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A Construction of Evaluation Index Model for the Sustainable Development of Volleyball in University, Shaanxi Province, the People's Republic of China

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Abstract

Background and Aim: Volleyball is an important part of university sports. Regular participation in volleyball cannot only cultivate people's good sportsmanship, team spirit of unity and cooperation, and excellent qualities of tenacious struggle but also cultivate people's information awareness and improve coordination and adaptability. This research was to construct the evaluation index model for the sustainable development of volleyball in university, Shaanxi Province, the People's Republic of China.

Materials and Methods: This research is mixed methods research type. The participants in this research can be divided into four groups, which are as follows: (1) 370 students and 10 teachers from 3 universities in Shaanxi China were chosen to engage in responding to the questionnaires; (2) 7 experts were invited to in-depth interview; (3) 19 experts were invited to conduct two-round Delphi study; and (4) 9 experts were invited to discuss and confirm the constructed evaluation index model for the sustainable development of volleyball in university, Shaanxi Province, the People's Republic of China. The average and standard deviation are utilized to analyze the data obtained from the questionnaire, the consensus data is analyzed by using the median and interquartile range, with criteria set at a median of ≥ 3.50 and an interquartile range of ≤ 1.50.

Results: the model of evaluation index for volleyball sustainable development in University, Shaanxi China consists of the 4 first-level indicators classified by the theory of sustainable development, namely (A) survival support subsystem; (B) development motivation support subsystem; (C) social security support subsystem; and (D) intellectual Support Subsystem, 12 second-level indicators and 33 third-level indicators.

Conclusion: the evaluation index model for the sustainable development of volleyball in university, Shaanxi Province, the People's Republic of China consists of the 4 first-level indicators classified by the theory of sustainable development,12 second-level indicators, and 33 third-level indicators. The content and application of this model have been evaluated and confirmed by 9 experts.

Keywords: Evaluation Index Model; Volleyball; Sustainable Development

Introduction

Volleyball originated in the United States in 1895, by the American William. Morgan pioneered and had a history of more than 100 years. It has the characteristics of diversity in form and broad mass; comprehensive technology and high skill; fierce confrontation and strict collectivity; and popularity with people from all walks of life.

Volleyball is an important part of university sports. Regular participation in volleyball can not only cultivate people's good sportsmanship, team spirit of unity and cooperation, and excellent qualities of tenacious struggle but also cultivate people's information awareness and improve coordination and adaptability. In the process of continuous confrontation and competition in volleyball, by correctly treating success or failure, giving full play to oneself, improving self-confidence, and the ability to withstand setbacks, it also has a unique effect on improving students' psychological conditions and developing their individual psychological quality. Improvement also plays a role (Huang, H. S, 2009).

Volleyball is one of the more common and important sports in China. In school physical education, volleyball has been listed as one of the contents of physical education textbooks in Chinese universities and middle schools. In recent years, with the continuous in-depth reform of sports, China's university sports are also facing many problems. Ordinary universities, as one of the higher education organizations, are public service departments that implement higher education and quality education. School physical education is an important content of quality education and an important part of higher education. The quality of school physical education directly affects higher education. The development level of education and national quality education. As a relatively common and important sport, university volleyball plays a vital role in promoting the development of Chinese volleyball. Therefore, university volleyball still faces many challenges and opportunities, and the government and other parties work together to promote the sustainable development of university volleyball (Wang, 2009).

Therefore, the researcher would like to create an evaluation index model for volleyball

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sustainable development at the university, Shaanxi China as a guideline for the sustainable development of volleyball at the university. The construction of a model for volleyball sustainable development at a university in Shaanxi China is to deeply understand the current situation and problems of volleyball projects in the region and provide guidance and support for future development. This research aims to explore the purpose and significance of the evaluation of the sustainable development of volleyball in a university in Shaanxi China, to provide beneficial enlightenment for the research and practice in this field.

First of all, to understand the current situation, one of the purposes of evaluation is to fully understand the development of university volleyball in Shaanxi China, through the evaluation, can carry on an objective and systematic description of the operation of university volleyball, reveal the existing problems and shortcomings. The second is problem discovery, the evaluation process can find the problems and challenges in ordinary college volleyball, such as the management organization is not perfect, the venue facilities are not complete, and the quality of the coaching team is not high. Through the discovery of problems, it can provide guidance and a basis for future improvement, and promote the sustainable development of volleyball in universities. Finally, it supports decision-making. The evaluation results can provide a decision basis and reference for decision-makers, help them formulate relevant policies and measures, and promote the sustainable development of university volleyball. The evaluation can reveal the root cause and cause of the problem and provide the decision-makers with improvement measures and optimization programs, to improve the development quality of college volleyball.

