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# *Construction and Discussion of Fuzzy Evaluation System for Fractal Technique Score*

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***Keywords:*** Gymnastic Dance, Fuzzy Evaluation System, Analytic Hierarchy Process, Technical Score

***Abstract:*** The technical requirements of the dances for each dance vary with the passage of time and people's exploration of new things. In order to improve the objectivity and scientificity of the dance and the technical level of the sports dancers, it is very important to score the form and technique of dancing. The dance movement and the rules are complementary. The movement develops in the continuous improvement of the rules, and the rules are constantly improved in the development of the movement. In order to fully reflect the comprehensive technical strength of a dancer, it is necessary to adopt a combination of qualitative and quantitative methods. Based on the above background, the purpose of this paper is to construct and discuss the fuzzy evaluation system for the performance of the dance form. The dance technique is an important part of the evaluation of the dance technique. The fuzzy evaluation system is constructed by using five aspects: basic movement skills, musical expression, movement arrangement, dance style and on-the-spot play. FAHP gives the weight of each index and the comprehensive evaluation coefficient, and draws a comprehensive evaluation method of the dance technique. It can provide solutions for the problems existing in the current practice of the athletes' dance pattern, and provide reference for the athletes to improve the dance technique. The comprehensive evaluation index system of the dance form technology includes five major factors and 12 factors. In this paper, the stratified analysis method is used to make the evaluation results of the dance modality technology better and the accuracy is higher. By determining the effect gap between the various comment levels, the comprehensive expert opinion is determined, and the final evaluation value is obtained, and the comprehensive evaluation level of the dance dance technique can be judged, thereby reflecting the contribution of the various variables of the dance technique, and provide useful reference for training and education of dancing.

## 1. Introduction

Although the dance started late in China, it developed rapidly and fully demonstrated its strong vitality [1]. The formation of dance is inseparable from the contributions of musicians, dancers, physiologists and gymnasts. The formation and development of each new thing is inseparable from the twists and turns that people have made on this new thing, just like love. If a successful invention of Instein is not the beginning, he will know that he will succeed. It is gradually summed up in practice and failure again and again. The dance is the same, and it is also after rhythmic gymnastics and nature. The combination of long-term theory and practice of gymnastics and modern dance has gradually developed [2]. The rule is the guiding principle for the development of the dance form score. Every change of the rule will bring profound and broad influence to the technology. The rule is also the basis and scale of the referee's score. It plays a positive role in guiding, restricting and improving the research of practice and theory of dance [3-4]. In the course of the game, due to the imbalance of rules, there has been an increase in athletes' injuries and premature athletes' retirement. The new rules of 2009 have redefined the number of difficulty rules, and also increased the difficulty of the equipment. The physical difficulty is only recognized in combination with the difficulty of the device, which increases the appreciation of the game, puts forward new requirements for the game, and promotes the development of the dance movement to a healthier direction. It can be said that dancing also promotes the development of rules [5-6]. The dance movement and the rules are complementary, the movement develops in the continuous improvement of the rules, and the rules are constantly improved in the development of the movement [7].

At present, China's evaluation of the form of dance technology is mainly based on the simple mathematical statistics, and the conclusions made by the coaches' own experience [8-9]. This method can also roughly reflect the pros and cons of a dancer's technique to a certain extent, but it lacks theoretical basis, objectivity is not strong, and subjective factors are too strong [10]. As we all know, the dance technique is composed of a number of interconnected links, each of which is influenced by many factors, which have varying degrees of ambiguity. Therefore, it is impossible to comprehensively measure a dancer's comprehensive technical strength only by qualitative judgment [11-12]. The merits and demerits of the performance evaluation of the dance play an important role in teaching and training. The practical evaluation can correctly reflect the actual situation of the students or athletes mastering the gymnastics technology, so as to improve the efficiency of teaching and training. Therefore, it is necessary to seek a way to establish a comprehensive evaluation of mathematical models based on strict science can adapt to the actual needs of the development of dance technology [13]. Therefore, for a large number of fuzzy factors in the process of evaluation of dance, the knowledge of fuzzy mathematics can be used, and the combination of qualitative and quantitative methods can be used to develop and develop a fuzzy comprehensive evaluation system for the dance form technology, which provides a scientific basis for teaching and training. [14-15].

This paper constructs a fuzzy evaluation system through five aspects: basic movement skills, musical expression, movement arrangement, dance style and on-the-spot play. The fuzzy analytic hierarchy process (FAHP) is used to give each indicator weight and comprehensive evaluation coefficient. The comprehensive evaluation method of the dance technique can be used to provide solutions for the athletes' current practice of the dance form and technology, and provide reference for the athletes to improve the dance form technology. In this paper, the stratified analysis method is used to make the evaluation results of the dance modality technology better and the accuracy is

higher. By determining the effect gap between the various comment levels, the comprehensive expert opinion is determined, and the final evaluation value is obtained, and the comprehensive evaluation level of the dance technique can be judged, thereby reflecting the contribution of the various variables of the dance technique, and training for the dance and education provide a useful reference.

