

Coupling Analysis on Development Pattern Based on Computer Mathematical Model

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Abstract. Competitive sports is a kind of professional sports, which treats sports as a tool to test one's limits and transcend oneself. While humanistic sports is a kind of movement means, which regards sports as a tool to improve the life quality and work efficiency. There is a close relationship between them. First, this paper analyzes the association between humanistic sports' development and school sports. It analyzes the development of modern competitive sports and the development goals of competitive sports after the Beijing Olympic Games. The author constructed mathematical model to analyze the coupling relationship between competitive sports and humanistic sports' development, which provides a new path and exploration direction for sports development research to make scientific decision analysis.

Introduction

Today, the human beings have created the sports' value and sports' beauty, even the exploration of sports ethics, which explains the existence form and significance of life. There are many research directions about the humanities' sports research, like Xiong Xiao and Zhengguohua's exposition on the development mode of evolution and reconstruction in our country's athletics sports, such as the development mode of our country's athletics sports [1]. According to the actual situation of the socialist market economic system, the author put forward that the people explore opinions for generating realistic problems continuously from the direction of the social reform. Liwei's regional development's theory of Chinese competitive sports, empirical study is based on the research foundation theory of regional science, which adopts a variety of scientific statistical method to analyze each index of the competitive sports in China. About classification and overall plans hierarchically and distributed domain, the author puts forward various principles and mechanism for a long-term stable development. Yanghua and Renhai's analyzing status and development trend of our country sports humanities social science research, which are based on the subject of national social science fund. It combines multidisciplinary in the application of sports science, which analyzes our country's research status in the humanities and social science. From more than one direction, it put forward advice of our country's subject system consummation and the development tendency [2]. Wangxianghong's research on integration of China's competitive sports talent cultivation system which aims at strategic road of our country competitive sports for a long time. It fuses various resources and form perfect system of talent cultivation. It also strives to improve training mechanism and training efficiency and realize the strategic target of competitive sports' the development finally. It synthesizes domestic scholars' thinking for humanistic sports. The influence of sports itself gradually present tendency of widening the scope and complication. It also has caused the doubts of some contradictory phenomenon which must be start with the social science. It needs to pay attention to humanities sports knowledge and supply humanities sports knowledge.

The association analysis between humanistic sports and athletic sports

Humanistic sports is the widespread public sports as the object of the public. Humanistic sports regard participants as the main body, which it fully promotes development of body and mind health and satisfy the needs of the entertainment [3]. With the development of the society, humanistic sports

promotes the construction of spiritual civilization, and it has the nature of spontaneous mutual. Competitive sports is a kind of special process complexing diversity of human activity, and it has its distinctively unique characteristics, such as the fierce competitive, strict regularity, the height of the identity, hard work and so on. Neighbor attribute of sports as Figure below.

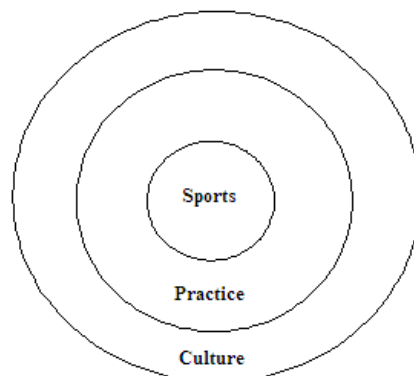


Figure 1. The near attribute of sports

As Figure 1 shows, the practice is transformation a person to nature (object), and sports is the same kind of practice of culture. Humanistic sports can be said to be a lifelong sports, and it can be said to be a part of the lifelong education. Under certain historical condition, it promotes the healthy development of the construction of spiritual civilization, and it plays an important role for the construction of material civilization and the spiritual civilization. Its development degree depends on the country's economic prosperity and social moral quality. The human competition always exists in the nature, and survival of the fittest is the main form of its expression. Modern society without war promote the modern athletic sports' development[4]. With social material and spiritual civilization developed continually, competitive sports are around every corner of society in rapidly gesture. Competitive sports build intimate contact with humanistic sports, which the project develops rapidly in competitive sports, it also developes rapidly in humanistic sports, such as China national ball game-table tennis, American basketball, Brazilian football and so on. Today competitive sports have greater independence and develop rapidly. After joining a variety of high and new science and technology in, sports are not only matured in theory day after day, but also combining with the specific practice. Its influences are expanding , which it is the same with art forms. Competitive sports is a kind of the project beyond the words , which the world common involves in. Without language of media restrictions, it more promotes great-leap-forward development of the competitive sports.

