

A FUZZY COMPREHENSIVE SYSTEM FOR EVALUATING VOLLEYBALL TEACHING ABILITY

¹SHUQING MA, ¹DONGLIANG WANG

¹Institute of Physical Education, HanDan College, 056005 HanDan, Hebei, China, shuqing_ma@yeah.net

ABSTRACT

Since the teaching ability has been influenced by many factors in volleyball sports teaching, it is more difficult to make objective and fair evaluation to mark it. At present, the evaluation volleyball teaching ability is mainly based on the following aspects, such as students' academic achievements students' evaluation for teacher and the finished status of teaching projects. All the evaluation methods have been greatly influenced by some subjective factors. By using mathematical statistics method, based on the reference literature and surveyed data, this paper confirms such an evaluation system index that it establishes a fuzzy evaluation model, designs and develops the fuzzy comprehensive evaluation system of volleyball teaching ability based on the fuzzy mathematics theory. Through the example of evaluation calculation, it demonstrates the reliability of evaluation system, which provides the safeguard to make objective and fair evaluation for volleyball teaching ability.

Keywords: *Volleyball Teaching, Teaching Ability, Fuzzy Comprehensive Evaluation, Quantitative Analysis*

1. INTRODUCTION

The teaching ability evaluation involves with the vital interests of teachers. Many teachers are skeptical of teaching ability evaluation system. It not only affects the enthusiasm of teachers' teaching, which make teachers not timely correct to understand the deficiencies, but also affects the teaching task being effective completed with high quality, and also influences the students study. Volleyball sports teaching has been influenced by many factors, such as teachers' teaching enthusiasm, teachers' professional ethics, the teachers' teaching theory guide in class, the class action display and so on. Each kind of situation will play a certain role on the teaching ability evaluation. At present, volleyball athletes often encounter the lower body muscle pain distress, some studies have found that athletes repeatable jumping movement lead to lower body muscle continuous wound. Through investigation and study, volleyball players occur around the lower body muscles at 28 years of age, which is amounted to 60%. Through dynamic kinematic research scholars to analyze, the long time continuous jump players are easy to produce muscle injuries for the lower body muscle when they struck the volleyball course. And when jumping strength is increased, it will lead to muscle strain phenomenon. Some researchers observe that the volleyball athletes'

jumping ball movement from the lower body electromyography changes patterns is easy to cause the damage tensor, when the volleyball athletes' muscle appears eccentric contraction, therefore muscle contraction and stretching process will lead to degeneration of the muscle fibers and muscle injury; secondly, due to overload operation, the lower body of isometric muscle may be led to other location muscle during muscle damage characteristics of digestion load. Therefore, the application of computer software technology on volleyball players' muscle carries out EMG computer tuning control, through the lower body muscles electromyography changes to collect relevant data, while the establishment of volleyball players' muscle model, to use the motion mechanical model on the lower body muscle EMG related characteristics analysis when volleyball athletes exercise.

Therefore, it can't through a kind of performance of the volleyball teacher's to judge teachers' teaching ability. It should be based on a variety of good or bad conditions to make comprehensive evaluation of teachers' teaching ability. And it requires the evaluation system to consider each of the effects evaluation. Based on this idea, this paper puts forward a comprehensive assessment of the fuzzy mathematical model. It considers each evaluation index influence. Through the matrix relationship,



it establishes the indicator evaluation matrix. Finally, through the matrix integrated computation, it obtains the volleyball comprehensive evaluation score. In this paper, through the calculation, it demonstrates that the comprehensive evaluation system is reliable. And finally, it puts forward the system's deficiency, which provides a theoretical basis to improve and perfect the evaluation system of volleyball teaching ability.