The first chapter is an overview. The main introduction is a brief introduction to the definition and advantages of the construction and discussion of the fuzzy evaluation system of the dance technique. This paper presents the background, research significance and the research of the fuzzy evaluation system of the dance technique. The second chapter introduces the method, introduces the analytic hierarchy process briefly, introduces the detailed analysis of the principle of analytic hierarchy process and the basic fuzzy comprehensive evaluation method, and summarizes the mathematical model classification of the fuzzy comprehensive evaluation system. The third chapter is an experiment that details the source of the experimental data and the type of data, and informs the experimental environment in which the experiment is performed and the steps that the experiment needs to perform. The fourth chapter is the experimental analysis, the experimental examples are unfolded, and the experimental content, experimental process and experimental details are introduced. The fifth chapter analyzes and summarizes. This chapter mainly analyzes and summarizes the experiments. On the basis of careful summarization and summary of the research, this paper points out the gains and losses of this research.

## 2. Proposed Method

### 2.1. Related Work

The departure of modern technology that has a negative impact on society, that is, the lack of physical exercise can lead to high obesity rates and poor health. James research shows that Zumba and high-impact aerobics are a way to lose weight and reduce body fat. The purpose of the James study was to determine the effects of Zumba exercise and high-intensity aerobics on weight loss and body fat loss. In addition, the James study also aimed to assess the difference in the effects of the two forms of exercise on body weight and fat percentage [16]. On the basis of analyzing the latest compliance requirements of the Seafarers Training Convention for seafarers' training and ability assessment, Hui established a fuzzy judgment matrix by using fuzzy comprehensive evaluation method. Then the fuzzy judgment matrix is taken as the objective basis of intelligent evaluation, and the comprehensive evaluation theory is established. Combined with subjective weight factors, the training and ability evaluation of ship engineering capability is realized. Hui developed the Ocean Simulator Intelligent Evaluation Module by using the C# language on VS. Hui established the Net 2010 development platform, and established a system knowledge database and a dynamic database to integrate the module with the ship cabin full-task simulator platform, and realized two forms of evaluation of the specified project and the custom project evaluation program . Cao proposed a system that recommends the best cutting parameters and controls the surface roughness during processing, based on the product quality requirements for surface roughness, with the shortest processing times and maximum metal removal rates. The proposed evolutionary neurofuzzy system for assessing surface roughness consists of three elements: surface roughness predicted by cutting parameters, multi-objective optimization for cutting parameters (for minimum processing time and maximum metal removal rate), and control gain or the required surface roughness is by means of features quantified from the digital image of the observed machined surface. Cao outlines the ideas and architecture of the system and the possibilities for

implementation. Experimental results show that the obtained results prove the rationality of the proposed evolutionary neuro-fuzzy system for evaluating surface roughness under given constraints and further development [17]. Xiangdong established a platform-based e-commerce credit evaluation model based on fuzzy comprehensive evaluation. The weights are determined by analytic hierarchy process and then the membership of each factor is determined. Finally, the model was validated by actual cases. The results show that the evaluation system and method proposed by Xiangdong are feasible and effective in solving practical problems. It provides a scientific basis for China's e-commerce credit evaluation system platform. Establishing a scientific and reasonable e-commerce integrity evaluation system has very important practical significance [18]. Wei has established a fire-fighting information evaluation system with clear results, strong systemicity, good solution to fuzzy, and difficult to quantify through fuzzy comprehensive evaluation. First, establish a new mechanism that reflects the degree and effectiveness of firefighting informationization, namely the “pre-middle-postimal” information evaluation mechanism. Then, based on the principle of fuzzy comprehensive evaluation method, a scientific, reasonable and feasible index system is established, and the quality of information construction is transformed from qualitative evaluation to quantitative evaluation, and the calculation method of fire protection evaluation based on fuzzy theory is proposed [19].

## 2.2. Analytic Hierarchy Process

Analytic Hierarchy Process (AHP) is a multi-criteria decision analysis method in operations research. This is the first time that human beings have unified the quantitative analysis and qualitative analysis organically in operational research. The main idea is to first decompose the more cumbersome problems, then find the association hierarchy between the individual unit problems, compare the importance of different ordered hierarchical structures, at the same time, several effective judgment matrices are constructed. The matrix analysis method is used to analyze the decomposition of different levels of decomposition elements, and the proportion analysis of the decomposition elements is arranged in an orderly manner. The relative proportion of each indicator in different levels of elements is evaluated and confirmed, and the final evaluation results of the research object are made according to the above methods.