Objectives

To construct the evaluation index model for the sustainable development of volleyball in university, Shaanxi Province, the People's Republic of China.

Literature Review

1. Sustainable Development Theory

Today in the 21st century, sustainable development has become the consensus of the development of human society and a new concept recognized by the world. It is the strategic thinking of the United Nations and other international organizations leading global, human, and future development. Throughout the history of human social development, from "growth theory" to "development theory" to "sustainable development theory", human understanding is gradually deepening. (Niu (2015)

The symbolic event of the origin of sustainable development theory should be: in 1962, Rachel Carson's book "Silent Spring" was published. "Silent Spring" showed the adverse effects of pesticides on birds and other animal groups, and pointed out that releasing harmful chemicals into the environment without considering their long-term effects is a serious mistake on the part of humans. (Zhang, 2018) Once this book was published, it was highly praised by critics and laid the foundation for the formal emergence of sustainable development theory.

The term "sustainable development" was first used as a term in the *"World Conservation Program"* in 1980. There is no uniform definition in the world for the Concept of Sustainable Development, It should be widely known that in 1987, the *"Our Common Future"* report issued by the United Nations World Commission on Environment and Development chaired by Norwegian Prime Minister Brundtland proposed the concept. "Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Ye, 2002)

In 2002, the United Nations held the "First World Summit on Sustainable Development" in Johannesburg, South Africa, and adopted important outcome documents such as the "Political Declaration" and "Plan of Implementation of the World Summit on Sustainable Development". measures to actively promote global sustainable development. In June 2012, the United Nations once again held the "United Nations Conference on Sustainable Development" (also known as the "Rio+20" Summit) in Rio de Janeiro, Brazil, and adopted the "Future We Want" outcome document. Member States agreed that the Sustainable Development Goals should be coherent and integrated into the post-2015 UN development agenda. The meeting resolved to establish an Open Working Group on Sustainable Development Goals, aiming to formulate a set of global sustainable development goals and provide important guidance for the formulation of the post-2015 international development agenda. (Cheng, 2021).

To sum up, the theory of sustainable development has gone from germination to establishment to application and practice, and the research perspective has changed from a single focus on the ecological

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environment to multi-dimensional perspectives such as society, economy, industry, agriculture, urban planning, and regional development. After decades, although the road is difficult and the process is tortuous, the result is developing in the right direction. The theory of sustainable development has gradually become a development concept with rich connotations, profound significance, and great practical significance. "Sustainable development" must leave a strong mark in the history of human development. Indeed, the development process of everything in the world will not be smooth, and there will always be problems of one kind or another, and sustainable development is no exception. This requires researchers to continuously improve the sustainable development theory in the process of practical application.

2. Evaluation Theory

The instrumental perspective of evaluation aims to ascertain program effectiveness and enhancement (Tyler, 1942; Campbell, 1981; Scriven, 1993). Despite Campbell's (1981) characterization of evaluation as a laboratory for policymakers, his emphasis has been on delivering impartial evaluation outcomes rather than guaranteeing the utilization of these results. This evaluative stance does not prioritize facilitating and ensuring the practical application of evaluation findings. In essence, the primary focus of this evaluative approach is not to guarantee the utilization of results but to ensure the accuracy of the evaluation process itself. While this perspective generally acknowledges stakeholder involvement in evaluation, it views it as a means to enhance the likelihood of utilizing evaluation outcomes.

The second perspective on evaluation use revolves around the practical application of evaluation results. Stufflebeam (2003) asserted that evaluation should play a role throughout the entire program, emphasizing the need for the timely utilization of evaluation information through his CIPP model, which guides both formative and summative evaluations. Cronbach (1980) highlighted that evaluation contributes to shaping policies and that its utilization is contingent upon the function of the political system. This viewpoint provides a comprehensive understanding of evaluation use by acknowledging the influence of the political system and the contextual environment. Additionally, Cronbach (1980) emphasized that effective communication with the policy-shaping community can facilitate the utilization of evaluation results. While Stufflebeam's perspective focuses on timely, specific, and local use, Cronbach's viewpoint presents a broader conception of evaluation use.

Stake (2003) aligned with Cronbach's perspective, emphasizing that evaluators lack control over the use of evaluation. Stake contended that evaluation serves not for the evaluators' instrumental use but rather for a conceptual and symbolic use that is fairly determined by stakeholders for future use, as stakeholders are the arbiters of program quality.

3. Factors Influencing Volleyball Sports in Universities

Volleyball, as one of the "Three Major Ball Games" in sports, holds a significant place among the key curriculum offerings in higher education. Being a team-oriented sport, volleyball has the potential to educate and inspire students through its unique gameplay. Engaging in volleyball not only enhances students' physical fitness but also cultivates their determination and collaborative spirit, contributing to a holistic education within universities. While various issues and influencing factors exist in the current state of volleyball sports in Chinese universities, the positive impact of volleyball on student development should not be overlooked.

