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## Constructing analysis on assessing index system of volleyball consciousness

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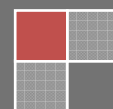
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### ABSTRACT

Through the application of several scientific methods such as expert consulting, hierarchy analytic approach, and experiments and so on, this paper constructs the assessing index system about volleyball consciousness, so as to promote the formation and development of volleyball athletes' or students' consciousness. The index system includes three second-index, such as servicing, receiving and attacking, and defending and attacking consciousness. The servicing consciousness includes five third-index, attacking, accuracy, purpose, flexibility, and variety. The receiving and attacking consciousness includes four third-index, dig pass, setting pass, spiking, and coordination consciousness. The defending and attacking consciousness includes blocking, dig pass, setting pass, spiking and coordination consciousness. The experiment confirms that it has good internal reliability coefficient, and the results are reliable, the assessment method is effective.

### KEYWORDS

Volleyball consciousness; Assessing index system; Servicing consciousness; Receiving and attacking consciousness; Defending and attacking consciousness.



### INTRODUCTION

Volleyball consciousness is the subjective response produced during the brain’s positive thinking process towards the objective regularity of volleyball in the volleyball practice activities that players are engaged in. It is the essence of volleyball which can predict, choose and dominate in guiding players to play correctly on the courts. In addition, it helps position, select, regulate and magnify the skills and tactics movement which plays an important role in the application and development of volleyball skills and tactics.

The formation of volleyball consciousness has its own objective regularity in which the “volleyball consciousness assessment”, a feedback mechanism, is rather vital to the formation and development volleyball consciousness. However, the current researches are mainly focusing on the concepts, classifications and training ways of volleyball consciousness and there is few studies focusing on the assessment of volleyball consciousness. Therefore, it is of both theoretical and practical meanings to deal with the key issues and difficult problems existing in volleyball teaching and training by establishing a comparatively objective and quantitative assessing index system, avoiding the single experimental and judgemental assessment, so as to improve the formation and development of players’ volleyball consciousness as well as the formation of self-assessment system of them.

### RESEARCH METHODOLOGY

The research methodologies adopted here in this study include literature review, expert consultation, analytic hierarchy method, experimental method and statistical analysis.

#### Literature review

According to the requirements of research goals and the contents, the author reviewed the related journals and books of this research to know more about the relative research front of this topic.

#### Expert consultation

According to the tasks and requirements of this research, it was determined to employ two circles of expert consultation. In the first circle, the author designed and issued the questionnaires on assessing index system of volleyball consciousness to experts to filter the index. As to the second circle, it was estimated that a total of 12 questionnaires were issued and the valid response rate is 100% (12 of 12 is returned). Experts and scholars have made assessment to this system from the four aspects including rationality, significance, comparability as well as feasibility to preliminarily establish the assessing index system of volleyball consciousness. TABLE 1 shows the distribution of professions, professionals titles and education. TABLE 2 shows the distribution of years of professional work

**TABLE 1 : Distribution of professions, professionals titles and education**

Professions, Professional Titles and Education	Professions:		Professional titles		Education Postgraduate:		Total	
	Teachers	coaches	Senior	Sub-senior	Undergraduate	College degree		
Number	6	6	5	7	7	2	3	12
Percentage (100%)	50	50	41.7	58.3	58.3	16.7	25	100

**TABLE 2 : Distribution of years of professional work**

Age groups	15-20	21-25	26-30	31-35	36-40	Total
Number	3	4	1	2	2	12
Percentage (%)	25	33.3	8.3	16.7	16.7	100

#### The analytic hierarchy process

On the basis of the expert consultation, establishing the assessing index system of volleyball consciousness to construct pairwise judgment matrix for two circles of expert evaluation. Next is to calculate the characteristic roots and characteristic vectors of the judgment matrix to order in single level and whole system as well as carry out the consistency check of these figures.

#### Experimental method

12 students from 2005 specialized volleyball class of Physical Education Institute of Xuzhou Normal University are divided into A and B two groups in which Group A is the observation group and Group B is the control group. During the

period from April to May in 2009, three teaching matches were organized to between A and B groups. Then the eight experts made assessments on the volleyball consciousness showed by Group A on the basis of the assessing index system.