With the continuous improvement of China's economic level and technical capabilities, the AHP theory has effectively solved the fundamental problems in many fields since it was introduced into China. In the process of evaluating the data asset model, the analytic hierarchy process can be used to analyze and evaluate each indicator weight in the data asset model. In practical application, the analytic hierarchy process relies on strict mathematical theory as the background. It can improperly conduct qualitative analysis on the data asset model, and can also quantitatively analyze the validity of the model. Through the unification of these two analysis strategies, the analysis conclusions obtained have higher authenticity.

According to the relevant basic theories of the AHP method, the main content of the AHP method refers to the decomposition of complex decision-making problems according to the problem conditions, and then obtains multiple sub-segment elements, and the secondary elements are used twice in the use of the conditional problems, and get more subdivision elements. In this way, the hierarchical structure model is constructed, and the more derived structural model is used to establish the relevant judgment matrix. The judgment matrix is integrated in a single arrangement, and finally the hierarchical structure corresponding to different analysis conditions is obtained, and it carries on the model analysis and rearranges.

(1) Hierarchical model creation. During the AHP process, the most critical step is to create a hierarchical model, and to create a judgment matrix according to the model. When the consistency of judgment matrix appears in the conclusion analysis and passes the condition check, the next more detailed evaluation and calculation can be carried out for it.

(2) The creation of the judgment matrix. After the created hierarchical structure model is completed, the corresponding judgment matrix is constructed according to the relevant indicators in the model. The judgment matrix specifically refers to the importance of the relevant conditional factors in this layer to the conditional factors in the upper layer. The creation of the judgment matrix has a direct impact on the final evaluation results, and is also the most direct expression of the quantitative analysis in the AHP method. In the process of creating the judgment matrix, you can refer to the opinions and suggestions of the experts in the relevant fields, and let the relatively professional personnel give numerical values to the important condition factors in the judgment matrix. During the given period of the numerical value, the nine-level scale method can be used. The nine-level labeling method is also a commonly used scale method in the AHP method.

(3) Check the unity of judgment matrix. Due to the diversity and complexity of multi-level judgment matrix in evaluation and calculation, there are often some numerical contradictions, that is, different judgment matrices do not show strong numerical unity. When the unity of the matrices changes, the corresponding characteristic roots of the judgment matrix will change greatly, so according to the judgment moment, this characteristic of matrix can be used to check the unity of judgment matrix.

(4) Perform a hierarchical total sorting. After hierarchically sorting the subdivision factors of the first-level research object with respect to the importance of the upper-level conditional factors, the matrix operation is performed from the bottom to the top in the model. Using the analysis of each layer of conditional factors, we can get the importance weight of each layer of conditional factors relative to the upper level. By prioritizing these importance weights, the key conditional factors in the model are obtained and focused on and dealt with.

### 2.3. Fuzzy Comprehensive Evaluation Method to Calculate Comprehensive Evaluation Value

Fuzzy comprehensive evaluation is based on fuzzy mathematics, applying the principle of fuzzy relational synthesis, quantifying some factors with unclear boundaries and difficult to quantify, and conducting a comprehensive evaluation. At the same time, compared with the fuzzy comprehensive evaluation and other comprehensive evaluation methods, the fuzzy comprehensive evaluation method is more suitable for the evaluation of the target system with many factors and fuzzy factors. Therefore, according to the characteristics of the technical score of dance form, the fuzzy comprehensive evaluation method is more scientific and operable. Therefore, this paper uses the fuzzy comprehensive evaluation method to comprehensively evaluate the indicators of the determined weights to obtain the evaluation value of the hotel product quality.

(1) Single factor fuzzy evaluation

The single factor fuzzy evaluation is to determine the membership degree of each factor index in the evaluation factor set $U$ in the evaluation set, and establish a fuzzy relationship from $U$ to $V$, so as to derive the membership degree matrix $R=(r_{ij})_{m\times k}$, where $r_{ij}$ represents the degree of membership of the factor $u_i$ to the comment $v_j$. In determining the evaluation factor's membership degree $r_{ij}$ to the evaluation set, in order to be more objective and reasonable, several experts may be invited as the evaluation team to evaluate each factor, making this subjective

estimation more objective.