In "Current Status and Analysis of Influencing Factors in the Development of University Volleyball Sports," Lü & Hu (2009) categorizes the factors influencing university volleyball sports into four aspects: volleyball-specific factors, student participation in sports, intensity of volleyball activities, and the degree of emphasis placed on volleyball by educational institutions.

Liu (2009) research on "Current Status and Influencing Factors of Volleyball in Physical Education Teaching" divides the factors affecting university volleyball sports into two main categories: teaching factors and student factors. To address these factors, Liu proposes three teaching strategies: nurturing students' interest in sports, implementing differentiated teaching strategies, and employing diverse evaluation methods.

Ma (2004). study on "Current Situation and Influencing Factors of College Students' Participation in Volleyball Sports in Private Undergraduate Colleges in Anhui Province" used interviews and questionnaires to investigate the participation mode, frequency, and influencing factors of college students in volleyball sports. The study revealed a weak campus volleyball atmosphere and low enthusiasm for student participation. This was attributed to schools' lack of emphasis on volleyball, inadequate facilities, and more. The author proposed measures including increased school attention, enhancing student engagement, improving facilities, and organizing volleyball leagues to guide extracurricular sports.

Zhang (2018) in "Research on the Current Status and Influencing Factors of After-school Volleyball Training in Private Universities in Henan Province," employs principal component analysis

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to extract 12 factors that affect after-school volleyball training in Henan's private universities. These factors include school emphasis, volleyball atmosphere, coaching quality, coach dedication, player interest, player physical fitness, training conditions, subsidies, and competition activities. The study identifies five representative main influencing factors: coaching factors, player factors, training conditions, competition factors, and volleyball atmosphere.

Zhang (2010) study on "Current Status and Influencing Factors Analysis of College Students' Volleyball Sports in Jilin Province" indicates a less favorable state of volleyball sports in colleges in Jilin Province. The study attributes influencing factors to teachers, schools, individuals, students, physical conditions, and market factors. While comprehensive, this study lacks specific quantification and its analysis of market factors relies on regional evaluation, which may not provide a fully objective assessment.

In conclusion, the factors influencing university volleyball sports are multifaceted and must be analyzed based on regional contexts. Regional variations have distinct impacts on the development of university volleyball sports, necessitating a systematic analysis that takes into account factors such as geographical environment, local culture, teaching staff, and campus culture. Only in this way can the sustainable development of volleyball be better promoted.

Conceptual Framework

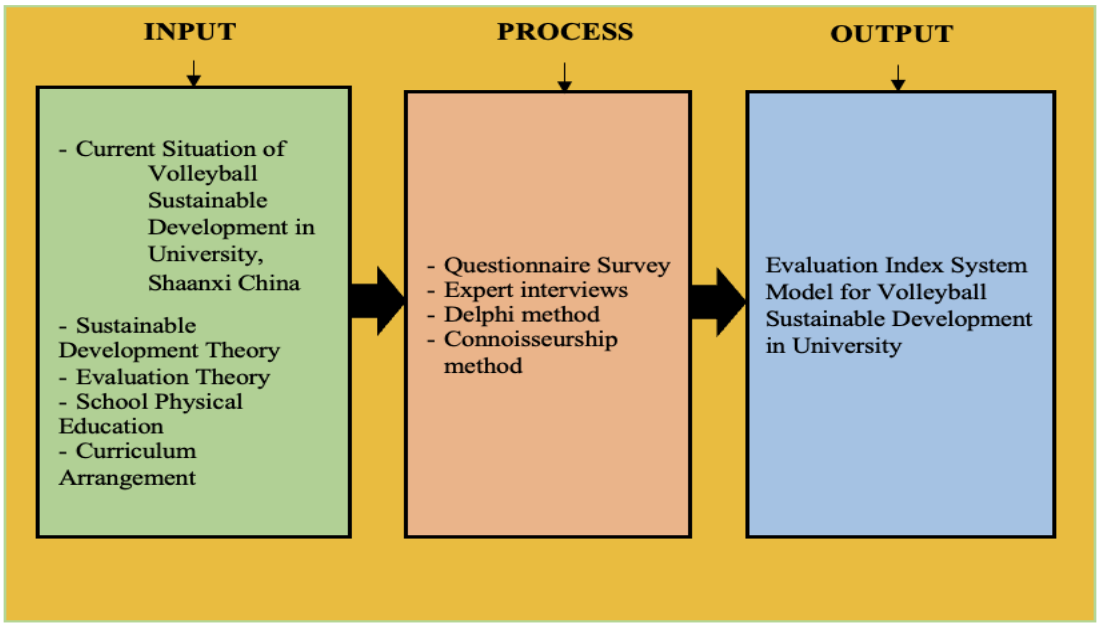

Figure 1 Conceptual framework

Methodology

The research utilizes a mixed-method approach, including surveys, expert interviews, and Delphi methods, offering a multifaceted view of the subject

