



## The Development of Sport Culture Indicators for Sports Avenue

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### Abstract

**Background and Aim:** China has officially entered a new era of reform, marking that the construction of university sports culture has also ushered in a new era and new challenges. Therefore, this research aims to develop the sports culture indicators for sports avenues.

**Materials and Methods:** The expert group members of this study are mainly university physical education teachers in Xi'an, leaders of Xi'an Sports Bureau, and grass-roots front-line teachers. All the selected experts have a rich theoretical basis and practical experience in constructing campus sports culture. Five people were selected by IOC, 25 people were selected by Cronbach reliability test, 19 experts by Delphi method, and 122 people for empirical research. Hierarchical Analysis YAAHP6.0 software is used to calculate the weight and consistency of each index and data processing of Fuzzy Comprehensive Evaluation Method Matlab software is used to analyze the data.

**Results:** The evaluation index system of university sports culture construction in Xi'an is constructed. The first-level indicators include sports spirit and culture, sports material culture, sports system culture, and sports behavior culture. The secondary index includes 9 aspects. There are 24 three-level indicators, covering all key aspects of the construction of campus sports culture.

**Conclusion:** The evaluation index system proposed in this study is comprehensive, systematic, and scientific, which can provide effective tools for the evaluation and decision-making of the sports culture construction in Xi'an universities. The evaluation index system is scientific, systematic, and practical.

**Keywords:** Sports Culture; Indicators; Sports Avenue

### Introduction

Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping has attached great importance to sports work and made important discussions on sports work many times. However, sports culture in universities started late, and some problems appeared, and the construction of sports culture in universities is more and more important. In his report to the 19th CPC National Congress, General Secretary Xi Jinping pointed out that, "Through long-term efforts, socialism with Chinese characteristics has entered a new era. This is a new historical juncture in China's development." (Han, 2020). China has officially entered a new era of reform, marking that the construction of university sports culture has also ushered in a new era and new challenges. In October 2020, the General Office of the CPC Central Committee and The State Council promulgated the Opinions on Comprehensively Strengthening and Improving the Physical Education Work in Schools in the New Era, which mentioned the strengthening and improvement measures of the physical education work in colleges and universities, which shows the importance China attaches to the physical education work in colleges and universities. College sports culture is a way of reflecting the socialist spiritual civilization and a comprehensive reaction to cultivating talents in colleges and universities. The college sports culture is the college students in the campus contact, the most attractive culture, college students as the main body of colleges and universities, is the wealth of the new era of successors of socialism with Chinese characteristics and builders, the state attaches great importance to college students' physical health and mental health, sports culture in colleges and universities not only enhance the role of physical quality and entertainment body and mind, the college students' ideas and personality development plays a strong influence. For example, sports activity courses and special sports training conducted by colleges and universities, Help college students to develop a good sense of exercise, Form good sports habits, Developed the spirit of not being afraid of fatigue and hardship, And implement this spirit into the future study and work, Help to improve the students' comprehensive ability; Through holding a variety of sports activities, Improve the students' teamwork ability and the awareness of fair competition; Colleges and universities, by holding competitive sports competitions, Cultivate college





students' consciousness to adapt to the rules and develop the idea of fairness, openness and justice, Win or losing in competitive competitions, Help college students experience the feelings of success and failure, The correct attitude towards success and failure is of great help to face the hardships and setbacks in the future life, Improved the ability of college students to face setbacks and difficulties; When college students participate in sports activities, Every man in his part, Teams work with each other, Help to improve the interpersonal skills of college students, Develop a sense of responsibility. Therefore, strengthening the construction of sports culture in colleges and universities is not only conducive to the healthy and sustainable development of college culture construction but also an important position of ideological and political education in the new period. It plays an irreplaceable role in cultivating the correct world outlook, outlook on life, and values of college students. At present, the construction of sports culture in universities has made some achievements, but there are also some deficiencies, so we conduct in-depth research, and constantly expand and innovate the construction strategies of sports culture in universities in the new era, to put forward effective ways.

Research under the background of new era university sports culture construction and communication, not only can cultivate students to set up "lifelong learning and exercise" sports consciousness, guide the students to master the basic knowledge of sports, learn a set of scientific exercise methods and professional technology, and is conducive to encourage students actively participate in all kinds of sports games, realize a cultural character, psychological quality, physical quality, and the balanced development. In addition, because the daily study and life of Chinese college students are concentrated on the campus, and sports culture is also considered the most important part of college campus culture, the construction, and dissemination of sports culture on college campus has a vital impact on improving the quality, character and physical quality of college students. Therefore, when sports culture spreads an excellent kind of culture such as bearing hardships and hard work, facing up to difficulties, and making positive progress, college students will be infected by the good sports culture atmosphere and imitate it, which virtually shapes their tenacious fighting character. At the same time, various forms of sports and sports activities often promote collectivism, selfless dedication, and an optimistic spirit, which can help college students find the unique fun and value of campus life, and also lay a solid foundation for them to constantly enrich and improve themselves.

## Objectives

To develop the sports culture indicators for sports avenues.