Let the evaluation set $V=[v_1,v_2,...,v_k]$ have $u_i$ $v_{ij}$ comments for the evaluation factor $v_j$, and $j=1,2,...,k$, then the $u_i$ membership degree vector $r_1=\{r_{i1},r_{i2},...,r_{ik}\}$ for the comment set, where:

$$r_{ij}=\frac{v_{ij}}{\sum_{j=1}^{k}v_{ij}} \tag{1}$$

First-level fuzzy comprehensive evaluation

The so-called first-level fuzzy evaluation refers to comprehensive evaluation according to various factors in one category. Its calculation formula is

$$\begin{aligned} B &= A \circ R \\ &= (a_1,a_2...a_m)\circ\begin{bmatrix} r_{11} & r_{12} & \Lambda & r_{1k} \\ r_{21} & r_{22} & \Lambda & r_{2k} \\ \mathrm{M} & \mathrm{M} & \mathrm{M} & \mathrm{M} \\ r_{m1} & r_{m2} & \Lambda & r_{mk} \end{bmatrix} \\ &= (b_1,b_2,...b_k) \end{aligned} \tag{2}$$

Where $\circ$ is a fuzzy synthesis operator. Usually, the operator $M(\wedge,\vee)$ is used more, that is, the first is small and then the big one is calculated, among them

$$b_j=\bigvee_{i=1}^{n}(a_i\wedge r_{ij}),\ j=1,2,...m \tag{3}$$

However, when there are many factors in this method, the weighting value for each factor is inevitably small, which may result in unsatisfactory evaluation results. Therefore, in order to comprehensively consider the influence of each evaluation factor and retain all the information of the single factor evaluation, the fuzzy composition operator $\circ$ can also adopt the $M(\bullet,+)$ operator, that is,

$$b_j=\sum_{i=1}^{m}a\bullet r_{ij},j=1,2,...m \tag{4}$$

Among them $\sum_{i=1}^{m}a_i=1$ .

(2) Two-level and multi-level fuzzy comprehensive evaluation

The second-level and multi-level fuzzy comprehensive evaluation is based on the first-level fuzzy comprehensive evaluation. The fuzzy evaluation method is used to normalize the evaluation result vector obtained by the first-level fuzzy comprehensive evaluation and then synthesize the matrix R as the factor set U. To the membership matrix of the evaluation set V, the evaluation vector is calculated according to the formula (2). This level-by-level evaluation constitutes a general model for the second-level or multi-level comprehensive evaluation.

## 3. Experiments

### 3.1. Experimental Environment

The merits and demerits of the performance evaluation of the dance play an important role in teaching and training. The practical evaluation can correctly reflect the time situation of the students or athletes mastering the dance technique to improve the efficiency of teaching and training. Therefore, it is necessary to seek a kind of establishment. The comprehensive evaluation of the numerical order model on the basis of strict science can adapt to the actual needs of the development of the dance technique. Therefore, for a large number of fuzzy factors in the process of evaluation of dance, the knowledge of fuzzy teaching can be used, and the combination of qualitative and quantitative methods can be used to develop and develop a fuzzy evaluation system of dance technology, which provides scientific basis for teaching and training.

### 3.2. Data Collection

To establish a scientific and effective evaluation method, we must first determine a reasonable evaluation index. Because the purpose of this study is to construct the fuzzy evaluation index system of the dance form, that is, to objectively evaluate the potential of the dancers to engage in the sport, after extensively listening to the opinions of the experts, it is necessary to consider the technical evaluation of the dance form. With a certain technical foundation, the technology was not included in it. Based on repeated investigations and extensive consultations, a questionnaire on 28 items of various aspects of the performance evaluation of the dancers was designed and the questionnaire was submitted. The degree test ($r=0.858$), and then conducted a large sample questionnaire survey. From the results of the survey statistics, the respondents basically recognized the items listed in the questionnaire, and the discrimination of each problem basically tended to be consistent.

### 3.3. Experimental Methods

(1) Through the various channels such as Wanfang Data Knowledge Service Platform, Capital Sports Institute Library, China Knowledge Network, Beijing Sports University Library, etc., relevant materials related to this article were collected and compiled, which laid the foundation for the smooth progress of this research. A solid theoretical foundation, detailed reading of the dance form technical scoring rules.

(2) In order to make the research content of this thesis more abundant, it is more comprehensive in theory, and consulted relevant experts, especially the authoritative experts in the field of gymnastic and dance. Use interviews, telephone interviews, WeChat exchanges, ask questions about the dance. Through interviews with experts, the research significance is further clarified, the research ideas are sorted out, the research content is clarified, and the accuracy, rationality and scientificity of the research are improved.

(3) Compare and analyze the changes in the scoring rules of the dance technique in recent years, summarize the changing characteristics of the scoring rules of the dance technique, and study the development trend of the dance.