Research Tools

In this research, the research tools are as follows: (1) Questionnaire for students; (2) Questionnaire for teachers; (3) Interviewing form for experts; (4) Questionnaire for Delphi; (5) Evaluation form for Connoisseurship

Population and Sample

Population specification and size

This research selected three universities with special volleyball teams, namely Northwestern Polytechnical University, Shaanxi Normal University, and Xi'an Physical Education University as research objectives. The three universities have a total of 8,554 students and 211 teachers, totaling 8,765. The number of students and teachers in the three universities that offer volleyball courses are as follows:

1) Northwestern Polytechnical University has 1,980 students and 59 teachers.
2) Shaanxi Normal University currently has 2,920 students and 84 teachers.
3) Xi'an Physical Education University has 3,654 students and 68 teachers.

In this case, a sampling method is employed by using the Taro Yamane table. The sample size of this study is 382 people, including 372 students and 10 teachers, through the stratified random

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sampling method, the sample can be divided as follows:

1) 86 students and 3 teachers from Northwestern Polytechnical University
2) 127 students and 4 teachers from Shaanxi Normal University.
3) 159 students and 3 teachers from Xi'an Physical Education University.

Research Participation

Expert for Experts' interview: 7 experts, including volleyball authorities, university leaders, and physical education teachers were selected by purposive sampling method. They were invited to conduct expert interviews for the construction of volleyball sustainable development evaluation indicators.

Expert for Delphi method: 19 experts, including volleyball authorities, university leaders, volleyball experts, and physical education teachers with deputy senior professional titles or more than 3 years of work experience, were selected to conduct a two-round Delphi consensus. The objective is to construct the evaluation index model for volleyball sustainable development in a university, Shaanxi China. The selection of experts was based on a purposive sampling method.

Expert for Connoisseurship method: 9 experts, including volleyball authorities, university leaders, and physical education teachers were selected to conduct a connoisseurship panel to discuss and confirm the evaluation index model for volleyball sustainable development at the university, Shaanxi China. The selection of experts was based on a purposive sampling method.

Data Collection

1. Questionnaires were distributed to 372 students and 10 teachers from three universities, namely Northwestern Polytechnical University, Shaanxi Normal University, and Xi'an Physical Education University.

2.7 experts were consulted through a combination of face-to-face interviews, telephone interviews, and email interviews to gain insights into the current situation of volleyball in universities and identify the challenges that hinder its sustainable development.

3. Drafting the framework of an evaluation index for volleyball sustainable development in the university.

4. A two-round Delphi consensus was conducted with 19 experts to develop an evaluation index model for assessing the sustainable development of volleyball in universities in Shaanxi, China. Delphi expert questionnaires were distributed to 19 experts in the form of on-site distribution and online mail.

5. 9 experts engaged in a connoisseurship process to evaluate the adequacy and applicability of the evaluation index model for assessing the sustainable development of volleyball in universities in Shaanxi, China.

Data Analysis

Utilize a software package for data analysis, incorporating the following statistical methods:

1. Descriptive statistical methods, including the computation of the average and standard deviation, are utilized to analyze the data obtained from the questionnaire.

2. Descriptive statistics, specifically the median and interquartile range, were employed to analyze the Delphi consensus data. The criteria for the analysis included a median of ≥ 3.50 and an interquartile range of ≤ 1.50.

3. Evaluate the content validity of the questionnaire using the Indexes of Items of Objective Congruence (IOC). The IOC value for the student's questionnaire is 0.86, the teacher's questionnaire is 0.89, and Delphi's questionnaire is s 0.94.

4. In considering the average score obtained from the information provided by experts. The researcher used the Likert scale to determine the average score of the measure. The meanings of 5 scale evaluation are 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. The details of the score criteria are as follows (Best, 1977):

Average score range	Meaning
1.00 - 1.79	Strongly Disagree
1.80 – 2.59	Disagree
2.60 – 3.39	Neutral
3.40 – 4.19	Agree
4.20 – 5.00	Strongly Agree

Results

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1. Investigate the current status and problems of the sustainable development of volleyball in the university, Shaanxi province, the People's Republic of China

1.1 Students' questionnaire survey

After sending the questionnaire to all 372 students from 3 universities, they completed the questionnaire. The results of the questionnaire responses can be analyzed as follows:

Table 1 Students' questionnaire survey results on the current status and problems of the sustainable development of volleyball in university, Shaanxi province, the People's Republic of China.