### **Statistical analysis**

Making statistical processing on the collected data with SPSS software and gathering relative statistical data with the help of data operation in analytic hierarchy process.

## **DISCUSSIONS AND ANALYSIS**

### **Construction of assessing index system about volleyball consciousness**

The volleyball consciousness assessment refers to a process in which the evaluation personnel making evaluation and estimation, using scientific methods, of players' volleyball consciousness for some specific purposes in accordance with certain standards and procedures. The assessing index system about volleyball consciousness is a critical or overall measurement towards the changes of volleyball consciousness. The assessing index is a kind of variable, created by the actual problem, whose every change will lead to the changes of the assessment results of volleyball consciousness that can be valued by the same scale. If it is assumed that there are "n" variables, then the set of all assessment index will be the assessing index system about volleyball consciousness.

### **Selection principles of assessing index about volleyball consciousness**

To properly select the assessing index system of volleyball consciousness, the following principles are to be followed.

#### **(1) The principle of pertinence**

The characteristics of evaluation objects should be taken into consideration when selecting the assessing index of volleyball consciousness. The action effect is the external performance of consciousness and the assessment about volleyball consciousness indirectly reflects the consciousness level with the features of action's effectiveness and rationality under the guidance of assessing awareness.

#### **(2) The principle of representativeness**

In the process of selecting the assessing index of volleyball consciousness, there may be various factors that can reflect the evaluation objects' either positive or negative conditions from different levels. This research only selects the most representative and critical factors that can reflect the nature and structure of volleyball consciousness as the index.

#### **(3) The principle of adaptation**

The principle of adaptation has two meanings. On one hand, it means to reach the consistency between objectives and index so that the selected assessing index can reflect the features of all aspects of volleyball consciousness in a comprehensive way without anything missing. On the other hand, it means to ensure the relative independence of the index so as to avoid the overlapping of index effect in which different index repeatedly reflects the same feature.

#### **(4) The measurable principle**

In the process of selecting index, it is preferred to choose the definite index that is easier for quantitative evaluation. Even when it has to select indefinite index, it is preferred to choose the one that is easier for quantitative index too.

#### **(5) The principle of objectivity**

When selecting the assessing index for volleyball consciousness, it is necessary to find out the objective assessing criterion for the index so as to eliminate or reduce the impacts of subjective factors like assessment personnel as many as possible.

#### **(6) Comparability Principle**

Try to adopt the standardized or commonly used index for ease of horizontal comparison.

### **The arrangement of assessing index system about volleyball consciousness**

The attacking and defending system of volleyball can be divided into servicing period, receiving period and the defending and attacking period according to the attacking and defending phases and links. Among them, the defending and attacking period can be further divided into the attacks including receiving spiking balls, blocking balls and other kinds of balls based on the nature of the volleyball with the spiking balls as the priority. Accordingly, the attacking period can be divided into dig pass, setting pass, spiking, and coordination links. The defending and attacking period can be divided into links including blocking, dig pass, setting pass, spiking and coordination. In this situation, the assessment on volleyball consciousness are distributed to the one of different periods and links.

In accordance with the principles of index selection, the assessing index system of volleyball consciousness has been blocked out with the expert consultation. This system, in overall, includes one first-index, three second-index and fourteen third-index.

The first-index includes three second-index which are servicing, receiving and attacking, and defending and attacking consciousness.

The servicing consciousness, covers five third-index such as attacking, accuracy, purpose (service area, neutral spot, service line and service objective), flexibility (noticing key time and tactical needs with flexibility), and variety (technical moves, the variety of volleyball’s nature)

The receiving and attacking consciousness includes four third-index which are dig pass (predictability, accuracy and ability to control the speed and arc of volleyball according to the attacking tactics), setting pass (predictability, accuracy, hidden ability, flexibility and adaptability), spiking (aggressivity, accuracy and flexibility), and coordination consciousness (clear labor division, reasonable movement, follow-up protection, crossover, three dimensional offense and group participation).