## Literature Review

### *Research on sports Culture in colleges and universities*

For a long time, university researchers and teaching and research workers on university sports culture mainly focus on three aspects, one is the study of this cultural pattern itself, that is, the research of the concept of college and university sports culture and its characteristics and functions. In the field, although scholars have not yet reached a consensus in the study of sports culture, the connotation of the related cognition has preliminary agreed, such as both the narrow interpretation of sports culture of colleges and universities and the interpretation of broad sports culture in colleges and universities, from the broad understanding it is a part of mass campus culture, from the narrow sense of sports culture is in the sports teaching, sports training, sports competition derived based on a kind of culture (Yang & Wang, 2013). Most scholars discuss the theory, structure, specific function, and characteristics of "culture", "campus culture" and "college sports culture" from the perspectives of pedagogy, ideology and politics, law, literature, journalism, and second and the influence of internal sports education on quality education. In this field, most scholars use some theories and principles of pedagogy to analyze and elaborate related issues (Zeng, 2012). Ji Canzhong and Wang Chongli conducted a questionnaire survey on more than 3000 students from ten colleges and universities in Henan Province and concluded that the sports culture not only helps to improve the student's physical fitness of students but also promotes the concentration of attention, and emotional stability and the improvement of the current situation and countermeasures of sports culture. The study of the current situation and countermeasures of sports culture is the basis point and the destination





for the construction of the whole campus culture. As early as the 1980s, some scholars conducted an in-depth and extensive investigation into the current situation of university sports culture in each region of China and put forward many constructive strategies (Xun, 2018).

Yu (2007) in "Research on the Integration of Campus Sports Culture in Multi-Campus Universities" indicated that campus sports culture is the spiritual driving force for the existence and development of colleges and universities, and the particularity of multi-campus colleges and universities makes it face greater challenges in the construction of campus sports culture. To promote the innovation of multi-campus university sports culture, we should not ignore the integration of campus sports culture in multiple campuses. However, how to integrate multiple campus sports culture directly affects and improves the spiritual consciousness and behavior habits of teachers and students. Given this problem, analyzing the significance and challenges of integrating multiple campus sports cultures and putting forward some reasonable solutions to the integration of multiple campus sports cultures can help to build a harmonious university campus.

Liu (2012) around Qinhuangdao the present situation of the campus sports culture construction of the thorough investigation, the Qinhuangdao sports culture construction in universities, he thinks the city environment of sports improved, the sports teaching level also has a lot of promotion, and extracurricular sports activities are often held, but due to the school the lack of attention on sports culture construction, the university teachers and students in the region of sports culture awareness is not enough.

Hu, et al (2008) investigated the present situation of ordinary college campus sports culture construction in central China, around the present situation of university sports culture construction in central China, he thinks that school leaders should strengthen the sports culture construction in colleges and universities, not only for sports teaching, daily sports training, sports competitive activities to provide relatively rich material basis but also establish and improve the management mechanism. At the same time, the PE teachers of other subjects should also participate in various sports activities together with the students. In addition, colleges and universities should hold more sports leagues through inter-school leagues, sports meetings, and other forms.

To sum up, Chinese scholars have in-depth research in the field of sports culture in universities, but there are still many shortcomings. In terms of the definition of concepts and related theories, there are still differences in the research of sports culture construction: students and teachers, the construction of the theoretical system, and the research methods of sports culture on campus. In addition, the research is very vague regarding the function and development goals of sports culture. Plus, too many research results only stay at the theoretical level, and the lack of practice, makes people's understanding of sports culture deviation, working ideas of sports culture construction in colleges and universities, varied, which makes most of the theoretical results lack practice and innovation, especially in the present situation of university sports culture construction and countermeasures repetitive research more, countermeasures generally lack innovation and feasibility.

#### ***Research on the structure of university sports culture***

Zhao (2018) agrees that the structure of campus sports culture is divided into four levels: sports material culture, sports system culture, school sports spirit culture, and sports behavior culture. Including sports material layer includes sports equipment, sports venues, sports sculpture, and other material basis, the sports system layer includes sports teaching, extracurricular sports activities, sports competition, sports knowledge lecture-related content, the sports spirit layer includes sports concept, sports fashion, sports behavior layer including sports activities, sports association sports community, such as main content.

Wu (2008) elaborated on the content of college sports culture and the concept of sports spirit in more detail. He believed that the construction content of sports culture in colleges and universities was divided into spiritual culture, system culture, and material culture. At the same time, sports spirit culture is subdivided into sports concept, sports spirit, sports ethics, sports fashion, sports knowledge, and sports publicity; sports system culture is subdivided into sports system, sports standard, sports tradition, and sports material culture into sports facilities, sports venues, sports sculpture, sports apparel, and sports articles. It





shows that sports material culture belongs to the external expression of sports system culture and spiritual culture (WU (2008)

Huimin (2004) elaborated on the structure of sports culture in universities. She believed that sports culture in universities can be divided into four orderly structures from surface to deep, which are divided into material culture, behavioral culture, institutional culture, and spiritual culture. The surface belongs to the material culture, its characteristics are the most concrete and practical; the activity in the shallow belongs to the behavior culture, expressed in intuitive form; the shell supporting the concept belongs to the system culture; the spiritual culture is the deepest, supporting and regulating the behavior culture of teachers and students, and is also the core culture and soul in the campus culture.

He (2008) elaborated on the form of university sports culture, he believes that university sports culture is divided into five forms: material culture, system culture, spiritual culture, behavior culture, and value culture, which reflects the richness and multi-level of university sports culture.

#### ***Research on the function of campus sports culture***

After sorting out and summarizing the relevant materials, the functions of campus sports culture are mainly divided into three categories, namely: health function, educational function, and emotional function.

