.

As Figure 3 shows, 16 people choose to promote the development of school sports, accounting for 94.1%; 16 people choose to participate in various college competitions, accounting for 94.1%; 15

Figure 3. The target orientation of extracurricular training in ordinary colleges and universities in Hangzhou



people choose to improve the school's reputation, accounting for 88.2%; 5 people cultivate general sports enthusiasts, accounting for 29.4%; and 3 people choose to improve the level of competitive sports, accounting for 17.6%. As far as the research object of this paper is concerned, 94.1% are positioned in "promoting the development of school sports," which seems to be more realistic; "cultivating general sports enthusiasts" is less (29.4%), but too much is positioned in "Participate in various college students' competitions" (91.4%) and "improve the school's reputation" (88.2%), there are major drawbacks in this view. Too much emphasis is placed on extracurricular physical training from the perspective of competitions, without fully considering the educational significance and importance of extracurricular physical training in universities. It is easy to lead to only a few top athletes participating in extracurricular sports training, which is not conducive to the comprehensive development of extracurricular sports training.

Figure 4 shows that the coaches' training motivation is ranked first with hobbies and hobbies, with 64 people, accounting for 44.8%; the evaluation of professional titles ranks second, with 47 people, accounting for 32.9%; work needs ranked third, with 21 people, accounting for 14.7%; and reflecting their own value ranked last, with 11 people, accounting for 7.7%. Since most of the coaches engaged in extracurricular sports training are mainly young and middle-aged, the young and middle-aged coaches at this age have less time under pressure. In the context of tight funding for extracurricular sports training, their interest is the main reason to support them in continuing to lead the team for training. Secondly, the professional titles of young and middle-aged coaches are basically at the intermediate stage, and they also need to obtain senior professional titles after achieving certain achievements. Therefore, the two motivations of hobbies and the need to evaluate professional titles occupy the main proportion.

Referring to the comprehensive score of the coaches' physical training, draw a histogram of the corresponding measured score distribution, as shown in Figure 5. From the graph, it can be clearly seen that the minimum and maximum levels of physical fitness training for university coaches are relatively similar. The number of teachers in the middle of physical fitness training (Levels 2 and 3) is relatively concentrated, presenting a fuzzy distribution feature. The physical fitness training of the vast majority of coaches meets the development requirements of local universities in Hubei. In 205 valid questionnaires, the distribution of sports training evaluation scores of the surveyed coaches is as follows: there are 14 people in the fourth level, accounting for 6.83% of the total sample; 59 people from the third level, accounting for 28.78% of the total sample; 108 people from the second level,

Figure 4. The motivation of coaches to carry out extracurricular sports training

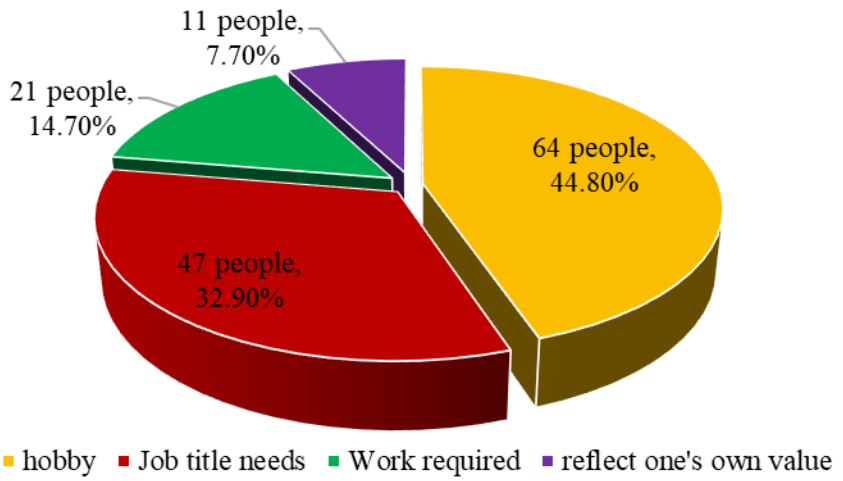
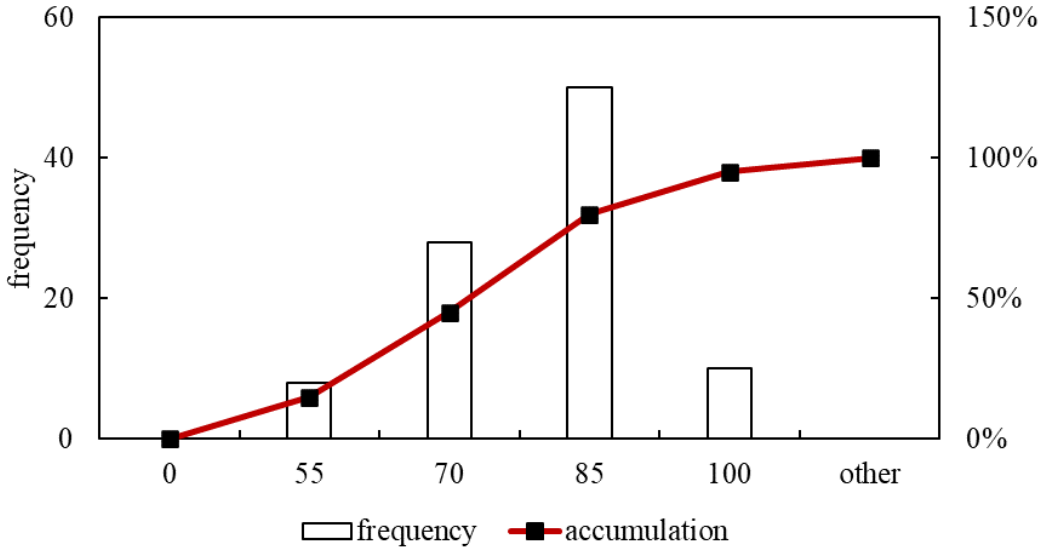


