

## A TRAINING MANAGEMENT SYSTEM MODEL OF CHINESE STUDENT SWIMMING ATHLETES IN FUJIAN PROVINCE

YANG CAO <sup>1</sup>, ANUCHIT KULWANICH <sup>2</sup> and TEERAPONG PONGPENG <sup>3</sup>

<sup>1,2,3</sup> Suan Sunandha Rajabhat University, Bangkok, Thailand.

Email: <sup>1</sup>s63484950019@ssru.ac.th, <sup>2</sup>anuchit.ku@ssru.ac.th, <sup>3</sup>teerapong.po@ssru.ac.th

### Abstract

The objectives of this study are as follows: 1. to study the influencing factors of the training system of student swimming athletes in Fujian Province. 2. The relationship between management system, development environment, social security, learning and training, coaches and athletes and the training system of student swimming athletes in Fujian Province. 3. Put forward the model of student swimming athletes training management system in Fujian Province. In terms of research methodology, a combination of qualitative and quantitative research methods were used, and the quantitative research model was validated using semi-structured interviews. A sample of 380 student-swimming athletes from a pool of more than 2,900 student-swimming athletes. Structural equation modeling was used to analyze the data. In the quantitative study, it was found that the management system, development environment, social security, economic security, learning and training, coaches and athletes all had a positive influence on the management system of student swimming training in Fujian Province. In the qualitative research phase, it was found that network relationships and word frequencies described the models of training management system, management system, development environment, social security, economic security, learning and training, coaches and athletes. The system model included training quality and talent competitiveness. These high-frequency keywords constitute a comprehensive training management model that focuses on the synergy of all aspects to provide comprehensive support for swimming students and to promote their overall development at multiple levels.

**Keywords:** Management System/ Development Environment, Social Security, Economic Security/Learning and Training/Coaches and Athletes.

### 1. INTRODUCTION

With the introduction of the construction of sports power in 2019, it marks that China's sports industry has entered a new historical stage. Our country's athletics sports cause has made remarkable achievements through long-term development. However, the management model of athletics sports under the nationwide system has gradually been precipitated and accumulated for many years, and it is also incompatible with the contemporary sports development goal orientation and strategic planning (Zhong and Li, 2022, p.672-679). Based on this, in 2020, China successively issued the Opinions on Deepening the Integration of Sports and Education to Promote the Healthy Development of Young People jointly issued by the State General Administration of Sport and the Ministry of Education, and the Opinions on Comprehensively Strengthening and Improving School Sports in the New Era issued by the General Office of the CPC Central Committee and The General Office of the State Council, It aims to improve the mechanism of competitive sports and school sports in China through top-level design, explore the development mode of multi-distance, and give the connotation of sports development in the new era.

To deepen the integrated development system of school sports and competitive sports and to promote the scientific development of student athletes has become the top priority of school sports in Fujian Province. Establishing a set of scientific, comprehensive and integrated student swimming athletes training system to promote the long-term sustainable development of student swimming athletes and the training of elite athletes in Fujian Province is an inevitable key stage for Fujian Province to implement the road of sports power and sports education integration. It will provide theoretical reference for the training of student swimming athletes in Fujian Province, the innovation of swimming events, the improvement of the integration system of sports and education, and the development of other sports under the integration of sports and education.

## **2. LITERATURE REVIEW**

### **2.1 Training Management System**

With the synergistic effect of key elements such as management system, development environment, social security, economic security, learning and training, and training subjects (coaches and athletes), the training system model can achieve more significant results in training quality and talent competitiveness.

The two main components are training quality and talent competitiveness. First of all, the role of cultural education is crucial to the quality of athlete development. By teaching cultural concepts such as sportsmanship, teamwork and fair play through cultural education to enhance student athletes, athletes with good character and moral values can be produced (Smith and Johnson, 2018, p.123-145). Secondly, in terms of talent competitiveness, the study points out that rational allocation of time for theoretical study and sports training, improvement of the execution efficiency of the two, and implementation of the spirit of the policy of integration of physical education and sports training are crucial to improving the competitiveness of student athletes (Wang and Li, 2020, p.45-48).