Health function. Scientific and regular physical exercise can not only enhance students' physical quality, improve students' central nervous ability, improve students' respiratory system and cardiopulmonary function, but and long-term exercise is also conducive to students' bone growth and the cultivation of will quality (Fang, et al, 2016) Lay a strong physical foundation for the growth of students. In addition to improving physical fitness, a good campus sports culture can also have a positive impact on students' psychology. Students can release the pressure in learning to a certain extent in the process of sports, and in team projects, such as basketball, they can experience the strength brought by the unity and cooperation between peers (Du and Zhang, 2014) educational function. Educational function is one of the important functions of school sports culture. The purpose of campus sports culture is to advocate sports knowledge and sports science, which has an important subject education value. Sports is not only the sport of the body movement or the field, but also a multidisciplinary curriculum system, it and natural science, philosophy, mathematics, and other disciplines have close ties, in the relationship with natural science including sports physiology, movement anatomy, biomechanics, and the campus sports culture discipline value are that the students systematically accepted the sports knowledge and sports culture, through sports practice, can more deeply feel the sports of science and law, but also can promote the study of other disciplines (Yu & Zhu, 2021). In addition to subject education value, campus sports culture also has ideological education value, it is reflected in the scientific, advanced campus sports culture will guide all the teachers and students to set up correct sports values, in the process of learning sports skills and participating in sports competition, the children will form a good sense of rules, then virtually makes the school rules get better compliance and maintenance (Huang, 2004).

Emotional function. The emotional functions of campus sports culture include entertainment and aesthetic functions. As an important spiritual and cultural activity, sports are also an optimistic and healthy way of cultural entertainment. Due to its practical characteristics, sports activities require the direct participation of participants (Liu, 2021). This makes health, strength, wisdom, personality, and other personality elements fully tempered in sports activities, in addition, the fatigue, mood, pressure, and other sports students will be effectively alleviated and relaxed (Hou, et al, 2021). The aesthetic function of campus sports culture is established in the students' participation, watching and appreciating sports virtually, for example in the Olympic Games, such as students watching diving, gymnastics, and figure skating, will unconsciously by athletes in the complete action of body beauty and spiritual beauty infection, make their aesthetic ability improved (Li, 2014).

#### ***Research on the construction of university sports culture***

Zhou (2020) studied the sports culture of universities in colleges and universities in the new era, and mentioned in the Research on the Connotation construction of Sports Culture in colleges and universities in the New Era: the problems existing in the connotation construction of sports culture in high schools in





the new era include the lack of cultural connotation in material culture construction, the lack of enough attention to spiritual culture, and the lack of standard system culture construction.

Liu (2018) around the problem of university sports culture construction in detail, he thinks the university sports culture construction problem lies in the lack of sports culture propaganda and knowledge level, the content of sports culture activities in colleges and universities form is not rich, students sports level is not optimistic, college sports teaching mode innovation and teaching quality, Sports policies and systems is not perfect, college exercise atmosphere is not strong, teachers staff is not neat and the comprehensive quality is not high, school leaders do not seriously.

Wu (2012) elaborated on the construction of sports culture in colleges and universities. He believed that the problems existing in the construction of sports culture in colleges and universities include attaching importance to physical health and mental health, attaching importance to entertainment, attaching importance to competitive competition and sports spirit, and the construction of hardware supporting facilities and software construction.

Ma (2018) elaborated on the countermeasures and paths of the construction of sports culture in colleges and universities. He believed that the countermeasures of the construction of sports culture in colleges and universities are to improve the physical quality level of college students, help the healthy construction, cultivate the sports ethics concept of college students, take the fundamental task of moral education, and enhance the sports culture quality of college students. Strengthen the promotion of socialist sports culture with Chinese characteristics, hold more sports activities and sports competitions, and make contributions to the construction of sports culture in colleges and universities.

As mentioned above, due to the different cultures and values of different countries, there is a gap in the practice of sports culture in colleges and universities. The research on sports culture construction in universities in China started late and took a short time, and the research results in this field have not formed a perfect system. The theory and practice of sports culture research results in foreign universities are relatively rich. Compared with the research in China, the theoretical research has not achieved any results, and the practical research is very few. It can be seen that there is a big gap between the sports culture of universities in colleges and universities in China and universities in developed countries. Due to the development of our country into a new historical position, university sports culture also ushered in new challenges and opportunities, university sports culture construction can draw lessons from the advanced experience of foreign developed countries, and according to China's national conditions, eventually form the new era of university sports culture theory achievements and has practical application value. In terms of communication, the communication of sports culture has attracted more and more attention from more and more scholars and has become a brand-new research hotspot. However, objectively speaking, the integration of the existing research is insufficient, most of the research on the communication of sports culture is from a single level, and the combination of new media and sports culture communication is still relatively scarce.

## Conceptual Framework

The conceptual framework for this research is as follows:



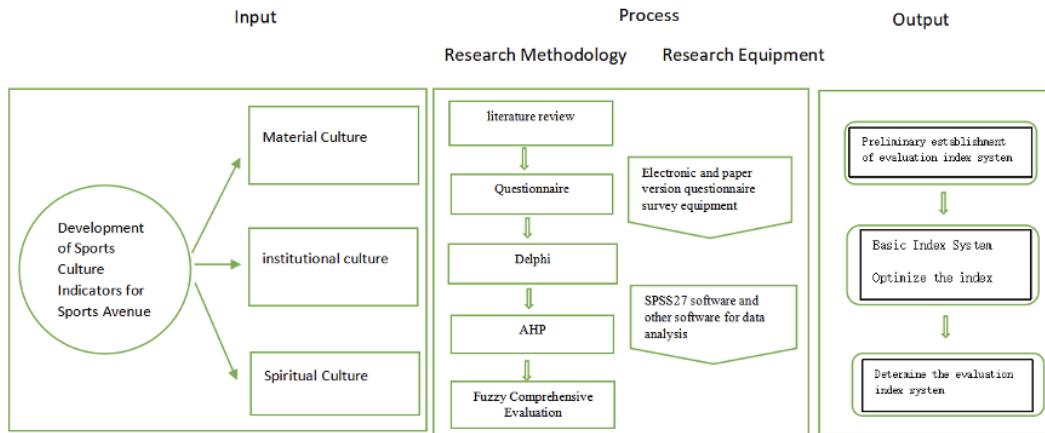


Figure 1 Conceptual framework of this research

## Methodology

**Research Tools:** The main research tool of this study is the expert questionnaire, which mainly includes:

1. The first questionnaire: reliability and validity test questionnaire.

2. The second questionnaire: Rating scale questionnaire, there are five options, which are very important, more important, generally important, less important, and not important. This questionnaire aims to construct the framework of the evaluation index system of university sports culture construction in Xi'an City.