2. THE CONFIRMATION OF VOLLEYBALL TEACHING ABILITY EVALUATION INDEX

Due to the volleyball teaching ability evaluation has been influenced by many factors, while these degree of influences are different. So it can make scores on various affecting factors through looking up the data and survey methods. Usually, the influence of teachers' teaching ability factor mainly includes the following several aspects, teachers' professional morality, teachers' teaching enthusiasm, the display theoretical guiding action in class ,teachers and students' communication, innovation ability. Through the investigation and analysis, the main influencing factors of the weight coefficient are as shown in Table 1:

Table 1: Weight Coefficient Of The Main Factor

Evaluation factors	weight		weight
teachers' professional morality P1	0.10	the action display in class P4	0.25
teachers' teaching enthusiasm P2	0.15	teachers and students' communication P5	0.15
teachers' class theoretical guiding P3	0.20	innovation ability P6	0.15

Each main influencing factors indicator has the corresponding secondary indicators, it is in Table 2:

Table 2: The Corresponding Secondary Indicators Each Main Influencing Factors Indicator

The main influence factors	The Secondary influence factors	Weight coefficient
P1	Teachers' image	0.3
	Moral quality	0.4
	Education psychological quality	0.3
P2	Preparation before class	0.4
	Whether late	0.3

P3	Classroom atmosphere	0.3
	Prepare lessons before class	0.4
	Lecture knowledge	0.3
P4	Students' accept the situation	0.3
	Preparation before class	0.3
	Action accuracy	0.4
P5	Students' accept the situation	0.3
	Communicate with Students before class	0.3
	Communicate with Students in class	0.4
P6	Communicate with Students after class	0.3
	Theory innovation	0.3
	innovation of class demonstration action	0.4
	Examination innovation	0.3

From Table 1 and Table 2 ,we could see that the cultivation of the students' ability of playing volleyball is closely related to the concept of volleyball sports education, and it has to meet the society's requirement of quality education, skill education and the comprehensive development. So it should strengthen the cultivation of the students' ability of playing volleyball, and make full use of the teaching technology of three-level evaluation teaching method. The enhancement of the cultivation of students' volleyball sports ability, we must firstly strengthen the requirements for teachers' teaching, and it is only to constantly strengthen the construction of teachers, the teachers' quality can obtain the improvement to ensure efficient education quality, and then it can effectively complete the teaching task. And the teacher should continuously follow up modern information technology teaching mode to innovate the teaching in the classroom and to give exercise and training to the students' creative thinking. The teacher also should give full play to the personal charm to integrate into the students, build good relationship with students, carry on scientific means to guide students to have physical training, make classroom atmosphere more active, and stimulate students' interest and initiative in volleyball teaching.

3. THE ESTABLISHMENT OF FUZZY COMPREHENSIVE EVALUATION MATHEMATICAL MODEL

Use the method of fuzzy evaluation for construction engineering by fuzzy analysis. Fuzzy evaluation mainly involves three main factors:

The first, establish the factor set $U = \{u_1, u_2, \dots, u_m\}$

Second, establish the evaluation set

$$V = \{v_1, v_2, \dots, v_n\}$$

In third, the single factor judgment matrix[1]:

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1m} \\ r_{21} & r_{22} & \dots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \dots & r_{nm} \end{bmatrix} \quad (1)$$

Among them, judgment matrix R is single factor geometry U evaluation judgment, get V on the fuzzy set formula (1) the grade fuzzy evaluation analysis.

The domain for V, and the definition of $V_i = (i = 1, 2, l, m)$. With the increasing of i, system risk is gradually increasing.

Make $W_i < W_{i+1}$. The domain of the V ranges for[2]:

$$\Omega = \{w_1 : w_2, w_1 : w_2, l, w_{m-1} : w_m\} \quad (2)$$

$$\bar{B} = \{u_{v1}, u_{v2}, \dots, u_{vm}\}, \text{ and}$$

$$\sum_{i=1}^m u_{vi} = 1$$

Then, a security feature vector for grade[3]:

$$H_{uv} = [H_{uv}^+, H_{uv}^-] \quad (3)$$

$$H_{uv}^- = \sum_{i=1}^m u_{vi} [w_i + u_{vi} (w_{i+1} - w_i) \div 2]$$

In which,

$$H_{uv}^+ = \sum_{i=1}^m u_{vi} \left[w_{i+1} - u_{vi} (w_{i+1} - w_i) \div 2 \right]$$