## 4. Discussion

### 4.1. Construction of Fuzzy Evaluation Index System for Dance Form Technology

The mentality of the dancers is an important part of the dance competition. The psychological factors also directly affect the final effect of the dance performance. The success of the dance competition (the exertion of strength) is 80%-90% determined psychologically. Therefore, the entire contents of the performance evaluation index system of the dance form are shown in Table 1.

*Table 1. Determine the evaluation index system*

| Primary indicator | Secondary indicators |
|---|---|
| Basic motion technique $U_1$ | Body posture $U_{11}$;Underfoot action $U_{12}$; |
| Musical expressiveness $U_2$ | Rhythm processing of music $U_{21}$;<br>The embodiment of music style $U_{22}$;<br>Resilience on the field $U_{51}$ |
| Action arrangement $U_3$ | Combined action fluency and novelty $U_{31}$;<br>Dance style characteristics and movement difficulty $U_{32}$;<br>Rationality of action scheduling $U_{33}$;<br>Coordination of action and music $U_{34}$ |
| Dance style $U_4$ | The style of dance $U_{41}$;Personal style $U_{42}$ |
| Play on the spot $U_5$ | Athletic status on the field $U_{51}$ |

The evaluation of the performance of each form of the performance of the dance form is shown in Figure 1. As can be seen from Figure 1, the most important thing is the basic action technique. It can be concluded that if you want to get high scores in the dancing competition, the basic skill is the key to score.

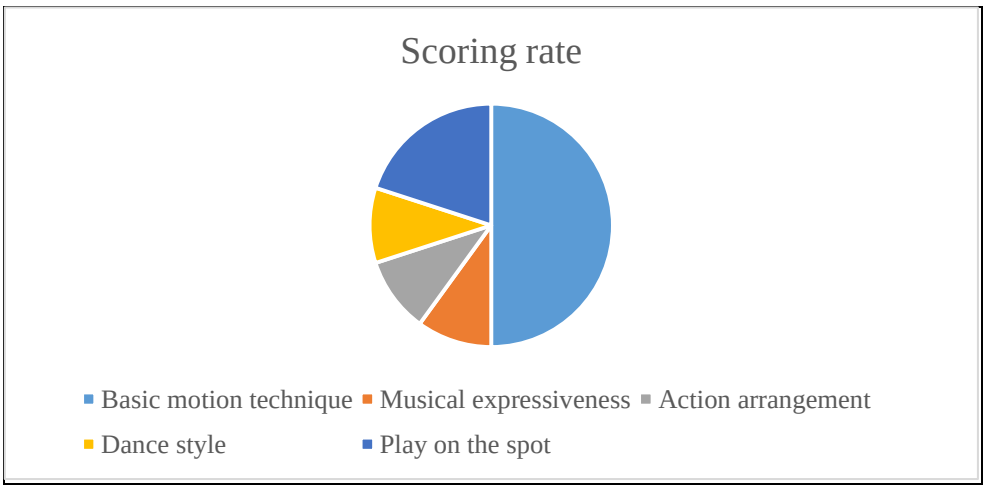


*Figure 1. Fancy dance scoring standard*

Let the set of evaluation factors be $U$, denoted as $U=\{U_1,U_2,U_3,U_4,U_5\}$, then $U_1=\{U_{11},U_{12}\}$, $U_2=\{U_{21},U_{22},U_{23}\},U_3=\{U_{31},U_{32},U_{33},U_{34}\},U_4=\{U_{41},U_{42}\},U_5=\{U_{51},\}$.

### 4.2. Use AHP to Determine the Weight of Each Evaluation Factor

(1) Establishment of AHP weighted scoring model

In fact, AHP is not only a analytic method, but also a weighted scoring method. One of its main features is the way to determine the weight. Unlike traditional weighted scoring models that use subjective judgments to determine weights, AHP uses a simple method to quantify such subjective judgments. The basis of this method is the comparison value aij of the relative importance of the target. The general definition is as shown in Table 2. The basic steps are: establishing the hierarchical structure (Table 1); using the ratio scale method of 1-9 to construct the judgment matrix; solving the largest eigenvalue of the judgment matrix and its corresponding normalized eigenvector, the components of the eigenvector are the ranking weights of the factors of the same layer relative to the relative importance of a certain factor.

*Table 2. Comparison of target relative importance comparison values*

| Value | Signification |
|---|---|
| 1 | Objective i is as important as j |
| 3 | Target i is slightly more important than target j |
| 5 | Target i is significantly more important than target j |
| 7 | Target i is of course more important than goal j |
| 9 | Target i is definitely more important than goal j |
| 2 4 6 8 | Other intermediate values that can be used |

Obviously, aij=1, and if aij=k, then aij=1/k.