3. The third questionnaire: was designed by the investigator for expert evaluation.

**Population and Sample:** The expert group members of this study are mainly university physical education teachers in Xi'an, leaders of Xi'an Sports Bureau, and grass-roots front-line teachers. This study used purposeful sampling to select experts in related fields. All the selected experts have a rich theoretical basis and practical experience in the construction of campus sports culture. 5 people were selected by IOC, 25 people were selected by Cronbach reliability test, 19 experts by Delphi method, and 122 people for empirical research.

## Data Collection

1. Ask 5 experts through a questionnaire survey and email interview to test the validity of the questionnaire.

2. Using the Delphi method, the expert questionnaire consultation form was distributed to 19 experts through on-site distribution and online email, and two rounds of questionnaires were distributed and recovered, selecting the core indicators of the evaluation system of university sports culture construction in Xi'an.

3. Using the hierarchical analysis method, the Questionnaire of Sports Culture Construction in Xi'an Universities was distributed to 19 experts through on-site distribution and online email, which determined the index weight of the evaluation system of sports culture construction in Xi'an universities.

4. Use the fuzzy comprehensive evaluation method to evaluate the ability of university sports culture construction in Xi'an City.

## Data Analysis

1. In this study, the data were mainly analyzed by using the Software Package.

2. Data Processing of Hierarchical Analysis Y AAHP6.0 software is used to calculate the weight and consistency of each index.

3. Data processing of Fuzzy Comprehensive Evaluation Method Matlab software is used to



analyze the data.

## Results

### 1. Evaluation of first-level indicators

In the construction of the "evaluation index system of sports culture construction in Xi'an", considering the general situation of sports culture construction and the special situation of universities in Xi'an, the following four main levels are adopted: sports spirit culture, sports material culture, sports system culture, and sports behavior culture. This choice of a hierarchical structure is based on the following reasons.

Sports spiritual culture (A1): The Opinions on Comprehensively Strengthening and Improving School Physical Education Work in the New Era issued by the General Office of the CPC Central Committee and the State Council points out the importance of the evaluation index system of sports culture construction in university sports spirit and culture. First of all, it is the fundamental task of cultivating people by virtue. Sports spirit and culture play an important role in college sports. It is not only a key part of realizing the fundamental task of cultivating people by virtue, but also the basis for improving students' comprehensive quality. The cultivation of sports spirit and culture can strengthen students' patriotism, collectivism, and socialist spirit, and at the same time cultivate students' quality of striving and indomitable struggle. Promoting the modernization of education. Sports spirit and culture are an important part of accelerating the modernization of education and building a strong education and sports country. By carrying forward the socialist core values and cultivating the positive sports spirit, the sports spirit and culture are helpful to realizing the goal of education modernization. In terms of the construction of a comprehensive training education system, in the process of strengthening and improving the school physical education work in the new era, attaching importance to the cultivation of sports spirit and culture is the key to constructing the education system of moral, intellectual, physical, aesthetic and labor. Sports spirit culture is not limited to sports activities themselves but also includes the positive influence of sports activities on students' all-round development.

Sports material culture (A2): Sports material culture involves the construction and utilization of material resources such as sports facilities, equipment, and environment. Considering that the development of sports activities cannot be separated from high-quality material support, the establishment of this level is helpful to evaluate and improve the completeness, and modernization level of university sports facilities and their accessibility to students. The "14th Five-Year" education development plan formulated by Xi'an City emphasizes the importance of education in national projects, including the goal of accelerating the modernization of education and building a strong city of education. As an important part of education, the material and cultural construction of physical education, such as the improvement and modernization of sports facilities and equipment, is the key to achieving this goal. Xi'an municipal government issued the Implementation Plan for Accelerating the Construction of a Strong Sports City, which covers the construction and improvement of sports infrastructure, to realize the strategic deployment of becoming a strong sports country. This program highlights the importance of Sports policies and systems and aims to enhance the material basis of sports culture by improving the quality and accessibility of sports facilities. The implementation plan of national fitness formulated by Xi'an Sports Bureau aims to increase the supply of sports venues and facilities and optimize the spatial layout of sports facilities. The plan sets out specific goals, such as increasing the per capita sports field area and improving the national fitness facilities, which play an important role in increasing participation in sports activities and promoting the popularization of sports culture. These policies and plans not only emphasize the importance of sports facilities but also reflect the role of strengthening the construction of sports material culture in improving the quality of education and promoting national fitness.

Sports system culture (A3): Sports system culture focuses on the systems and policies related to physical education in universities, such as physical education curriculum, organization and management of sports activities, the role of sports performance in academic evaluation, etc. The strengthening of this





level helps to ensure the quality and effect of physical education and promotes the institutionalization and standardization of sports culture. Sports system culture ensures the effectiveness and systematization of physical education by formulating and implementing policies related to physical education curriculum setting, activity organization, and management. A reasonable physical education curriculum can ensure that students can get comprehensive physical education, while effective organization and management of physical activities can ensure the smooth progress of sports activities, to improve the overall quality of physical education. Sports performance occupies a place in students' academic evaluation, emphasizing the importance of physical education in students' all-round development of students. This not only enhances the status of physical education in the education system but also promotes students' active participation in sports activities, thus contributing to the development of students' physical and mental health. Through the establishment and improvement of the systems and policies related to sports in colleges and universities, the sports system and culture provide the framework and guide for the standardization and standardization of sports activities. This institutionalization and standardization not only make physical education more systematic and effective but also contribute to the formation of a positive and healthy sports culture atmosphere. The establishment and improvement of sports system culture is the concrete embodiment of national sports policy at the university and university level. It not only reflects the country's understanding of the importance of physical education, but also reflects the implementation of the national sports power strategy in college education. The purpose of taking sports system culture as the first-level index of the evaluation index system of university sports culture construction in Xi'an is to ensure the quality and effect of physical education, and to respond to and implement the national policies and strategies on physical education. This setting is conducive to promoting the in-depth development of sports culture in colleges and universities and providing students with a systematic, standardized, and healthy physical education learning and practice environment.