Figure 5. Distribution histogram of coaches' sports training results



accounting for 52.68% of the total sample; and there are 24 people at the first level, accounting for 11.71% of the total sample.

Comparison of Competency Feature Groups of Physical Training

The comprehensive comparison of physical training reflects the overall status of the coaches in local colleges and universities in Hubei, but the specific reasons for the difference in the strength of physical training in this group are the focus of improvement for local colleges and coaches. Starting from seven explicit and implicit sports training competency characteristic groups, combined with the evaluation scores of each module of the empirical sample and the secondary survey results of key objects, the advantages and disadvantages of sports training for coaches in local universities in Hubei

were analyzed in sequence, as shown in Figure 6. According to the distribution characteristics of the broken line in the figure, it can be seen that the average performance of college coaches is basically the same, the comprehensive evaluation score hovers around 80 points, and the law of simultaneous increase and decrease of each sub-ability is significant. Among them, the overall level of University B is slightly higher than that of the other three universities.

Although the intensity of talent introduction in colleges and universities is not as intense as that of subordinate colleges and universities, it is still more competitive than most provinces. Therefore, young teachers who can enter colleges and universities often have experienced continuous knowledge learning and systematic scientific research training, showing good innovation. However, this innovative spirit gradually decays with the increase of the sample age. Figure 7 divides the 25–40-year-old age group into five equal parts. Decreasing features are just different in deceleration. This may be related to their own social experiences and changes in the external environment, but it does not mean that the innovative spirit of all young teachers in the older age group is not as good as that of the younger age group, because some young teachers, despite accumulating scientific research achievements, still maintain a strong innovative spirit.

The distribution of the coaching team is basically reasonable, and the middle-aged and middle-level professional coaches with high knowledge level and energetic have constituted the main body of the coaching team in ordinary colleges and universities, and a more reasonable echelon has been formed. Coaches' physical education workload is too large, and they generally believe that their efforts in extracurricular physical training are not equal to the return, which affects their enthusiasm for extracurricular physical training. The training rate of coaches participating in training is relatively high, but the training level is not high, and there is a lack of more professional and systematic training.

Figure 6. Radar distribution of measured values of competency characteristic group in sports training