Analysis of China's modern athletic sports' development present situation and the target

A. The current situation of the development of Chinese modern athletic sports

China's modern athletic sports develop rapidly, but due to the weak of national comprehensive strength earlier days in the new China. It leads sports' development to lag behind, so competitive sports performance is not significant. Since the founding of new China, Chinese competitive sports made high-profile achievements, because in the development process China improves the pattern of modern athletic sports. From 26th Atlanta Olympic Games in 1996 to the 30th London Olympic Games in 2012, the medal's numbers China won are shown in the list below.

TABLE I. CHINESE MEDAL'S NUMBERS IN THE 26TH – 30TH OLYMPIC GAMES

Ye ar	Sessio n numb er	Place	Gold medal	Silver medal	Bronz e medal	Medal total
199 6	26th	AtLant a	16	22	12	50
200 0	27th	Sydney	28	16	15	59
200 4	28th	Athens	32	17	14	63
200 8	29th	Beijing	51	21	28	100
201 2	30th	Londo n	38	27	22	87

As Table 1 shown, Chinese Olympic gold medal's numbers doubled from 1996 to 2012. Total numbers are also substantially increased. Especially in the 29th session of the Beijing Olympic Games, China's gold medal numbers are the world first, and total medals are basically realizing the double. The world rankings of gold medal's number in the past five games are shown below .

TABLE II. THE WORLD RANKINGS OF CHINESE GOLD MEDAL'S NUMBERS IN THE PAST FIVE OLYMPIC GAMES

Year	1996	2000	2004	2008	2012
The world rankings	4	3	2	1	2

As Table 2 shown, Chinese world rankings of gold medal's number in the past five Olympic Games increased dramatically. With China's overall national strength continuously improved in recent years, China's athletic sports development's pattern are constant updated. Competition pattern of China's current sports mainly included the government input type, social investment type and joint investment type. The mainly development mode of athletic sports is government input type in China. Specific data as below.

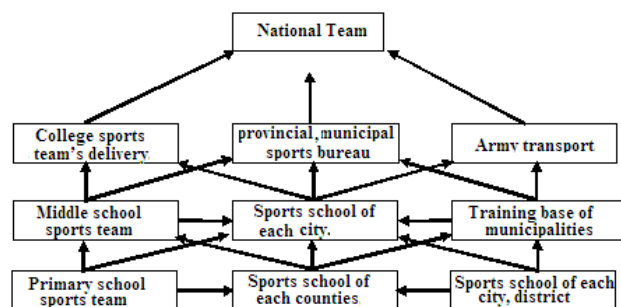


Figure 2. Sports talent development model of government input type

As Figure 2 shows, the most top international athletic talents are provided by cities and the people's liberation army and colleges. Middle school and training base of lower level make important efforts to provide the national team's athletic talents. Athletic talents development model of government investment type can stimulate national morale, rouse national spirit and improve national pride and so on. Competitive sports can create certain economic value, and the modern athletic sports has become a industry with rapid development. At the same time, competitive sports has the very strong cultural value. It is a culture of solemn ceremony, culture of the human body energy potential excitation. It improves the moral level of culture, and improves the emotional culture of the aesthetic consciousness.

B. China's modern athletic sports' development goals

Competitive sports belongs to subject education category in the current school sports education, and it is a kind of important education means to make comprehensive development. Furthermore, it is a subject of today's sports education. Competitive sports' value is embodied in the practice of competitive sports activities. In fact for people's value, it stimulates your body's biggest potential through the fierce competition, and it realizes "swifter, higher, stronger" goal through the sports tenacious struggle and unremitting efforts. Furthermore, it realizes the athlete's self demand value and competitive sports special value[5]. Training development goals of China competitive sports after 2008 Beijing Olympic Games are as below.

Development targets of Chinese sports's talent training after the Beijing Olympic Games as Figure 3 shown. With the development of social economy and progress, the declining national physique is worried. Competitive sports have a strong competitive and antagonistic stimulation on human physiological which is far greater than humanistic sports. It develops the human physical ability to a more high altitude through the continuous competitive sports and it promotes the development of the human further. Competitive sports effectively improves the adaptability people in the outside of environment. As the prop of spirit and strength in future development in our country, the college students have become the focus of attention further. "Development of the college students' physical" has become the major issue and the serious challenges at present. "Development of the physical" is not just physical unilaterally concerned, but need the science and healthy way to promote the consciousness of understanding about health. Many other aspects of consideration and research on nutrition, work and rest, physical and mental burden, medical and health conditions, measures and so on, it improves awareness and understanding for humanistic sports .