**Sports Behavior Culture (A4):** Sports behavior culture focuses on the sports activity participation, sports habits, and sports consumption behavior of students and staff. By evaluating and promoting healthy and positive sports behaviors, students' physical quality and quality of life can be improved, while enhancing the vitality and attraction of campus sports culture.

On the whole, these four levels constitute a comprehensive and systematic evaluation framework, which not only covers the multiple dimensions of sports culture but also takes into account the internal spirit and external performance of university sports culture. The adoption of this structure is to ensure that the evaluation system can fully reflect the current situation of the university sports culture construction in Xi'an, and also provide an effective tool to guide and promote future development. Through the comprehensive evaluation of these different levels, the overall level of university sports culture in Xi'an can be better understood and improved.

Table 1: expert evaluation form of first-level indicators

Evaluation theme	expert	expert	expert	expert	expert	conclusion	conclusion
	1	2	3	4	5		
A1 Sports spiritual culture	1	1	1	1	1	1	eligibility
A2 Sports material culture	1	1	1	1	1	1	eligibility
A3 Sports system culture	1	1	1	1	1	1	eligibility
A4 Sports behavior culture	1	1	1	1	0	0.8	eligibility

**Comprehensive analysis:** The evaluation results of the first-level indicators show that the questionnaire has been well presented and described in the measurement of sports spirit culture, sports material culture, and sports system culture, while there is room for improvement in the measurement of sports behavior culture. However, overall, these indicators have reached an acceptable level, proving that the main indicators in the questionnaire have certain practicability and reliability in assessing the health



status of university sports culture construction in Xi'an. Researchers can refer to the results of the expert evaluation to further optimize and improve the questionnaire to improve its effectiveness and reliability.

## 2. Evaluation of secondary indicators

B1 Sports concept communication: The communication of sports concepts is very important. It not only includes the popularization of sports values but also involves the integration of sports spirit into daily education and social practice. This indicator helps to assess and promote the deep spread of sportsmanship on campus. It belongs to A1 (Sports spiritual culture).

B2 Sports ethics and morality: Ethics and morality in sports activities are the core components of sports spirit and culture, which are related to the basic principles of fair competition, integrity, and respect. It belongs to A1 (Sports spiritual culture).

B3 Sports policies and systems: Sports facilities are the basis of sports activities, and their construction and improvement directly affect the participation and experience of students in sports activities. It belongs to A2 (sports material culture).

B4 Sports activities are held: holding all kinds of sports activities can enhance students' participation in sports, but also an important way to promote sports culture and enhance the sports atmosphere. It belongs to A2 (sports material culture).

B5 Sports policies and systems: The formulation and implementation of sports policies and systems are very important to ensure the quality and effect of physical education. It belongs to A3 (sports system and culture).

B6 Sports organization and management: The effective management of sports organization is the key to ensuring the smooth progress of sports activities, which involves the rational allocation and utilization of sports resources. It belongs to A3 (sports system and culture).

B7 Sports meetings and Cultural Festivals: Sports meetings and cultural festivals are an important part of campus sports activities, which are helpful to show students' sports achievements and enhance the campus sports cultural atmosphere. Subject to A4 (sports behavior culture).

B8 Extracurricular physical exercise: Encouraging and organizing students to participate in extracurricular physical exercise is conducive to students' physical and mental health and improving the popularity and influence of sports activities. Subject to A4 (sports behavior culture).

B9 Sports association: A sports association is an important way for students to participate in sports, which can provide a variety of sports activities and promote the development of students' sports skills and interests. Subject to A4 (sports behavior culture).

Table 2: Evaluation of the secondary indicators

Evaluation theme	expert1	expert2	expert3	expert4	expert5	conclusion	conclusion
B1 Sports concept communication	0	1	1	1	1	0.8	eligibility
B2 Sports ethics and morality	1	1	1	1	1	1	eligibility
B3 Sports policies and systems	1	1	1	1	1	1	eligibility
B4 Sports activities are held	1	0	1	1	1	0.8	eligibility
B5 Sports policies and systems	1	1	1	1	1	1	eligibility
B6 Sports organization management	1	1	0	1	1	0.8	eligibility
B7 Sports meetings and cultural festivals	1	1	1	1	0	0.8	eligibility
B8 Extracurricular physical exercise	1	1	1	1	1	1	eligibility
B9 sports association	1	1	1	0	1	0.8	eligibility



The five experts have no objection to the setting and naming of the nine two-level indicators, but they put forward some suggestions in advance for the subsequent three-level indicators.

### 3. Evaluation of three-level indicators

The three-level index (C1-C24) covers all aspects of sports spirit culture, sports material culture, sports system culture, and sports behavior culture, and reflects the detailed and comprehensive evaluation index system of sports culture construction in Xi'an universities. Each index has a clear evaluation goal and relevance, which is helpful for the in-depth analysis and evaluation of all levels of university sports culture.

Related indicators of sports spirit and culture (C1-C6): focus on evaluating the popularization of sports concepts, the practice of sports spirit, and the moral and integrity problems in sports activities. These indicators emphasize the importance of sportsmanship in campus culture, focusing on the ethical aspects of physical activity.

