

RESEARCH ON THE SUSTAINABLE DEVELOPMENT OF PHYSICAL EDUCATION STUDENTS' EXERCISE IN COLLEGES AND UNIVERSITIES



ORIGINAL ARTICLE
ARTIGO ORIGINAL
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PESQUISA SOBRE O DESENVOLVIMENTO SUSTENTÁVEL DO EXERCÍCIO DE ESTUDANTES DE EDUCAÇÃO FÍSICA EM FACULDADES E UNIVERSIDADES

INVESTIGACIÓN SOBRE EL DESARROLLO SOSTENIBLE DEL EJERCICIO DE ESTUDIANTES DE EDUCACIÓN FÍSICA EN COLEGIOS Y UNIVERSIDADES

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ABSTRACT

Introduction: The essence of sustainable development is ecological civilization. The entire modern development, including sports in colleges and universities, is built based on resource conservation, enhanced environmental support capabilities, and a virtuous ecological environment cycle to achieve sustainable economic and social development. **Objective:** Looking at the development history of sports in Chinese colleges and universities for more than 50 years, there have been many successful experiences in human resource development, and there are also many problems that need to be solved. **Methods:** The author took 442 people from 4 provinces as the survey object, researched and discussed the evaluation indicators of the sustainable development of sports in colleges and universities. After factor analysis and professional theoretical research, a total of 15 indicators in 5 categories were established: science and technology, moral education, system Standard category, economic, competitive development category, external input category, and the coach training system category that eliminates "inbreeding." **Results:** The author found in the research that both sports and non-sports families in China are unwilling to engage in sports and college sports for their children. The main reasons are traditional ideological issues, sports social status issues, and athletes' education issues. Among them, coaches, the "inbreeding" training system is one of the main reasons that affect the sports talent resources of colleges and universities in China. **Conclusions:** There can be at least five types of evaluation indicators for the sustainable development of sports in Chinese colleges and universities: science and technology and ethics education, institutional norms, economic and competitive development, external investment, and a coach training system that eliminates inbreeding. The income of sports families is generally lower than that of non-sports families, and their education level is also lower. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Sports; Sustainable development; Evaluation index; Workforce.

RESUMO

Antecedentes: A essência do desenvolvimento sustentável é a civilização ecológica. Todo o desenvolvimento moderno, incluindo esportes universitários, é baseado na economia de recursos, fortalecimento da capacidade de suporte ambiental e realização do desenvolvimento econômico e social sustentável do ciclo ecológico e ambiental. **Objetivo:** revisar o curso de desenvolvimento de educação física da universidade chinesa por mais de 50 anos, há muitas experiências bem-sucedidas no desenvolvimento de recursos humanos e muitos problemas a serem resolvidos. **Métodos:** 442 pessoas de 4 províncias foram investigadas para conhecer o índice de avaliação do desenvolvimento sustentável da educação física universitária. Por meio da análise fatorial e da pesquisa da teoria profissional, foram determinados 15 índices de cinco categorias principais: ciência e tecnologia, educação moral, normas institucionais, economia, desenvolvimento competitivo, insumos externos e eliminação da consanguinidade. **Resultados:** as famílias esportivas e não esportivas não estão dispostas a permitir que seus filhos participem de atividades esportivas universitárias, sendo os principais motivos as ideias tradicionais, o status social do esporte e a educação dos atletas. Entre eles, o sistema de treinamento "consanguíneo" de treinadores é um dos principais motivos que afetam os recursos de talentos esportivos das universidades chinesas. **Conclusão:** O índice de avaliação do desenvolvimento sustentável da educação física nas universidades chinesas pode ser dividido em pelo menos cinco categorias: educação científica e ética, normas institucionais, desenvolvimento econômico e competitivo, investimento externo, eliminação do sistema endógamo de treinamento de treinadores. A renda das famílias que praticam esportes é geralmente menor do que a das não praticantes, e o nível de educação também é baixo. **Nível de evidência II; Estudos terapêuticos: investigação dos resultados do tratamento.**

Descritores: Esportes; Desenvolvimento sustentável; Índice de avaliação; Recursos humanos.