Fuzzy characteristic quantity of grade median[4]:

$$H_{muv} = \sum_{i=1}^m 0.5 u_{vi} (w_i + w_{i+1}) \quad (4)$$

When the $[H_{uv}^+, H_{uv}^-] \subseteq [w_i, w_{i+1}]$, grade is a 100% chance;

When the $[H_{uv}^+, H_{uv}^-] \subseteq [w_i, w_{i+2}]$, Security level as a possibility for[5]:

$$\pi_i = \frac{\int_{H_{uv}^-}^{w_{i+1}} u_{Fvi}(w) dw}{\int_{H_{uv}^-}^{w_{i+1}} u_{Fvi}(w) dw + \int_{w_{i+1}}^{H_{uv}^-} u_{Fvi}(w) dw} \quad (5)$$

From the model, we can see that the first step is to strengthen the optimal selection and plan of the teaching content and realize the optimized configuration. It not only has to ensure that the courses are good and suitable for use in the teaching, but also should make volleyball sports bring great benefit to students' physical and mental health. In today's society when people pay attention to the pursuit of spiritual enjoyment, at the same time they have to focus on the mental education, and in this way it can make the students get some exercise and enjoy the art style and great charm of the volleyball sports teaching. This method realizes the skills education, and at the same time it also can improve the quality education.

4. THE APPLICATION OF FUZZY EVALUATION MODEL

Comprehensive evaluation model, because of its simple and practical characteristics, it is widely applied to various fields of the evaluation system. The basic process is as shown in Figure 1:

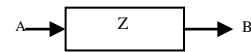


Figure 1: Comprehensive evaluation fuzzy transformation

A and Z were two matrixes. A is the influence factors matrix. Z is on behalf of the weight coefficient. B is comprehensive evaluation results. Through $A \cdot Z = B$ and it obtains the results.

Comprehensive evaluation model is divided into two kinds of model. One is the basic model, the other one is confidence model.

4.1 Basic model

The main influencing factors P which is written the form of P set $P = \{P1, P2, \dots, Pn\}$, weight coefficient is $T = \{T1, T2, \dots, Tn\}$. It gets evaluation matrix[6]:



$$\begin{bmatrix} t_{11} & t_{12} & \dots & t_{1n} \\ t_{21} & t_{22} & \dots & t_{2n} \\ \vdots & \vdots & & \vdots \\ t_{m1} & t_{m2} & \dots & t_{mn} \end{bmatrix} \quad (6)$$

Z is on behalf of subjection degree matrix. It marks $C=\{c_1,c_2,\dots,c_n\}$, satisfies $\sum_{i=1}^n c_i = 1$.

After synthesis[7]:
 $Y=C \cdot Z=(Y_1, Y_2,\dots,Y_n)$ (7)

4.2 The confidence level model

Confidence level model mainly confirms confidence level.

The t_{ii} of Z needs to investigate some times. The number of participating person can be set as M. After the unified planning, we can get[8]:

$$\left\{ \frac{Di1}{M}, \frac{Di2}{M}, \dots, \frac{Dim}{M} \right\}, \text{ and } \sum_{j=1}^m D_{ij} = M \quad (8)$$

If it is classified as different grades, it also can get[9]:

$$\sum_{i=1}^M \frac{D_{ij}}{n} [e_i, f_i] \quad (9)$$

From the above analysis, we'd better strengthen the continuous innovation of volleyball sports teaching methods, it should pay

attention to integration of science and knowledge, and enhance comprehensive cultivation of physiological knowledge and psychological knowledge. The teachers should do more heuristic education and use the three-level evaluation teaching method to promote interaction with students, the teachers also have to constantly strengthen exercise and cultivation of students' innovation consciousness, and they can continue to stimulate the students' interest in volleyball sports to make the students learn and take the exercise in the entertainment, and at the same time the students can have entertainment in the learning and training. At the same time the modes and methods of volleyball sports teaching should give attention to each student's individual needs and development, and they have to teach students in accordance with their aptitude.