Sports material and culture-related indicators (C7-C12): pay attention to the completeness, accessibility, maintenance, and management of sports facilities, as well as the diversity of sports activities and student participation. These indicators reflect the importance of sports facilities and activities to promote students' physical and mental health and the development of sports culture.

Sports system and culture-related indicators (C13-C18): including sports policy support, curriculum institutionalization, performance evaluation, organizational management, resource allocation, etc., reflecting the role of the sports system in improving the quality and effect of physical education.

Indicators related to sports behavior culture (C19-C24): involving the frequency of sports meetings and cultural festivals, the participation of teachers and students in physical exercise, the participation of sports associations, and the initiative of teachers' guidance. These indicators evaluate the activity and participation of campus sports culture.

The five experts said that in general, these three-level indicators can comprehensively evaluate and reflect all aspects of the university sports culture construction in Xi'an, and help to identify the advantages and improvement points, to promote the development and improvement of sports culture. However, the specific indicators still need to be further considered and modified.

Table 3: Evaluation and modification opinions of the three-level indicators

Secondary indicators	The original three-level index	Modified three-level indicators	Suggestions and reasons for modification
B1 Sports concept communication	C1 The popularity of physical education values	C1 The degree of integration of sports concepts in the curriculum	Quantify the practical application of physical education values in the curriculum setting, and improve the concreteness and operability of the evaluation.
	C2 Internalization and practice of campus sports spirit	C2 The embodiment degree of sports spirit in campus sports activities	Make clear the embodiment of sports spirit in specific sports activities to facilitate specific evaluation and quantification.
	C3 The recognition of sports equity and inclusiveness	C3 Evaluation of fairness and inclusiveness in physical activities	Provide more specific evaluation indicators to reflect the actual situation of fairness and inclusiveness in physical activities.
B2 Sports ethics and morality	C4 The impartiality of the sports competition	C4 The specific performance of sports competition fairness	Focus on the specific examples and performance of impartiality in sports competitions to facilitate observation and quantification.
	C5 The implementation of physical ethics education	C5 Curriculum setting and implementation effect of physical ethics education	Quantifying the curriculum setting of physical ethics education and its implementation effect among students.





Secondary indicators	The original three-level index	Modified three-level indicators	Suggestions and reasons for modification
B3 Sports policies and systems	C6 Handling mechanism of sports integrity problem	C6 The handling efficiency and effect of the campus sports integrity problem	Focus on evaluating the efficiency and practical effect of the handling mechanism of sports integrity problem, and improve the operability of the index.
	C7 The completeness of the campus sports facilities	C7 The number and degree of modernization of campus sports facilities	Quantify the number and modernization level of sports facilities to provide a more specific evaluation basis.
	C8 Access and openness of sports facilities	C8 Access to and opening hours of sports facilities	Specifically, assess the accessibility and opening time of sports facilities to facilitate quantitative analysis.
B4 Sports activities are held	C9 Maintenance and management of sports facilities	C9 Maintenance quality and management efficiency of sports facilities	Focus on the quality of sports facility maintenance and the efficiency of management to improve the practical significance of the evaluation.
	C10 Frequency and scale of campus sports events	C10 Type and participation rate of campus sports events	Pay attention to the variety of sports events and student participation rate, and provide more specific evaluation indicators.
B5 Sports policies and systems	C11 The diversity of sports and cultural activities	C11 The types and participation rate of campus sports and cultural activities	Focus on evaluating the types of campus sports and cultural activities and the degree of student participation, and improve the practical operability of the indicators.
	C12 The universality of students' participation in sports activities	C12 Proportion of students participating in major sports activities	Quantifies the proportion of students participating in major sports activities to specify the assessment of student engagement.
	C13 Policy support for physical activities	C13 Implementation effect of sports activity-related policies	Focus on the evaluation of the effect of relevant sports policies in practical application and improve the pertinacy of evaluation.
B6 Sports organization management	C14 The degree of institutionalization of the physical education curriculum	C14 The comprehensiveness and implementation quality of physical education curriculum setting	Focus on the comprehensiveness of the physical education curriculum and the quality of the implementation process to ensure the comprehensiveness of the evaluation.
	C15 The proportion of sports performance in academic evaluation	C15 The weight and influence of sports performance in the general evaluation	Quantify the weight of sports performance in the comprehensive evaluation of students to specifically evaluate its importance.
B6 Sports organization management	C16 The management efficiency of sports organizations	C16 Efficiency and feedback mechanism of sports organization and management	Assess the efficiency of sports organization and management, and consider the establishment and operation of the feedback mechanism.
	C17 Reasonable distribution of sports resources	C17 Fairness and transparency of sports Resource allocation	Emphasis should be placed on evaluating the fairness and





Secondary indicators	The original three-level index	Modified three-level indicators	Suggestions and reasons for modification
	C18 Teacher and student participation in campus sports organizations	C18 The specific performance of the participation of teachers and students in the campus sports organization	transparency of sports resource allocation and improving the rationality of resource allocation. Specifically the participation degree and activity of teachers and students in the sports organization, to facilitate the practical operation and evaluation.
B7 Sports meetings and cultural festivals	C19 The number of times the school holds sports meetings every year	C19 Organizational quality of the sports meeting and student satisfaction	In addition to the number of events, the organizational quality of the games and student satisfaction should be considered to provide a more comprehensive assessment.
	C20 The school holds a sports and culture festival every year	C20 Innovation and participation in the sports culture festival	Focus on evaluating the innovation and student participation of the sports culture festival to ensure the effectiveness of the activities.
B8 Extracurricular physical exercise	C21 The number of times that teachers and students participate in physical exercise every week	C21 Frequency and duration of teachers and students participating in extracurricular physical exercise	To quantify the frequency and duration of teachers and students participating in extracurricular physical exercise and provide more specific assessment data.
	C22 Each time teachers and students participate in physical exercise duration	C22 Teachers and students to participate in the quality assessment of physical exercise	Assess the quality of physical exercise, including the effectiveness of the exercise and student satisfaction.
B9 sports association	C23 The active degree of students' participation in sports associations	C23 Participation in sports associations and student feedback	Assess student participation in sports clubs and consider student feedback and suggestions to optimize club activities.
	C24 Teachers guide the initiative of sports associations	C24 The guiding effect of teachers in the sports associations	Focus on evaluating the effect of teachers in guiding sports associations, including the quality of guidance and the impact on students.