The defending and attacking consciousness includes five third-index which are blocking (observing the opposite’s first passer, second passer and blocker, the movement changes and combination block), dig pass (predictability, reasonable movement, accuracy with dig and pass, ability to control the speed and arc of volleyball according to the attacking tactics), setting pass(predictability, accuracy, hidden ability, flexibility and adaptability), spiking (aggressivity, accuracy and flexibility)and coordination (clear labor division, reasonable movement, follow-up protection, crossover, three dimensional offense and group participation) consciousness.

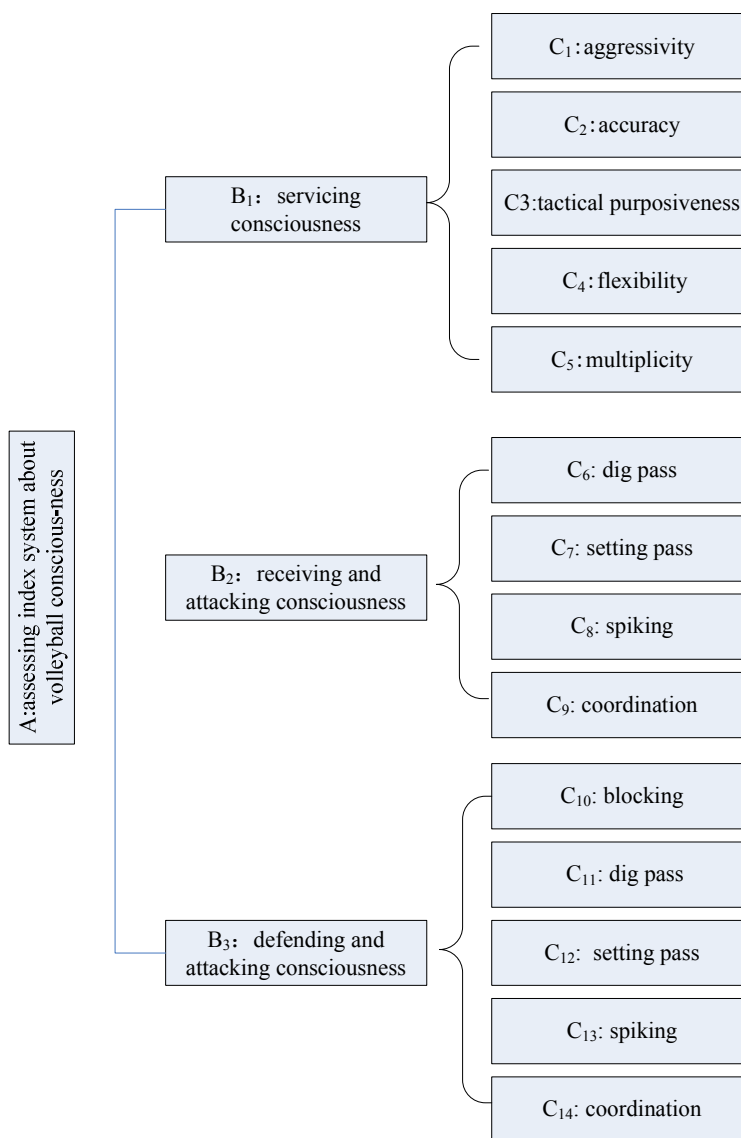


Figure 1 : Index system of volleyball consciousness

The results of the feasibility of this research has been shown in TABLE 3 according to the questionnaire survey to 12 experts. Seeing from the filtering and sorting results, the approval rates of all index are over 90%. Now the assessing index system with three second-index, fourteen third-index is preliminarily established.

**TABLE 3 : Research on the feasibility of establishing the assessing index system about volleyball consciousness**

	Definitely feasible	Feasible	Less feasible	Infeasible	Definitely infeasible
Number(n=12)	4	6	2	0	0
Percentage(%)	33.3	50	16.7	0	0

**Establish assessing index system of volleyball system through analytic hierarchy method**

On the basis of the expert consultation, establishing the assessing index system of volleyball consciousness to construct pairwise judgment matrix for two circles of expert evaluation. Next is to calculate the characteristic roots and characteristic vectors of the judgment matrix to order in single level and whole system as well as carry out the consistency check of these figures. The total level of sorting is seen in TABLE 4.