Between 2005 and 2009, the rules reduced the degree of false reductions, and the penalty for serious errors was adjusted to 0.3 points, which increased the viewing of the game and enabled the athletes to fully demonstrate their actions. In the new rules introduced in 2013, the scores of the initial mistakes of the original rules were restored, and the points for serious mistakes were increased to 0.5 points. The rules of the dances experienced a decline in the degree of wrong action. The rising trend also shows that the dance is gradually advancing in people's exploration. The dance score rule changes the score of the error, score as shown in Figure 2.

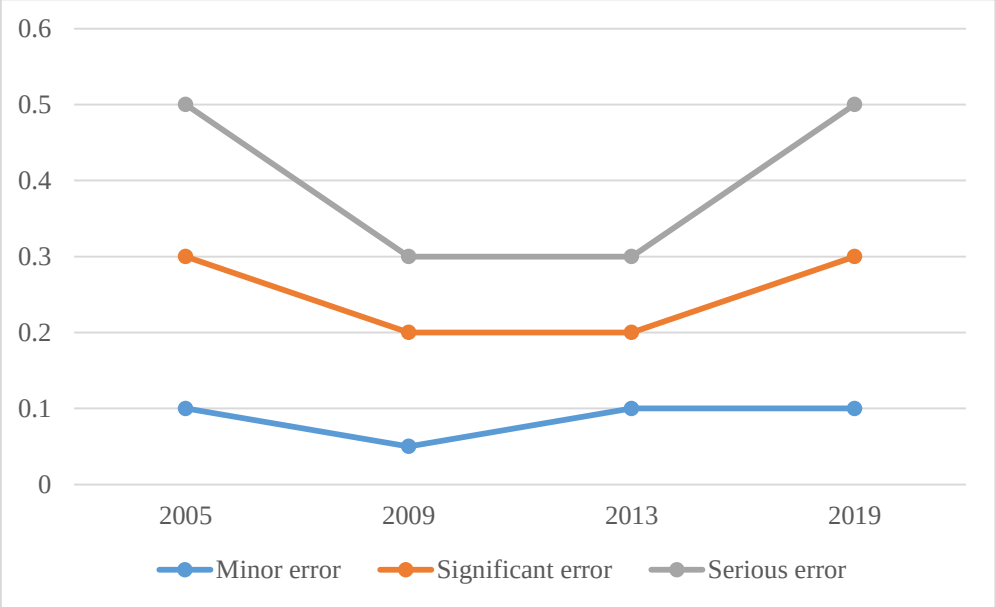


*Figure 2. The dance scoring rule changes the score of the wrong score*

(2) Establish a judgment matrix for the primary indicator

According to the calculation method of AHP analytic hierarchy method, the judgment matrix of AHP analytic hierarchy is established, as shown in Table 3.

*Table 3. Weights of each evaluation factor*

| A | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| B1 | 1 | 1/2 | 1/3 | 4 | 6 |
| B2 | 2 | 1 | 3 | 7 | 9 |
| B3 | 3 | 1/3 | 1 | 5 | 7 |
| B4 | 1/4 | 1/7 | 1/5 | 1 | 3 |
| B5 | 1/6 | 1/9 | 1/7 | 1/3 | 1 |

After the following matrix transformation, the relative weights of the first-level indicators can be obtained:

$$\begin{matrix} 1 & 1/2 & 1/3 & 3 & 6 \\ 2 & 1 & 3 & 7 & 9 \\ 3 & 1/3 & 1 & 5 & 7 \\ 1/4 & 1/7 & 1/5 & 1 & 3 \\ 1/6 & 1/9 & 1/7 & 1/3 & 1 \end{matrix} \begin{matrix} 0.156 & 0.241 & 0.071 & 0.231 & 0.231 & 0.201 \\ 0.312 & 0.481 & 0.642 & 0.404 & 0.346 & 0.361 \\ 0.467 & 0.159 & 0.214 & 0.289 & 0.269 & 0.255 \\ 0.039 & 0.069 & 0.043 & 0.058 & 0.115 & 0.112 \\ 0.027 & 0.053 & 0.031 & 0.019 & 0.038 & 0.071 \end{matrix}$$

In recent years, the difficulty movements in the performance pattern of the dance are also constantly changing. The number of difficulty actions in the 2005-2008 version of the rules is 520, of which the difference between the difficulty of jumping and the difficulty of turning is not large, and the difficulty of jumping is 28.7%. The difficulty of turning is 29.5%, the balance is 22.6%, and the flexibility and wave difficulty are at least 19.6%. In the 2009-2012 version of the rules, the total number of difficulty is reduced by more than 130 compared with the 2005-2008 version, in which the difficulty of jumping is up to 31.3%, the difficulty of balancing is 27.8%, the difficulty of turning is less than 19.3%, flexibility and wave difficulty accounted for 21.7%. Flexibility and wave difficulty were eliminated in the 2013-2019 rules, in which the difficulty of jumping was 39.3%, the difficulty of balance was 31.0%, and the difficulty of turning was 29.7%. The specific data is shown in Figure 3.