RESUMEN

Antecedentes: la esencia del desarrollo sostenible es la civilización ecológica. Todo el desarrollo moderno, incluidos los deportes universitarios, se basa en el ahorro de recursos, el fortalecimiento de la capacidad de apoyo ambiental y la realización del desarrollo económico y social sostenible del ciclo ecológico y ambiental. Objetivo: revisar el curso de desarrollo de la educación física universitaria en China durante más de 50 años, hay muchas experiencias exitosas en el desarrollo de los recursos humanos, y hay muchos problemas que resolver. Métodos: 442 personas de 4 provincias fueron investigadas para conocer el índice de evaluación del desarrollo sostenible de la educación física universitaria. A través del análisis factorial y la investigación de la teoría profesional, se han determinado 15 índices de cinco categorías principales: ciencia y tecnología, educación moral, normas institucionales, economía, desarrollo competitivo, insumos externos y eliminación de la endogamia. Resultados: tanto las familias deportivas como las no deportivas no están dispuestas a que sus hijos participen en actividades deportivas universitarias. Las principales razones son las ideas tradicionales, la condición social deportiva y la educación de los atletas. Entre ellas, el sistema de formación de "endogamia" de los entrenadores es una de las principales razones que afectan a los recursos de talentos deportivos de las universidades chinas. Conclusión: el índice de evaluación del desarrollo sostenible de la educación física en las universidades de China puede dividirse en al menos cinco categorías: educación científica y ética, normas institucionales, desarrollo económico y competitivo, inversión externa, eliminación del sistema de formación de entrenadores endogámico. Los ingresos de las familias deportivas son generalmente inferiores a los de las familias no deportivas, y el nivel de educación también es bajo. Nivel de evidencia II; Estudios terapéuticos: investigación de los resultados del tratamiento.

Descriptor: Deportes; Desarrollo sostenible; Índice de evaluación; Recursos humanos.

DOI: http://dx.doi.org/10.1590/1517-8692202127042021_0089

Article received on 04/26/2021 accepted on 05/10/2021

INTRODUCTION

The essence of sustainable development is an ecological civilization. The entire modern development, including sports and universities, is established based on resource conservation, enhanced environmental support, and a virtuous cycle of the ecological environment to achieve sustainable economic and social development.¹ The sustainable development of sports in colleges and universities depends largely on the reasonable development and allocation of sports human resources in colleges and universities. The development of human resources for sports in colleges and universities mainly includes athletes, coaches, and generalized managers.

THE GUIDING IDEOLOGY OF THE SUSTAINABLE DEVELOPMENT EVALUATION INDEX OF COMPETITIVE SPORTS

Reflecting on the idea of development

Without development, there will be no improvement in people's living standards. The idea of sustainable development also emphasizes economic growth, social progress, and wealth accumulation, rather than avoiding development. Therefore, the assessment of the sustainable development of competitive sports must reflect the degree of development of competitive sports in a country or region, that is, be able to judge whether the level of competitive sports in a country or region is truly developing.² The emphasis here is on the concept of "quantity," the overall competitive sports development level.

Reflect on the idea of coordination

That is, it can distinguish the development of competitive sports in a country or region and the problems of mass sports, school sports, leisure sports, etc. whether it is balanced, whether the development level of competitive sports is coordinated with the social economy, people's living standards, and scientific and technological strength, whether the market development of competitive sports is balanced with the government's macro-control.³⁻⁶

Basic principles for the selection of evaluation indicators for the sustainable development of competitive sports

The amount of information reflected in the sustainable development of competitive sports is very large and complex, and it covers a wide range of fields. Therefore, the determination of evaluation indicators is a very difficult task. It should pay attention to the basic requirements of the scientific development view. The selection of evaluation indicators must follow the scientific principle and pay attention to the effectiveness.⁶ The formulation of policies has a guiding role.

Scientific principles

The sustainable development index system of competitive sports must be established on a scientific basis, which can fully reflect the internal mechanism of the sustainable development of competitive sports. The indicators' meaning must be simple, clear, standard for measurement methods, and standardized statistical calculation methods, which can comprehensively and comprehensively reflect competitive sports.

Dynamic principle

Considering that competitive sports' sustainable development needs to be reflected through a certain time scale, the selection of evaluation indicators requires full consideration of the characteristics of dynamic changes and a better description, depiction, and measurement of the future development or development trend of competitive sports.

Principle of Comparability

The sustainable development system of competitive sports is a complex and huge system, which can be decomposed into several subsystems. Therefore, to describe and evaluate the degree of sustainable development and development of competitive sports, different indicators should be used at different levels. As far as possible, the evaluation indicators adopt common names, concepts, and calculation methods to facilitate horizontal and vertical comparisons.