Through the adjustments, each three-level index is more specific and easier to operate and quantify, to more effectively evaluate and promote the development of university sports culture in Xi'an. These amendments reflect a deep understanding of the existing educational resources and environment, as well as the understanding of the importance of sports culture construction in colleges and universities.

Table 4: Revised table of evaluation indicators at all levels

Level 1 indicators	Level 2 indicators	Level 3 indicators
A1 Sports spiritual culture	B1 Sports concept communication	C1 The degree of integration of sports concepts in the curriculum C2 The embodiment degree of sports spirit in campus sports activities C3 Evaluation of fairness and inclusiveness in physical activities C4 The specific performance of sports competition fairness
	B2 Sports ethics and morality	





Level 1 indicators	Level 2 indicators	Level 3 indicators
A2 Sports material culture	B3 Sports policies and systems	C5 Curriculum setting and implementation effect of physical ethics education C6 The handling efficiency and effect of the campus sports integrity problem
	B4 Sports activities are held	C7 The number and degree of modernization of campus sports facilities C8 Access to and opening hours of sports facilities C9 Maintenance quality and management efficiency of sports facilities C10 Type and participation rate of campus sports events C11 The types and participation rate of campus sports and cultural activities C12 Proportion of students participating in major sports activities
A3 Sports system culture	B5 Sports policies and systems	C13 Implementation effect of sports activity-related policies C14 The comprehensiveness and implementation quality of physical education curriculum setting C15 The weight and influence of sports performance in the general evaluation C16 Efficiency and feedback mechanism of sports organization and management C17 Fairness and transparency of sports Resource allocation C18 The specific performance of the participation of teachers and students in the campus sports organization
	B6 Sports organization management	C19 Organizational quality of the sports meeting and student satisfaction C20 Innovation and participation in the sports culture festival C21 Frequency and duration of teachers and students participating in extracurricular physical exercise C22 Teachers and students to participate in the quality assessment of physical exercise C23 Participation in sports associations and student feedback C24 The guiding effect of teachers in the sports associations
A4 Sports behavior culture	B7 Sports meetings and cultural festivals	
	B8 Extracurricular physical exercise	
	B9 Sports association	

#### 4. The third round of test and weight setting of the index system

In the third round of testing and weight setting the stage of the index system, 122 experts were selected to provide data support for the weight allocation of first-level, second-level, and three-level indicators. These experts come from different fields, including sports scholars, data analysts, educational administrators, and professionals in the practice field, and their expertise and practical experience are crucial to ensure that the weight allocation of the evaluation system is both scientifically reasonable and feasible.

In the weight setting, each expert was invited to evaluate the importance of first, second, and third-level indicators based on their professional judgment and experience. These assessments are conducted quantitatively to ensure the objectivity and operability of the evaluation results. The evaluation results of the experts will be used to calculate the weight value of each level index, which will reflect the relative importance of each index in the whole evaluation system of sports culture construction. The calculation of





weights usually adopts a variety of methods, including the hierarchical analysis method (AHP), entropy weight method, or expert scoring method, to ensure the fairness and scientificity of the results. The method selected in this paper is the hierarchical analysis method (AHP). The large amount of data provided by 122 experts will help to improve the accuracy and reliability of the final weight setting and ensure that the weight allocation of each index can truly reflect its practical significance and contribution to the construction of sports culture in universities in Xi'an.

Finally, the weight set through this method will directly affect the application of the evaluation system, including the evaluation, monitoring, and improvement of the quality of the university sports culture construction in Xi'an. The weight allocation results of the first-level indicators will be elaborated in detail in the subsequent research report, which will provide a basis for relevant policy formulation and resource allocation, to promote the comprehensive development of university sports culture in Xi'an city.

### 5. Final weight

Table 5 shows the results of a final weight calculation based on hierarchical analysis (AHP), which represents the relative importance of each index in the evaluation index system of university sports culture construction in Xi'an. The final weight of each three-level indicator is obtained by multiplying the weight within its group by the weight of the superior (second and first level) index.

For example, for the first-level index of "A1 Sports spiritual culture", the weight in the group is 25.65%. In this category, the weight of the secondary group of "B1 Sports concept communication" is 10.72%, while the weight of the third-level group of "the integration degree of C1 sports concept in the curriculum" is 4.06%. To get the final weight of "C1", we need to do the following calculation:

Final relative weight = weight within primary group weight within two group weight within three group weight. Let the inverse of the sum of the final relative weights of all three indexes be  $\alpha$  and  $\alpha$  be about 36. So, the final weight of "C1" is the final relative weight of  $\alpha C1 = 4.02\%$

This means that in the whole evaluation system, the weight of the "C1 sports concept integration degree in the curriculum" accounts for 4.02%. The goal is to score each three-level indicator on a 100-point scale.

All these calculation results provide a detailed evaluation index system for the construction of sports culture, which can help decision-makers understand which aspects are the most important and which aspects may need more resources and attention in promoting the development of sports culture. This weight system also reflects the relative priorities between different indicators, which can help universities and policymakers develop more effective strategies to improve the overall level of campus sports culture.