### **2.2 Management System**

Training management system by taking some specific means and measures, design and maintain an environment, including the internal and external environment of the organization, so that all management objects in a specific environment, to achieve coordination and orderly activities.

It mainly includes two parts: organizational structure and training objectives. The United States is the most typical country that implements the decentralization system of school education, the responsibility of school management is mainly taken by the local education administration department, and the management of school sports is obviously loose and diversified (Zhao, 2007, p.15-17). At present, the main focus of competitive sports management in schools in China is to realize complementary advantages and collaborative management among sports, education departments and social organizations. In the cultivation goal, School sports competitions in our country are mainly managed independently by the education department and sports gate. At present, there is a vague target of the system, and there is no unified standard

in the formulation and implementation of competition rules, which restricts the development of school sports events (Yang and Wu, 2021, p.96-102).

### **2.3 Development Environment**

The development environment of Chinese athletes is defined as the process of training athletes to adapt to the new requirements of the new era and the new situation and improve the quality of talent training in terms of graduation requirements, curriculum system, training and teaching activities, practice paths and other aspects guided by national standards.

The development environment consists of project survival environment and talent pool environment. Every school in China has greater autonomy in the implementation of physical education curriculum, which makes different physical education curriculum models emerge in different types of schools in the United States. According to the characteristics of students' growth and development in different periods and the rules of the formation of sports skills, the training objectives of different stages are set up to promote the long-term sustainable development of student-athletes (Shi and Mao, 2009, p.25-30). In terms of talent pool environment, 80% of the athletes of the United States Olympic swimming team come from American colleges and universities, but China's high-level athletes are still mainly concentrated in provinces (cities) and national teams, and there are few outstanding athletes trained from colleges and universities (Huang and Peng, 2018, p.44-45).

### **2.4 Social Security**

The social security of athletes is defined as the process of continuously deepening the integration of sports and education, optimizing the athletes' cultural education system, optimizing the athletes' financial aid system, improving the athletes' income and treatment, perfecting the athletes' security policies and regulations, and enhancing the level of athlete security under the rule of law. At present, the main problems in China are athletes' rights protection policies and regulations to be improved, the lack of integration of the cultural education system, the implementation of the sports arbitration system is difficult to protect athletes' rights, and the lack of financial security mechanism restricts the career development of athletes (Kang et al., 2022, p.75-83).

### **2.5 Economic Security**

Economic security refers to the design and maintenance of an economic security by taking some specific means and measures, including internal and external economic security of the organization, so that all management objects in a specific environment, coordinated and orderly activities.

Economic security is mainly manifested in the social and economic level, and sufficient funds determine the training quality of athletes and the development of the project. The funds for competitive sports in Russia give more funds to the training system for competitive sports reserve talents and the Olympic Games and international competitions, while the state funds are less invested in the club side. Obviously, in the decades of exploration after the collapse of the Soviet Union, Russia's gradually formed competitive sports funding management methods

are in line with the needs of the current development of competitive sports in Russia(Zhang, 2014, p.130-135). Around 24 universities in the UK offer a variety of sports scholarships for athletes under different conditions, with grants of up to £10,000 for world-class athletes competing at the London 2012 Olympic Games(Aquilina, 2016, p.37-55).

## **2.6 Learning and Training**

Learning and training refers to the design and maintenance of an environment by taking some specific means and measures, including learning and training environment, so that all management objects in a specific environment, to achieve coordination and orderly activities.

NCAA, as an unofficial social mass sports management organization of American universities, not only trains excellent student-athletes, but also attaches great importance to students' theoretical course learning. Student athletes have strict requirements for academic performance from the beginning to the beginning of the school, and students who do not meet the standards are not allowed to enter or compete(Wu et al., 2010, p.97-99).

In our country, the shortage of competitive reserve talents and the low comprehensive quality of athletes have become increasingly prominent, and the "contradiction of learning and training" has become the focus of reflection on the training system(Wang and Cao, 2015, p.7-12; Tao et al., 2010, p.86-89).