5. THE FUZZY COMPREHENSIVE EVALUATION SYSTEM DESIGN OF VOLLEYBALL TEACHING ABILITY

The first step is to make sure the fuzzy evaluation set Z. Assuming that Z is divided into four levels. There are respectively very good, good, general, the qualified, $Z = \{Z_1, Z_2, Z_3, Z_4\}$. Assuming that, fifty people participate in evaluation. The four levels' fraction is $F = [90, 80, 70, 60]$. Assuming that, fifty people mark on the six main evaluation factors. The marking results can be seen in Table 3:

Table 3: The Marking Result Of Six Main Evaluation Factors

Evaluation factors	The number of marking person (Z1, Z2, Z3, Z4)				Evaluation factors	The number of marking person (Z1, Z2, Z3, Z4)			
	P1	10	20	10		10	P4	5	25
P2	15	10	20	5	P5	15	15	10	10
P3	5	15	10	20	P6	25	10	5	10

Through the formula $\left\{ \frac{Di1}{M}, \frac{Di2}{M}, \dots, \frac{Dim}{M} \right\}$, it can get the transformation matrix.

$$Z = \begin{bmatrix} 0.2 & 0.4 & 0.2 & 0.2 \\ 0.3 & 0.2 & 0.4 & 0.1 \\ 0.1 & 0.3 & 0.2 & 0.4 \\ 0.3 & 0.5 & 0.3 & 0.1 \\ 0.3 & 0.3 & 0.2 & 0.2 \\ 0.5 & 0.2 & 0.1 & 0.2 \end{bmatrix}$$

According to the survey result, the main influence factors of evaluation matrix are:

$$T=[0.1,0.15,0.2,0.25,0.2,0.2],$$

$$\begin{aligned} Y=T \cdot Z &= \\ & [0.1,0.15,0.2,0.25,0.2,0.2] \cdot \\ & \begin{bmatrix} 0.2 & 0.4 & 0.2 & 0.2 \\ 0.3 & 0.2 & 0.4 & 0.1 \\ 0.1 & 0.3 & 0.2 & 0.4 \\ 0.3 & 0.5 & 0.3 & 0.1 \\ 0.3 & 0.3 & 0.2 & 0.2 \\ 0.5 & 0.2 & 0.1 & 0.2 \end{bmatrix} \\ & = [0.27,0.265,0.245,0.22] \end{aligned}$$

Comprehensive evaluation

$$\hat{Y} = Y \cdot F = [0.27,0.265,0.245,0.22] \cdot \begin{bmatrix} 90 \\ 80 \\ 70 \\ 60 \end{bmatrix} = 24.3$$

$$+21.2+17.15+13.2=75.85$$



From the above, in university volleyball elective courses, teaching can be combined with selective use of the auxiliary game, so not only allow the volleyball option teaching to become more interesting and competitive, but also to better enhance the skills of the learners; for teachers in the teaching process, teaching should be for different levels of students, respectively, and be proposed to meet the teaching objectives of the actual situation, thereby leading to differential treatment; a very wide view of the volleyball use is a popular worldwide sports to carry out interactive teaching methods (emphasis highlights between teachers and students in the teaching process of multilateral interaction between university students learning enthusiasm and participation and to achieve the promotion of university students physical and mental qualities comprehensive development purposes), which is also very conducive to the pros and cons of the university students to identify and discuss volleyball skills and tactics, but also more conducive to effectively mobilize the initiative of interactive teaching; close cooperation between teachers and students in the teaching of the whole process[10,11]. The effective mobilization of the enthusiasm and creativity of the majority of university students together to accomplish the task of soccer teaching, students are able to more fully grasp the basic theory, techniques, skills and tactics in the teaching content of the new teaching philosophy; in the university volleyball elective course teaching, we should actively use the audio-visual and other technical means and information feedback for university students, but also shorten the needed time for students to master the volleyball skills volleyball teaching process becomes more scientific and systematic. We can better improve the university students the ability to analyze problems and problem-solving skills; Volleyball class evaluation should adhere to the qualitative and quantitative combination of subjective and objective aspects. We should not only consider university students in the volleyball program the study reached the absolute level, but also focus on the Students' progress rate in the volleyball learning and effort. At the same time, it should be process-oriented evaluation, which can be more objective and true reflection of the actual learning situation for university students.