Questionnaire Items	Total Score		Result
	$\bar{x}$	S.D.	
1. How much do you like volleyball?	4.72	0.59	Strongly Agree
2. Your knowledge of volleyball techniques and tactics	2.92	0.76	Neutral
3. The degree of your motivation to participate in volleyball because you are interested in the sport	3.88	0.86	Agree
4. The number of times per week you participate in volleyball?	2.12	1.43	Disagree
5. Do you think the time of each extracurricular volleyball exercise is appropriate	2.61	0.69	Neutral
6. Do you think about the organizational and management skills of volleyball teachers?	3.07	0.79	Neutral
7. The school's field equipment to meet the needs of your participation in volleyball activities situation	4.34	0.72	Strongly Agree
8. The content of the volleyball class has guided your participation in extracurricular volleyball	4.04	0.71	Agree
9. Are you satisfied with the content arrangement of the volleyball class and the way the class is conducted	3.16	0.84	Neutral
10. You usually go to volleyball practice on your own initiative	3.10	0.64	Neutral
11. Organization of Volleyball Competitions in faculties and departments	4.05	0.74	Agree
12. Satisfaction with the way volleyball activities are promoted in our school	4.00	0.66	Agree
13. Satisfaction with the diversity of promotional activities about volleyball in our schools	4.11	0.76	Agree

Table 1 the students' questionnaire survey results on the current status and problems of the sustainable development of volleyball in universities, in Shaanxi Province, the People's Republic of China, showed that students in universities of Shaanxi Province, China still need to increase their participation in volleyball, this can be seen from question 4 "The number of times per week you participate in volleyball?", the result of this question was in the "Disagree" ($\bar{x} = 2.12$).

1.2 Teachers' questionnaire survey

After sending the questionnaire to all 10 teachers from 3 universities, they completed the questionnaire. The results of the questionnaire responses can be analyzed as follows:

Table 2 Teachers' questionnaire survey results on the current status and problems of the sustainable development of volleyball in university, Shaanxi province, the People's Republic of China.

Questionnaire Items	Total Score		Result
	$\bar{x}$	S.D.	
1. The degree of improvement of your school's volleyball competition system	4.00	0.77	Agree
2. The satisfaction with the system for calculating and rewarding teachers' extracurricular volleyball workloads	4.10	0.70	Agree
3. The degree of guidance provided by professional teachers of	2.80	0.60	Neutral

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Questionnaire Items	Total Score		Result
	$\bar{x}$	S.D.	
extracurricular volleyball activities in your school			
4. The degree of improvement of your school's supervisory mechanism regarding the development of volleyball	4.20	0.60	Strongly Agree
5. The importance your school leaders attach to volleyball	2.90	0.54	Neutral
6. The coordination of the work of your sports department with that of other faculties and departments	3.40	0.49	Agree
7. Amateur participation in volleyball by the staff of the Physical Education Department	4.50	0.60	Strongly Agree
8. Whether you are satisfied with the funding for volleyball in your school	2.60	0.80	Neutral
9. School's implementation of the funding for the volleyball concerned	2.30	0.46	Disagree
10. The arrangements for regular school volleyball matches in your school	3.90	0.70	Agree
11. The number of volleyball courts in your school	3.70	0.64	Agree
12. The school's volleyball training team set up a situation	2.90	0.54	Neutral
13. The completion of the volleyball teaching curriculum program	3.00	0.45	Neutral
14. School organizes volleyball competitions outside the school properly	2.40	0.49	Disagree
15. The total number of credit hours of the volleyball program in your school is properly	4.20	0.60	Agree
16. The volleyball court in your school is open to students outside of class time	2.40	0.49	Disagree
17. The number of volleyball clubs or societies in your school	3.10	0.54	Neutral
18. How much importance do you think your school places on volleyball teachers	4.70	0.64	Strongly Agree
19. How satisfied do you think the students in your school are with the volleyball program	3.10	0.54	Neutral

Table 2 the teachers' questionnaire survey results on the current status and problems of the sustainable development of volleyball in university, Shaanxi province, the People's Republic of China, showed that question 9 "School's implementation of the funding for the volleyball concern" and question 14 "School organizes volleyball competitions outside the school properly", the result of these questions was in the "Disagree" ($\bar{x}$ = 2.40). Therefore, universities need to be more concerned about funding and competitions outside the school.

2. Conduct an expert interview to gather information about the evaluation index model for the sustainable development of volleyball at the university, Shaanxi Province, the People's Republic of China.