Table 5: Final weights obtained by weighting within the primary, secondary, and three-level group weights

Level 1 indicators	Level 1 Within-group weights	Level 2 indicators	Level 2 Within-group weights	Level 3 indicators	Level 3 Within-group weights	The final weight
A1 Sports spiritual culture	25.65%	B1 Sports concept communication	10.72%	C1 The degree of integration of sports concepts in the curriculum	4.06%	4.02%
				C2 The embodiment degree of sports spirit in campus sports activities	4.16%	4.12%
				C3 Evaluation of fairness and inclusiveness in physical activities	4.21%	4.17%
		B2 Sports ethics and	11.06%	C4 The specific performance of sports	4.23%	4.33%





Level 1 indicators	Level 1 Within-group weights	Level 2 indicators	Level 2 Within-group weights	Level 3 indicators	Level 3 Within-group weights	The final weight
A2 Sports material culture	24.97%	B3 Sports policies and systems	10.98%	morality	competition fairness	
				C5 Curriculum setting and implementation effect of physical ethics education	4.18%	4.28%
				C6 The handling efficiency and effect of the campus sports integrity problem	4.18%	4.28%
				C7 The number and degree of modernization of campus sports facilities	4.19%	4.14%
				C8 Access to and opening hours of sports facilities	4.18%	4.13%
	11.25%	B4 Sports activities are held	11.25%	C9 Maintenance quality and management efficiency of sports facilities	4.35%	4.29%
				C10 Type and participation rate of campus sports events	4.12%	4.17%
				C11 The types and participation rate of campus sports and cultural activities	4.30%	4.36%
				C12 Proportion of students participating in major sports activities	4.36%	4.41%
				C13 Implementation effect of sports activity-related policies	4.22%	4.25%
A3 Sports system culture	24.91%	B5 Sports policies and systems	11.22%	C14 The comprehensiveness and implementation quality of physical education curriculum setting	4.10%	4.13%
				C15 The weight and influence of sports performance in the general evaluation	3.94%	3.96%
				C16 Efficiency and feedback mechanism of sports organization and management	4.23%	4.26%
				C17 Fairness and transparency of sports Resource allocation	4.02%	4.04%
				C18 The specific performance of the participation of teachers and students in the campus sports organization	4.11%	4.13%





Level 1 indicators	Level 1 Within-group weights	Level 2 indicators	Level 2 Within-group weights	Level 3 indicators	Level 3 Within-group weights	The final weight
A4 Sports behavior culture	24.48%	B7 Sports meetings and cultural festivals	11.22%	C19 Organizational quality of the sports meeting and student satisfaction C20 Innovation and participation in the sports culture festival	3.99% 4.10%	3.95% 4.06%
		B8 Extracurricular physical exercise	11.44%	C21 Frequency and duration of teachers and students participating in extracurricular physical exercise C22 Teachers and students to participate in the quality assessment of physical exercise	4.26% 4.06%	4.30% 4.10%
		B9 sports association	10.91%	C23 Participation in sports associations and student feedback C24 The guiding effect of teachers in the sports associations	4.17% 4.23%	4.01% 4.07%

## Conclusion

Through the construction of the evaluation index system of university sports culture construction in Xi'an, the following conclusions can be drawn:

1) In this study, the evaluation index system of university sports culture construction in Xi'an is constructed, including the first, second, and third-level indexes. The first-level indicators include sports spirit and culture, sports material culture, sports system culture, and sports behavior culture. The secondary index includes 9 aspects. There are 24 three-level indicators, covering all key aspects of the construction of campus sports culture.

2) This study adopts the expert review method, questionnaire survey method, and other methods, to test the indicators systematically and comprehensively at all levels and ensure the scientific nature of the evaluation index system. The reliability and validity analysis shows that the evaluation index system has good reliability, validity, and internal consistency.

3) This study uses the hierarchical analysis method to give weight to all levels of indicators, reflecting the relative importance of different indicators in the evaluation of sports culture construction in universities in Xi'an. Weight setting provides a basis for the subsequent evaluation.

## Discussion

The evaluation index system proposed in this study is comprehensive, systematic, and scientific, which can provide effective tools for the evaluation and decision-making of the sports culture construction in Xi'an universities. The evaluation index system is scientific, systematic, and practical.

The evaluation results of the first-level indicators will include the measurement of sports spirit culture, sports material culture, and sports system culture, this is consistent with the research result of Zhao (2018) which agrees that the framework of campus sports culture encompasses four tiers: sports material culture, sports system culture, school sports spirit culture, and sports behavior culture. The sports





material layer encompasses foundational elements such as sports equipment, sports venues, and sports sculptures. The sports system layer involves components like sports teaching, extracurricular sports activities, sports competitions, and sports knowledge lectures. The sports spirit layer incorporates aspects like sports concepts and sports fashion. Finally, the sports behavior layer includes activities like sports clubs, sports communities, and other related content.

## Recommendation

- 1) Colleges and universities should carry out the self-evaluation of their own sports culture construction according to the evaluation index system, find out the shortcomings, and make improvement plans.
- 2) The educational administrative department should establish a monitoring mechanism, regularly use the evaluation index system to evaluate the construction of sports culture in colleges and universities, and provide guidance opinions.
- 3) Colleges and universities and relevant departments should strengthen the investment of resources for sports culture construction, improve the conditions of running schools, and promote the comprehensive development of sports culture.
- 4) Colleges and universities should strengthen the dissemination of sports culture concepts, enhance the sports awareness of teachers and students, and create a strong sports culture atmosphere.
- 5) Further improve and develop the evaluation index system, and improve the targeted, scientific, and operable indicators with the times.

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