**TABLE 4 : The total level of sorting**

Level B Level C	B <sub>1</sub> 0.304	B <sub>2</sub> 0.467	B <sub>3</sub> 0.229	Final rank of level C
C <sub>1</sub>	0.477	0	0	0.145
C <sub>2</sub>	0.238	0	0	0.072
C <sub>3</sub>	0.152	0	0	0.046
C <sub>4</sub>	0.072	0	0	0.022
C <sub>5</sub>	0.061	0	0	0.019
C <sub>6</sub>	0	0.390	0	0.182
C <sub>7</sub>	0	0.206	0	0.096
C <sub>8</sub>	0	0.278	0	0.130
C <sub>9</sub>	0	0.126	0	0.059
C <sub>10</sub>	0	0	0.296	0.068
C <sub>11</sub>	0	0	0.206	0.047
C <sub>12</sub>	0	0	0.171	0.039
C <sub>13</sub>	0	0	0.211	0.048
C <sub>14</sub>	0	0	0.115	0.026
CR	0.015	0.003	0.010	0.005

**Notes: CR refers to the value of consistency. When CR is less than 0.10, it is considered that the evaluation matrix is with satisfied consistency.**

**Assessment method design for volleyball consciousness**

It is required to conduct quantification because this index system is the one with multi-level, multi-index and weights, and each index is qualitative index. The methods used for quantify index are grade method and the proportional value method. For instance, using five-classification method to divide the grades into five levels which are “very good”, “good”, “general”, “poor”, “bad” so that reviewers only need to select the corresponding grade according to the practical condition of players’ volleyball consciousness. Then according to the fuzzy quantity table/ second quantification table (TABLE 5), converting the corresponding grades into quantitative scores. Next is to multiply those scores with the weight, the total level of sorting of level C in TABLE 4), of this index to get the evaluation value of each index. Finally, add up all evaluation values to get the total value of volleyball consciousness. The general evaluation value should be in the 0-100 range. The higher the number is, the better the volleyball consciousness will be.

**TABLE 5 : Fuzzy quantity table/ second quantification table**

Evaluation grade	Very good	Good	General	Poor	Bad
Grades	100	80	60	40	20

The formula of weight grade method is:

$$\text{Synthesis value: } A = \sum_{i=1}^{14} W_i \cdot Q_i$$

Notes: A refers to the synthesis value after being weighted; W<sub>i</sub> is the index weight and Q<sub>i</sub> is the index evaluation value.

## Reliability verification of index system assessment

### Analysis on the evaluation of external reliability verification

External reliability aims at measuring whether the results, obtained through different reviewers assessing on the same group, are in consistency. The commonly used external reliability index is the Kendall coefficient of concordance which can represent the correlation degree of multiple rank variables. The evaluation values given by experts for volleyball consciousness level is shown as TABLE 6.

**TABLE 6 : Evaluation values given by experts for volleyball consciousness level (N=8)**

Expert number	1	2	3	4	5	6	7	8
Scores	62	58	64	66	61	63	57	67
Grade	5	7	3	2	6	4	8	1

On the basis of the correlation analysis of SPSS 13.0, the Kendall coefficient of concordance of correlation degree is 0.8341. This means the eight experts understanding towards evaluation standard as well as their evaluation results of the volleyball consciousness' performance are in consistency. It is proved that the evaluation standard has strong objectiveness.

### Analysis on the internal reliability verification of index system assessment

Internal reliability aims at checking whether one group of the scale or the whole scale is testing the same concept. A commonly used internal reliability coefficient is Cronbach's alpha which can calculate the average correlation among variables. On the basis of the reliability analysis of SPSS 13.0, the coefficient of Cronbach's alpha is 0.9143. This means the index system of volleyball consciousness is in good reliability.

## CONCLUSION

The assessing value of first-index volleyball consciousness includes three second-index such as servicing, receiving and attacking, and defending and attacking consciousness. Second-index servicing consciousness has five third-index, attacking, accuracy, purpose, flexibility, and variety. The receiving and attacking consciousness includes four third-index, dig pass, setting pass, spiking, and coordination consciousness. The defending and attacking consciousness has five third-index including blocking, dig pass, setting pass, spiking and coordination consciousness. The experiment confirms that it has good internal reliability coefficient, and the results are reliable, the assessment method is effective with the whole coefficient of assessing index system reliability is of 0.9143 high.

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