Operability principle

Decision-makers will ultimately use the index system for sustainable development of competitive sports to reflect the current situation and trends of competitive sports development and serve policy formulation and scientific management. Therefore, the evaluation index system's establishment must consider the principle of operability, that is, easy data Collection, easy to quantify, and evaluable.

METHOD

Research objects

The paper sent out questionnaires to 572 people in Jiangsu, Fujian, Jiangxi, and Anhui, and recovered 442 valid questionnaires, with an effective recovery rate of 77.3%. The details of the research subjects are shown in Table 1.

Research subjects 250 women, 194 men, 321 non-sports families, and 121 sports families (a sports family means that at least one of the three generations of the family is engaged in sports work); 286 people have higher education (above college), 14 people have income More than 2000 yuan/month.

Table 1. The basic situation of research objects.

Province	Number of people	Education	Number of people	Monthly income (yuan)	Number of people
Jiangsu	138	junior high school	48	0-100	20
Fujian	137	High school	108	101-1000	318
Anhui	86	Junior college	188	1001-2000	90
Jiangxi	81	Bachelor degree or above	98	Above 2000	14

Research methods

Questionnaire survey method

The questionnaire includes 60 questions in 3 categories. The first category is the basic situation of the research object; the second category is the evaluation of sports talent resources in Chinese colleges and universities; the third category is the evaluation index used to evaluate the sustainability of sports in Chinese colleges and universities. Evaluation of development.

Mathematical Statistics

The questionnaires of the first and second types of questionnaires are tested for differences between each group and each question, and the evaluation index analysis is carried out by R-type factor analysis. All statistical analysis results are obtained under the SPSS statistical program.

Establish a judgment matrix

The judgment matrix is the basic information of the analytic hierarchy process, and it is also an important basis for calculating the relative importance. The judgment matrix is a certain element H_s of the upper level as the judgment criterion, and the elements of this level are compared to determine the matrix elements. Assuming that the evaluation target is A and the evaluation index set is $B = \{a_1, a_2, ..., a_n\}$, the construction of the judgment matrix $P(A - B)$ is:

$$P = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \tag{1}$$

Calculate the judgment matrix

When applying the analytic hierarchy process to make multi-objective decision-making, you need to know the relative importance of a_i to H_s , that is, the weight of a_i to H_s . For this reason, the eigenvector W of the relevant judgment matrix can be obtained first, and then after normalization a_i , the relative importance to H_s , that is, the weight, can be obtained. Therefore, the method of calculating the component W_i of the feature vector W is as follows:

$$W_i = \left(\sum_{j=1}^n a_{ij} \right)^{1/n}, i = 1, 2, \dots, n \tag{2}$$

Normalize the vector $W = \{W_1, W_2, \dots, W_n\}^T$, according to the formula

$$W_i^0 = \frac{W_i}{\sum_{i=1}^n W_i} \tag{3}$$

We calculate W_i^0 separately and get the feature vector

$$W = \{W_1^0, W_2^0, W_3^0, W_4^0\} \tag{4}$$

Calculate the largest characteristic root λ_{\max} of the judgment matrix.

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AW)_i}{nW_i^0} \tag{5}$$

Among them, $(AW)_i$ represents the i element of vector AW .

RESULTS

Educational level and income of different families

It can be seen from Table 2 that the educational level and income of non-sports families are higher than those of sports families. The level of education is the internal condition for the formation of good professional ethics, and the institutional norms are the external conditions for the formation of good professional ethics.

People's attitudes towards sports in colleges and universities

People's attitudes towards sports in colleges and universities (Table 3 and 4). With the further establishment of Chinese market economy system, the development of sports in colleges and universities will also balance the input and output of sports personnel in colleges and universities.

Attitudes of different income groups towards sports in colleges and universities

It can be seen from the questionnaire that there are four main reasons: one is the status issue. 22.6% of the families who do not want their children to engage in sports training think that the income of

Table 2. Educational level and income of different family research objects.