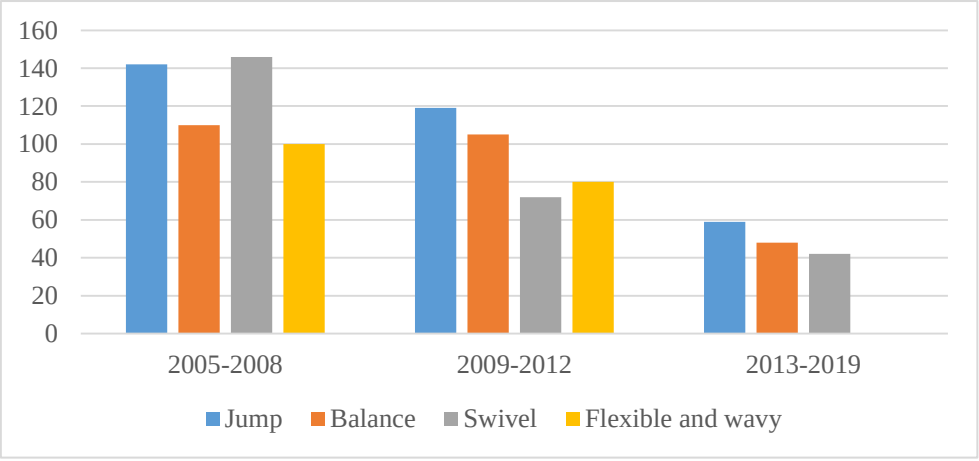


*Figure 3. Comparison of the number of actions in each difficulty class*

(3) Establish a judgment matrix for secondary indicators

According to the AHP analytic hierarchy process and the above integral method, on the basis of establishing the judgment matrix of B1, B2, B3, B4 and B5 respectively, the corresponding weights of each secondary index synthesis are obtained respectively, get the importance of each index to the target, that is, the importance of each factor in the system. It is also possible to clearly know the mutual importance of the factors from the overall ranking of the various factor indicators, and use its quantitative criteria to provide a scientific quantitative basis for the selection of tennis. (Note: retain three digits after the decimal point) as shown in Table 4.

*Table 4. Synthetic weight level total ordering*

| A | B1<br>0.201 | B2<br>0.361 | B3<br>0.255 | B4<br>0.112 | B5<br>0.071 | Synthetic weight | Total sort |
|---|---|---|---|---|---|---|---|
| C11 | 0.400 | | | | | 0.080 | 5 |
| C12 | 0.600 | | | | | 0.012 | 12 |
| C21 | | 0.396 | | | | 0.143 | 1 |
| C22 | | 0.283 | | | | 0.102 | 3 |
| C23 | | 0.321 | | | | 0.116 | 2 |
| C31 | | | 0.251 | | | 0.064 | 7 |
| C32 | | | 0.152 | | | 0.039 | 11 |
| C33 | | | 0.234 | | | 0.060 | 8 |
| C34 | | | 0.363 | | | 0.093 | 4 |
| C41 | | | | 0.500 | | 0.056 | 9 |
| C42 | | | | 0.500 | | 0.056 | 9 |
| C51 | | | | | 1.000 | 0.071 | 6 |

The consistency test is performed, and the above judgment matrix is tested by using the formula $C.R = C.I / R.I$, wherein the values of the consistency indicators $C.I = (\lambda \max - n)/(n-1)$ and $R.I$ are stochastic indicators of the same-order matrix. Substituting the data, $C.R = (C.V / R.I) = 0.032 < 0.10$, it is considered that the above judgment results have satisfactory consistency.

Since each factor in U has different emphasis, each factor needs to be given different weights, which is represented as a fuzzy subset $A = (a_1, a_2, ...a_n)$ on U, and specifies: $a_i \geq 0$, and $\sum_{i=1}^{n} a_i = 1$.

According to the fuzzy mathematics theory, the mathematical model of the comprehensive evaluation result B of the evaluation object is:

$$B = (b_j)1*m = (b_1, b_2, b_3 ... b_m) = A \quad R = (ai)1*m.[rij]1*m \tag{5}$$

Enter A and R as a variator to get B. In this paper, the general matrix operation operator method is adopted, because the model is a weighted average model, in which only weight set A has the meaning of weight quantifiable. After R and B are found, the factor class is judged as: $B = A*R$. If a graded score matrix is established, as shown in Table 5, the comprehensive evaluation score is: $X = D \bullet Z$, then the calculation result can determine whether the player is suitable for the desired type of dance player.