6. THE EXISTING PROBLEMS OF VOLLEYBALL FUZZY COMPREHENSIVE EVALUATION SYSTEM

Volleyball fuzzy comprehensive evaluation system may also exist the following problems [12, 13]:

(1) The confirmation of the weight coefficient

Weight coefficient is generally through the consult literature or experts' discussion, it confirms after the final consent. So its confirmation must be determined by the effect of subjective factor. Thus, it sets up a comprehensive evaluation weight system to confirm the volleyball evaluation weight coefficient.

(2) The influence factors of evaluation

Though, the comprehensive fuzzy evaluation system of volleyball teaching ability can make comprehensive evaluation for volleyball teaching ability. But it will be affected by subjective factors, in which each item marking is made by experts. It is influenced by subjective factors.

(3) The confirmation of confidence level

The confirmation of confidence level has big influence on the accuracy and reliability of the evaluation results. The general evaluation system only uses the direct confirmed level. Actually in order to ensure accurate and reliable confidence, the best way is to make hierarchical level evaluation. After it is hierarchical, confidence interval is divided into multiple interval, each interval can confirm confidence again. Finally, it combines with all the confidence interval, so as to obtain the confidence coefficient. It can ensure the reliability of confidence level.

The findings confirm that the lower body muscles of volleyball athletes will generate tensile contraction in the intense training. At the same time, according to intense training course of the volleyball players, building muscle kinematics model on the lower body muscle movement, to analyze of the interaction relationship between muscle movement strength and the angle of tendon. During the electromyography changes of the lower body muscles movement, the muscle in which the conditions and the degree of mutual influence predict the kinetics state of the lower body muscles, this approach can provide training bases and protection method for volleyball athletes in the intense training course.

Sports reform, and social development of the twenty-first century, the new requirements [14].



At present, China's national conditions, the development of competitive sports out of a single system to achieve diversified development pattern; ordinary institutions of higher learning how to play an educational and scientific and technological advantages to develop national outstanding university athletes; extensive training system into intensive cost-effective training system, to ensure that the sports sustainable development, and so these problems have a significant impact on the overall development of sports in the state of the twenty-first century, made from practical and theoretical scientific answer is very important. The construction and management of the sports team coaches, track and field team by Associate Professor Wang then served as head coach of the remaining coaches are responsible for their own projects to work together in the training game[15]. In addition, the Ministry of sports and art teaching coaches specially formulated assessment criteria, business files, coaches workload methodology for calculating and spiritual, material incentives, and win the school agreed to develop the special provisions of the coaches staff rank. Coaches is a political quality, reliable, upright style, with a strong sense of professionalism and responsibility of the team. Coaches are the unit carefully selecting the right trainer competition results, and implementation of assessment, not the professional quality of the coaches to develop evaluation criteria and methods.

7. CONCLUSION

Through the ways of consulting literature and survey collects data, this paper used the method of mathematical statistics to sort data. And finally, it confirms mathematical index of evaluation system. Based on the fuzzy mathematics knowledge, it establishes a fuzzy evaluation model, designs and develops the fuzzy comprehensive evaluation system of volleyball teaching ability. Through the evaluation case calculation, it ultimately gets the comprehensive evaluation score with 75.85. It verifies the reliability of evaluation system. Volleyball teaching ability evaluation is related to the physical teachers' positive evaluation, so its objectivity and impartiality is particularly important. Reasonable and objective evaluation can not only improve the enthusiasm of teachers' teaching, but also can make the teacher timely recognize deficiencies. So as to improve their

teaching methods, teaching efficiency and quality. It has profound significance for volleyball sports teaching reform and development. So schools and education circles should increase investment, and actively explore the objective and just evaluation system. Then it can provide reliable guarantee for teachers' teaching and students' learning.

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