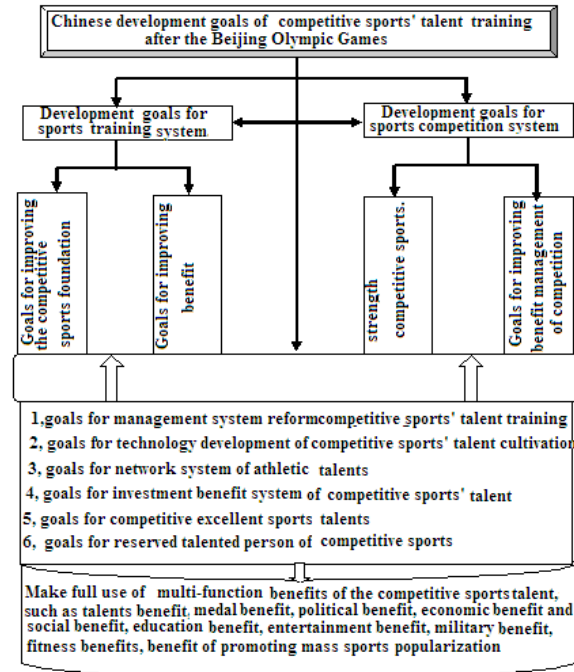


Figure 3. The development goals of China sports training after the Beijing Olympic Games

Coupling relationship of development mode between competitive sports and humanistic sports

From man to culture, culture to sports, it mixes people and sports together through sports and cultural form. In order to play cultural factors of sports culture to the limit, the three aspects (people, culture, sports) can not be dispensed with. As an important part of the sports, competitive sports is characteristics of sports competition. In order to create a more excellent performance and win the final game. We analyze the coupling relationship between competitive sports and humanistic sports development, and construct mathematical model. Competitive sports advantage rate $Z(t) = Q(t)/L(t)$, its growing conditions should be $\dot{Z}(t) > 0$, which is constantly established, and it usually takes value constantly. It can be equivalent with relative growth rate of athletic sports advantage rate[6]:

$$\dot{Z}(t)/Z(t) > 0$$

Take $Q = a \cdot L^\gamma \cdot K^{1-\gamma}$ in $Z(t) = Q(t)/L(t)$, get $Z(t) = a \cdot L^{\gamma-1}(t) \cdot K^{1-\gamma}(t)$, both sides take logarithmic at the same time, and take the derivative of t, available[7]:

$$\frac{\dot{Z}}{Z} = (1-\gamma) \cdot \left(\frac{\dot{K}}{K} - \frac{\dot{L}}{L} \right)$$

For $\dot{Z}(t) > 0$ is constantly established, and it usually take value constantly, the equivalent conditions[8]:

$$\frac{\dot{K}}{K} > \frac{\dot{L}}{L}$$

The formula is constantly established, competitive sports advantage rate and humanistic sports advantage rate. In the trend of humanism, it further explores human as the subjectivity in the nature of society. It reflects the human spiritual civilization achievements in the process of historical progress through the humanism at the same time. Multidisciplinary integration of scientific research, radioactive development, it sets up self-improvement's main body consciousness for respecting life, fair competition, strive constantly. So competitive sports and humanistic sports are also according to model assumptions $K(t)$, $L(t)$ initial value can be caculated by the following equation[9]:

$$\begin{cases} \dot{L} &= \rho \cdot L \\ \dot{K} &= \sigma \cdot Q \\ Q &= a \cdot K^{1-\gamma} \cdot L^{\gamma} \\ K(0) &= K_0 \quad L(0) = L_0 \end{cases}$$

In which, $L(t) = L_0 \cdot e^{\rho t}$, $K^{\gamma}(t) = K_0^{\gamma} + \frac{\sigma \cdot a}{\rho} L_0^{\gamma} \cdot (e^{\rho \gamma t} - 1)$,

Then, the competitive sports advantage rate is as follows[10]:

$$\frac{\dot{K}}{K} - \frac{\dot{L}}{L} = \left(\frac{\dot{K}(0)}{K_0} - \frac{\dot{L}(0)}{L_0} \right) \cdot \left(\frac{K_0}{K} \right)^{\gamma}$$

$$\frac{\dot{K}(0)}{K_0} - \frac{\dot{L}(0)}{L_0} > 0$$

The necessary and sufficient conditions of taking constant value is[11]:

If the coupling significance is in the original, competitive sports advantage rate relative growth rate is greater than the rate of humanistic sports advantage of the relative growth rate to assure competitive sports advantage rate increasing. On the contrary, competitive sports advantage rate will only be reduced. It can strengthen humanistic sports development through the athletic sports, and humanistic sports can imitate the athletic sports through inheriting style of competitive sports by humanistic sports. At the same time, competitive sports can promote the development of the sports humanities, like that China's traditional sports wushu developed to competitive sports.

Conclusion

Since the ancient times, proportion of Human sports' competitive sports are not allowed gazed. Many athletics project are from everyday labor ,life skills, imitation part or combined action which makes the project into shape. Through continuous evolution ,it forms the strict system, principles finally. We must insist that sports education form is base on the health and comprehensive education. We trains high quality talents and blend sports culture really into daily training.

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