	Education				Monthly income		
	junior high school	High school	Junior college	Bachelor degree or above	High income	Middle income	Low income
Non-sports family	18	98	123	82	16	245	60
Sports family	30	30	65	16	1	95	25

sports work is low, 48.0% think that there is little way out, and 24.9 think that the status is low is the problem of coaches. 31.9% believed that the coaches' literacy level, 32.6% thought that the coaches were not very professional, 32.1% thought that the use of drugs, 44.8% thought that the coaches were eager for quick success, 56.1% thought that the success rate was low; the third was ideological problems. 17.9% believe that traditional thinking is affected, 20.1% believe that family income is low, and 27.1 families are afraid of their children's hardship. It is worth noting that 64.3% of families are afraid of affecting their children's cultural studies. This has raised the issue of Chinese youth in the sports sector in colleges and universities. The reorientation of the direction of sports schools; the fourth is the problem of colleges and universities' sports system. 33.7% think that the system is unreasonable, and 29.0% think that the competitive team atmosphere is unhealthy. (Table 5 and 6)

Table 3. Parents' attitude towards their children's sports training (%).

	Only child			Non-only child		
	willing	Unwilling	Very unwilling	willing	Unwilling	Very unwilling
Sports family	16	48.2	24.4	12.1	44.1	26.3
Non-sports family	29.4	31.6	25.1	24.5	32.9	26.5

Table 4. Parents' attitude towards their children's professional sports training (%).

	Only child			Non-only child		
	willing	Unwilling	Very unwilling	willing	Unwilling	Very unwilling
Sports family	32.2	17.4	25.9	18.4	36.6	31.6
Non-sports family	37.3	11.5	25.9	25.6	32	28.7

Table 5. Attitudes of families with different incomes to their children's sports training%.

	High-income family		Middle-income family		low-income family	
	willing	Unwilling	willing	Unwilling	willing	Unwilling
Sports Training	22.2	77.8	25.4	74.6	30.2	69.8
Professional sports	30.6	69.4	28.7	71.3	37.6	62.4

Table 6. Factor analysis results.

Main factor	First factor	Second factor	Third factor	Fourth factor	Fifth factor
Factor name	Science and Ethics Education	Institutional norms	Economic, competitive development	External input	Eliminate inbreeding
High load factor	Q57, Q59	Q55, Q47	Q42, Q43	Q39, Q40	Q49, Q41
	Q56, Q52	Q46, Q54	Q44, Q45		
	Q48, Q50	Q51, Q53			
Contribution rate (%)	47.9	7.7	5.1	4.1	3.7

AUTHORS' CONTRIBUTIONS: Each author has made significant personal contributions to the manuscript. Chaohu He analyzed and explained the relevant data of the sustainable development of physical education students in colleges and universities, and played a leading role in writing the full text. Zhenpeng Huang made major contributions to the research background and the collection of research literature and was the main contributor to the manuscript writing. Liaokun Ye made a great contribution to the questionnaire survey. All authors read and approved the final manuscript.

DISCUSSION

The relationship between people's attitudes towards sports in colleges and universities and human resources

It can be seen from the questionnaire that there are four main reasons: one is the status issue. 22.6% of the families who do not want their children to engage in sports training think that the income of sports work is low, 48.0% think that there is little way out, and 24.9 think that the status is low is the problem of coaches. 31.9% believed that the coaches' literacy level, 32.6% thought that the coaches were not very professional, 32.1% thought that the use of drugs, 44.8% thought that the coaches were eager for quick success, 56.1% thought that the success rate was low; the third was ideological problems. 17.9% believe that traditional thinking is affected, 20.1% believe that family income is low, and 27.1 families fear their children's hardship. It is worth noting that 64.3% of families are afraid of affecting their children's cultural studies. This has raised the issue of Chinese youth in the sports sector in colleges and universities. The reorientation of the direction of sports schools; the fourth is the problem of colleges and universities' sports system. 33.7% think that the system is unreasonable, and 29.0% think that the competitive team atmosphere is unhealthy.

CONCLUSION

There can be at least five types of evaluation indicators for the sustainable development of sports in colleges and universities in China: science and technology and ethics education, institutional norms, economic sports development, external investment, and a coach training system that eliminates inbreeding. (2) The income of sports families is generally lower than that of non-sports families, and their education level is also lower. The stock of human capital and human resources of sports in colleges and universities in our country is low. Whether it is sports or non-sports families, there is a tendency that children are unwilling to engage in sports in colleges and universities. Within the scope of this research, one of the main factors affecting the stock of human capital and human resources of sports in colleges and universities in China is coaches, especially the training system and system of coaches. Chinese traditional thinking is also one of the main factors affecting the human capital and human resource stock of sports in Chinese colleges and universities, especially only-child families' performance.

ACKNOWLEDGMENTS

The work was supported by Blue book of campus development in Yunnan Province(Grant: 2017XYZQ02).

All authors declare no potential conflict of interest related to this article

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