Following the distribution of questionnaires to teachers and students to assess the current state of the sustainable development of volleyball in university, Shaanxi province, the People's Republic of China, 7 experts were subsequently interviewed to develop a framework for an evaluation index for volleyball sustainable development.

The experts recommended that the evaluation index system for volleyball sustainable development in universities is considered to be a good starting point, but it still needs to be further improved and refined. First-level indicators include the survival support subsystem, development power support subsystem, social support subsystem, intelligence support subsystem, and environment support subsystem. Under each first-level indicator, there are several related second-level indicators, which are used to evaluate different aspects of development in more detail. Further, there are specific third-level indicators under

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each second-level indicator, which are used to measure and evaluate the sustainable development of college volleyball in a more detailed way.

3. Delphi Method survey results

After the first round of the Delphi survey method, most factors associated with the sustainable development of university volleyball in Shaanxi, China, garnered consensus approval. Nonetheless, certain items failed to secure agreement and were consequently excluded. To verify and validate these opinions, the researcher administered a second-round questionnaire to the experts, furnishing them with the consensus data and the researcher's decisions from the first round. In the second round of the Delphi survey, the remaining factors consisted of 49 items, as outlined in Table 3.

Table 3 Second round of Delphi results

Item	Indicators	Mdn.	IQR	Result
(A) Survival support subsystem		5.00	0.00	Retained
A1 Basic resource		5.00	0.00	Retained
A1.1	Volleyball population	4.73	0.50	Retained
A1.2	Number of volleyball teachers	5.00	0.00	Retained
A1.3	Number of volleyball courts	4.89	0.00	Retained
A2 Teaching activities in schools		4.47	1.00	Retained
A2.1	Volleyball courses per semester	5.00	0.00	Retained
A2.2	Volleyball Cultural Activities	4.47	1.00	Retained
A2.3	Frequency of specialized volleyball instruction and services provided outside of school hours	4.89	0.00	Retained
A3 Training and competition		4.89	0.00	Retained
A3.1	Number of school volleyball teams for boys and girls	4.94	0.00	Retained
A3.2	Number of volleyball clubs or interest groups established in schools	4.89	0.00	Retained
A3.3	Weekly training time	5.00	0.00	Retained
A3.4	Volleyball Teaching and Training Program	5.00	0.00	Retained
A3.5	Number of intramural volleyball competitions per year	4.89	0.00	Retained
A3.6	Number of off-campus volleyball competitions per year	4.73	0.00	Retained
(B) Development motivation support subsystem		4.89	0.00	Retained
B1 Subjectivity		5.00	0.00	Retained
B1.1	School's long-term plan for volleyball development	4.89	0.00	Retained
B1.3	Volleyball Teachers' Treatment Satisfaction	4.73	0.50	Retained
B1.4	Student involvement in volleyball	4.94	0.00	Retained
B2 Policy support		4.94	0.00	Retained
B2.1	National policy support	5.00	0.00	Retained
B3 level of development		5.00	0.00	Retained
B3.1	Number of teachers with volleyball coaching certificates	4.89	0.00	Retained
B3.2	Enrollment of University Volleyball Players	5.00	0.00	Retained
B3.3	Number of high-level volleyball players recruited	5.00	0.00	Retained
B3.4	Level of competition security for national volleyball tournaments	4.94	0.00	Retained
(C) Social Security support subsystem		4.73	0.00	Retained
C1 Economic support		4.84	0.00	Retained
C1.1	Support from social forces	4.89	0.00	Retained
C1.2	The volume of financial investment in sports	5.00	0.00	Retained
C2 Media Support		5.00	0.00	Retained
C2.1	Official Media Support	5.00	0.00	Retained
C3 Safety and security		5.00	0.00	Retained
C3.1	Personal sports liability insurance coverage	4.84	0.00	Retained
(D) Intellectual Support Subsystem		4.36	1.00	Retained

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Item	Indicators	Mdn.	IQR	Result
D1 Level of education		4.84	1.00	Retained
D1.1	Volleyball teacher training sessions	4.89	1.00	Retained
D1.2	Number of invitations to off-campus professional coaches to provide technical guidance	4.21	1.00	Retained
D1.3	Volleyball Teaching Materials Development	4.89	0.00	Retained
D1.4	Volleyball Specialty Curriculum Development	4.94	0.00	Retained
D2 Level of science, technology, and innovation		4.89	1.00	Retained
D2.1	Volleyball Patent Results Conversion Rate	5.00	0.00	Retained
D2.2	Number of scientific papers published	4.89	0.00	Retained
D3 Level of decision-making management		4.94	0.00	Retained
D3.1	Robust working mechanisms	4.84	0.00	Retained
D3.2	Regulatory institutional effectiveness	5.00	0.00	Retained
D3.4	Improvement of laws and regulations	5.00	0.00	Retained

Therefore, it can be deduced that the 49 identified factors serve as indicators influencing the sustainable development of university volleyball in Shaanxi, China. Following the second round of the Delphi survey, there was no necessity to eliminate, alter, or introduce any influencing factors.