*Table 5. Grading values of grades and scores*

| Grade | Better | Good | General | Bad |
|---|---|---|---|---|
| Fraction | 100-90 | 89-80 | 79-70 | 69-60 |
| Group median | 95 | 85 | 75 | 65 |

The grade score chart is shown in Figure 4:

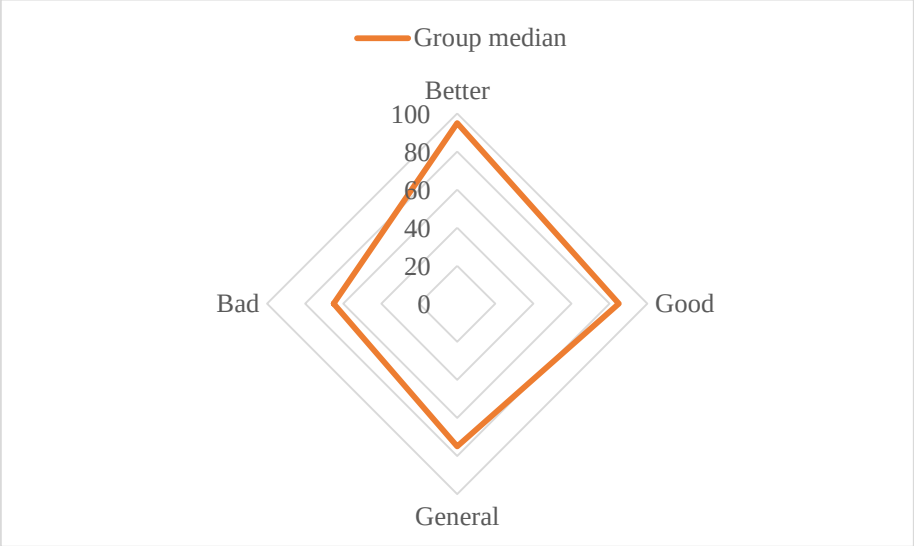


*Figure 4. Rank score chart*

## 5. Conclusion

This paper uses the knowledge of fuzzy mathematics to evaluate the dance form technique to seek a more objective and accurate evaluation method. The development of modern dance is becoming more and more fierce, and people's requirements for the dance technology are getting higher and higher. To train an excellent dance dancer, more human, financial and material resources must be invested than ever before. Therefore, improving the talents of the dance and dance talents is a matter of great concern. The improvement of the talent rate must have corresponding high-quality evaluation methods and evaluation criteria. The traditional evaluation methods based on qualitative judgments cannot meet the needs of the development of the times. "Scientific research not only requires qualitative, but also quantitative treatment. Qualitative is the basis of quantitative, while quantitative is qualitative and precise." To fully reflect the comprehensive technical strength of a gymnast, it must be combined with qualitative and quantitative methods.

The comprehensive evaluation index system of the dance form technology includes five major factors and 12 factors. This paper realizes the comprehensive evaluation of the dance technique by introducing the FAHP method, which avoids the shortcomings of the single factor quantitative evaluation analysis of the dance technique. The stratified analysis method is used to make the performance evaluation results of the dance modality better and the accuracy is higher. By determining the effect gap between the various comment levels, the comprehensive expert opinion is determined, and the final evaluation value is obtained, and the comprehensive evaluation level of the dance technique can be judged, thereby reflecting the contribution of the various variables of the dance technique, and training for the dance and education. Provide a useful reference. Using FAHP and expert consultation survey method, the weight of the evaluation index system of the dance form is determined, and the technical evaluation of the dance form is more objective and quantitative. It has circumvented the shortcomings of the influence of the subjective factors on the evaluation of the people who used the dance technique.

The evaluation system of the dance form technique is a multi-factor problem for the choice of the dancers. The fuzzy mathematics method is used to comprehensively evaluate, and the fuzzy

edge-rich information makes the evaluation closer to artificial intelligence; the selection of athletes is closer to scientific and has the characteristics of operability. The work of this paper is relatively preliminary. It is based on the first-level evaluation of fuzzy mathematics. If the quantitative and fuzzy comprehensive evaluation of evaluation indicators are organically combined, and the establishment of multi-level evaluation will make the evaluation system of tennis players more perfect. In addition, the comprehensive assessment has yet to be further revised in terms of the determination of fuzzy subsets and the effects of comprehensive assessment.

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## Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

## Conflict of Interest

The author states that this article has no conflict of interest.

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