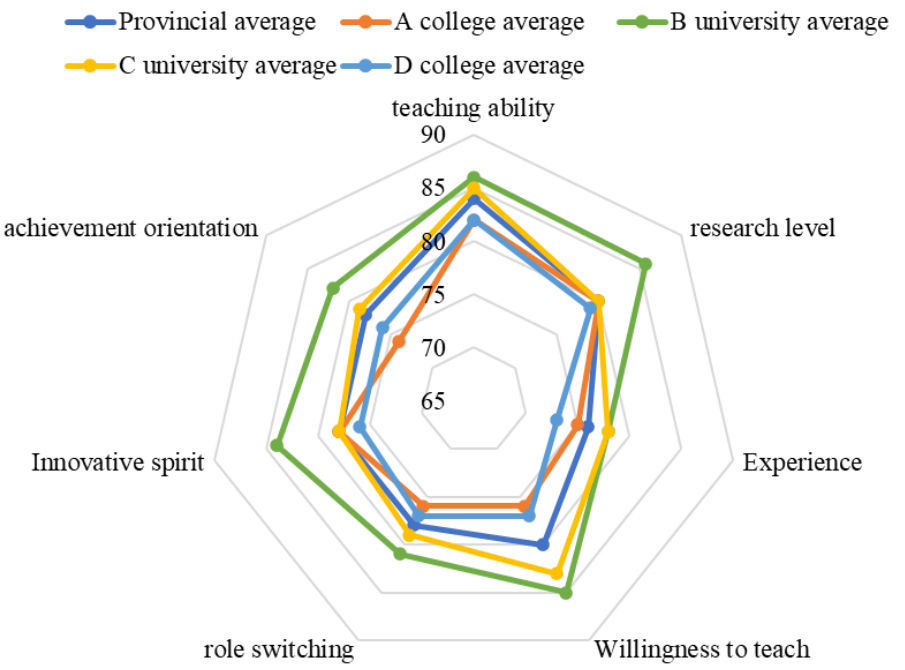
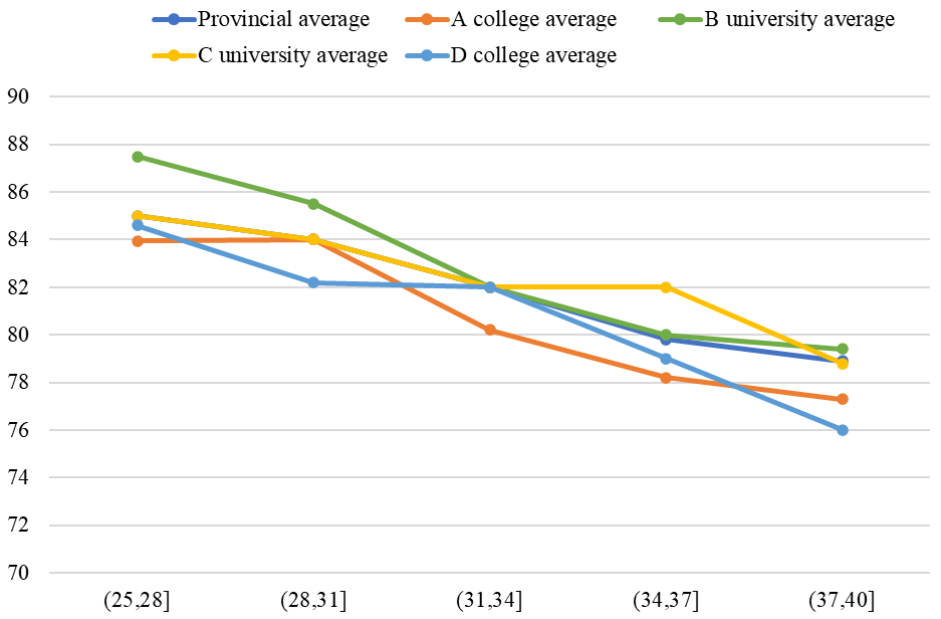


Figure 7. Age distribution of the measured values of physical education teaching for young teachers in colleges and universities



Some studies have shown that the education received by education students during school and the influence of teachers on them have a great impact on their careers. Physical education teachers will play an irreplaceable role in the initiation, cultivation, formation, and promotion of student physical literacy. Students majoring in physical education should first be individuals with a high level of physical literacy, and then the physical literacy of students majoring in physical education should be competent for physical education teaching.

CONCLUSION

The comprehensive quality of physical education and training refers to the relatively stable internal quality accumulated and developed by students in physical education and training on the basis of innate genetic quality, through systematic higher professional education in physical education and individual sports training practice. This paper combines fuzzy mathematics and the analytic hierarchy process to avoid the large error of subjective judgment caused by a single number. The results of the model prioritize student physical education learning, which provides a scientific basis for schools and teachers to improve physical education teaching and improve the physical quality of college students. The evaluation results of this model are more objective and stable, and the results have better discreteness and higher discrimination, which has a certain application and promotion value. In terms of evaluation methods, the fuzzy analytic hierarchy process algorithm is a combination of qualitative and quantitative analysis, which requires a large amount of practical data to support it. We should continuously enrich the database information in order to further improve the algorithm.

DATA AVAILABILITY

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

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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AUTHOR NOTE

We have no conflicts of interest to disclose.

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