Drawing from the results of the two rounds of the Delphi method, all items conformed to the criteria of Mdn. ≥ 3.50 and IQR ≤ 1.50. Consequently, it can be inferred that all items were considered crucial and deemed suitable for inclusion in the model.

4. Confirmation the evaluation index for evaluation index for the sustainable development of volleyball in the university, Shaanxi province, the People's Republic of China, by using the Connoisseurship method

To ensure the satisfaction, utility, and practicality of this model, the researcher conducted a connoisseurship panel. A total of 9 experts, encompassing authorities in volleyball, university leaders, and physical education teachers, were invited to participate in discussions. The 9 experts unanimously agree that this model comprises appropriate and high-quality content, and the evaluation index model for the sustainable development of volleyball in the university, Shaanxi province, the People's Republic of China, is deemed suitable for implementation.

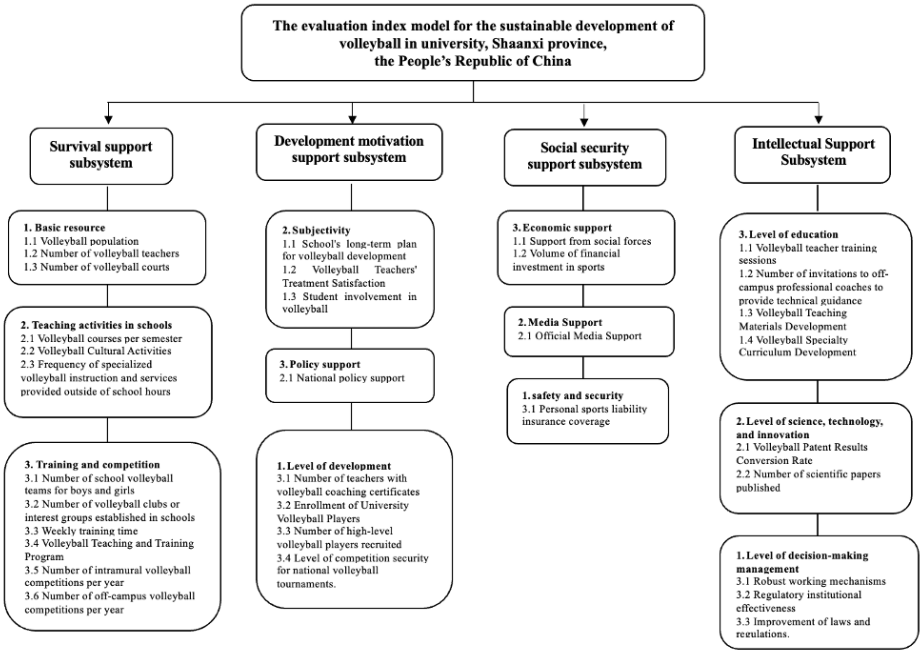

Figure 2 The evaluation index model for the sustainable development of volleyball at the university, Shaanxi Province, the People's Republic of China

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Conclusion

After confirmation by the connoisseurship method, the final evaluation index model for the sustainable development of volleyball in the university, Shaanxi province, the People's Republic of China including the 4 first-level indicators, 12 second-level indicators, and 33 third-level indicators. The detail of model of the evaluation index model for the sustainable development of volleyball in the university, Shaanxi Province, the People's Republic of China was confirmed as follows:

Table 4 The detail of the model of evaluation index for the sustainable development of volleyball in the university, Shaanxi province, the People's Republic of China

First Level Indicators	Second Level Indicators	Third Level Indicators
Survival Support Subsystem	1. Basic Resource	1. Volleyball Population
		2. Number of Volleyball Teachers
		3. Number of Volleyball Courts
	2. Teaching Activities in Schools	1. Volleyball Courses Per Semester
		2. Volleyball Cultural Activities
		3. Frequency of Specialized Volleyball Instruction and Services Provided Outside of School Hours
	3. Training and Competition	1. Number of School Volleyball Teams for Boys and Girls
		2. Number of Volleyball Clubs or Interest Groups Established in Schools
		3. Weekly Training Time
		4. Volleyball Teaching and Training Program
		5. Number of Intramural Volleyball Competitions Per Year
		6. Number of Off-Campus Volleyball Competitions Per Year
Development Motivation Support Subsystem	1. Subjectivity	1. School's Long-Term Plan for Volleyball Development
		2. Volleyball Teachers' Treatment Satisfaction
		3. Student Involvement in Volleyball
	2. Policy Support	1. National Policy Support
	3. Level of Development	1. Number of Teachers with Volleyball Coaching Certificates
		2. Enrollment of University Volleyball Players
		3. Number of High-Level Volleyball Players Recruited
		4. Level of Competition Security for National Volleyball Tournaments
Social Security Support Subsystem	1. Economic Support	1. Support from Social Forces
		2. Volume of Financial Investment in Sports
	2. Media Support	1. Official Media Support
	3. Safety and Security	1. Personal Sports Liability Insurance Coverage
	1. Level of Education	1. Volleyball Teacher Training Sessions
		2. Number of Invitations to Off-Campus Professional Coaches to Provide Technical Guidance

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First Level Indicators	Second Level Indicators	Third Level Indicators
Intellectual Support Subsystem		3. Volleyball Teaching Materials Development
		4. Volleyball Specialty Curriculum Development
	2. Level of Science, Technology and Innovation	1. Volleyball Patent Results Conversion Rate
		2. Number of Scientific Papers Published
	3. Level of Decision-Making Management	1. Robust Working Mechanisms
		2. Regulatory Institutional Effectiveness
		3. Improvement of Laws and Regulations

Discussion

Based on the research results, from the evaluation index model for the sustainable development of volleyball in university, Shaanxi province, the People's Republic of China shown that the goal of the system is not only to train volleyball reserve talents, meet the needs of students to master volleyball skills, but also to enhance students' physique and improve students' personality, and promote the physical and mental health and all-round development of college students.

Based on the five most basic connotations of sustainable development extracted by Niu (2015), we interpret the connotation of "sustainable development of volleyball in colleges and universities in Shaanxi Province" as follows:

The sustainable development of volleyball in colleges and universities in Shaanxi Province reflects the nature of the whole, endogenous, and comprehensive system. It pays attention to all aspects of the development of volleyball, from the planning and organization of volleyball activities to the training of talents, and comprehensively considers all elements within the system to achieve stable development. At the same time, the sustainable development of volleyball sports in Shaanxi colleges and universities reveals the basis of development, coordination, and continuous operation. It not only pays attention to the training of volleyball skills but also pays attention to the coordination of the relationship between volleyball and school education goals, to ensure the continuous progress of volleyball activities to meet the needs of students. The sustainable development of volleyball in colleges and universities in Shaanxi Province reflects the organic unity of power, quality, and fairness. It is committed to stimulating the motivation of students to participate in volleyball, improving the quality and level of volleyball activities, and paying attention to ensuring fairness so that every student has equal opportunities to participate and benefit. The sustainable development of volleyball in colleges and universities in Shaanxi Province stipulates a harmonious, orderly, and rational human environment. It encourages the establishment of a harmonious volleyball culture, promotes the orderly development of volleyball events, while taking into account students' physical and mental health and academic burden, and forms a rational and beneficial volleyball atmosphere.

Moreover, from the constructed evaluation index model for volleyball sustainable development in a university, Shaanxi China, to achieve sustainable development in university volleyball, it is essential to enhance various aspects, including academic courses, teaching content, training programs, facilities, and coaching staff's skills. This can be observed through the model created, which can be categorized into four first-level indicators, including (A) survival support subsystem; (B) development motivation support subsystem; (C) social security support subsystem; and (D) intellectual Support Subsystem. It is consistent with the research findings of Ma (2004), whose study on "Current Situation and Influencing Factors of College Students' Participation in Volleyball Sports in Private Undergraduate Colleges in Anhui Province", used interviews and questionnaires to investigate the participation mode, frequency, and influencing factors of college students in volleyball sports. The study revealed a weak campus volleyball atmosphere and low enthusiasm for student participation. This was attributed to schools' lack of emphasis on volleyball, inadequate facilities, and more. The author proposed measures including increased school attention, enhancing student engagement, improving facilities, and organizing volleyball leagues to guide extracurricular sports.

Recommendation

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Recommendation for current research

1. Expand the involvement of stakeholders, including students, teachers, administrators, and local communities, in the evaluation process. Their perspectives can offer valuable insights and ensure a more comprehensive assessment.

2. Conduct a comparative analysis between universities of different sizes, academic focus, and geographical locations within Shaanxi to identify potential variations in volleyball sustainable development practices.

3. Collaborate with regional and national sports organizations to align the evaluation index model with broader sports development initiatives.

Recommendation for further research

1. Establish a system for continuous monitoring of the evaluation index model, allowing for real-time adjustments based on evolving needs and changing circumstances.

2. Integrate sustainability education into the curriculum for students and coaches involved in volleyball programs.

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