## **2.7 Coaches and Athletes**

The definition of coaches and athletes is to design and maintain a human resources guarantee by taking some specific means and measures, so that all management objects can coordinate and orderly activities in a specific environment.

At present, the school competitive sports in our country is an important part of competitive sports. From the concept analysis, school physical education is to further narrow the concept of competitive sports.

At present, there are few researches on the coaches and athletes in school competitive sports in our country. Most of the researches focus on the relationship and function between coaches and athletes in competitive sports

## **3. METHODOLOGY**

### **3.1 Sampling Technology**

The researchers used the 20-fold rule to calculate the sample size to ensure that there were at least 20 research units per study dimension. There are 12 dimensions involved in this study, so the sample size is calculated as the number of dimensions multiplied by 20. The original plan was to have a sample size of 240.

Considering the sample-missing rate, the researchers increased the sample size to 380 student-swimming athletes in Fujian Province, eventually issuing 380 questionnaires and recovering 363.

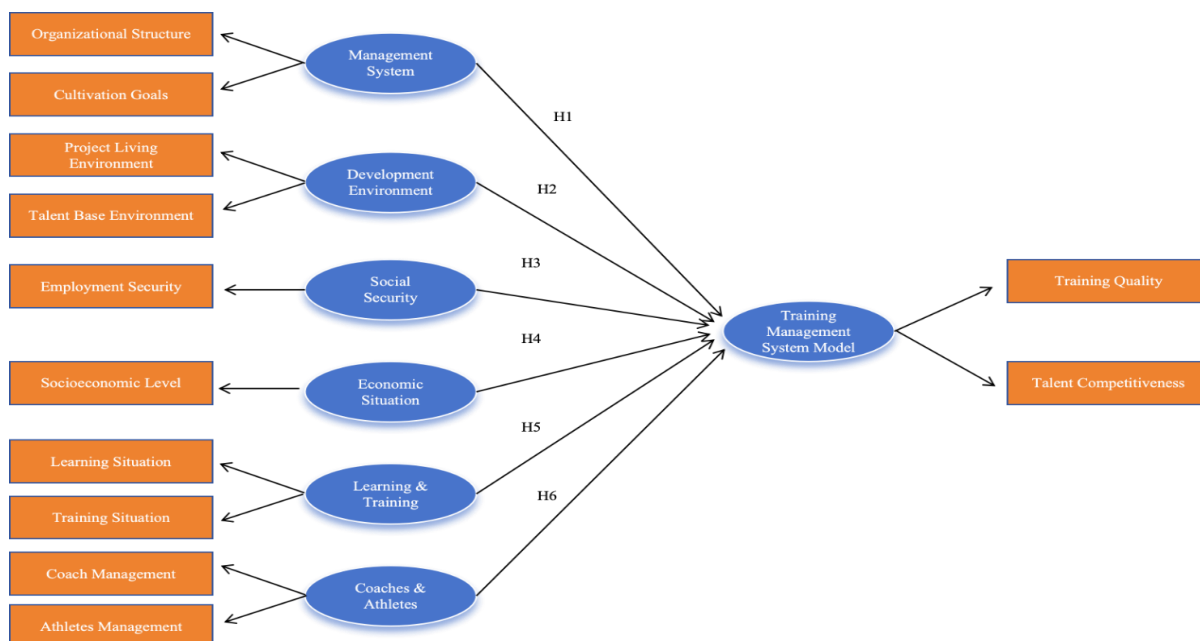


Figure 1: Research Conceptual Framework

### 3.2 Data Analysis

This study explains the methodology for analyzing measurement models and structural models of reflective assemblies using a newly developed second-generation<sup>54</sup> multivariate statistical technique called PLS-SEM (Partial Least Squares-Structural Equation Modeling). Subsequently, the researchers used a newly invented statistical tool, smartPLS4 version analysis.

## 4. RESULTS AND FINDINGS

### 4.1 Descriptive Analysis

#### 4.1.1 Respondents' Background

Table 1: Respondents' Background

	Value	Value	Frequency	Percent
<b>Gender</b>	0	<b>Female</b>	180	49.6
	1	<b>Male</b>	183	50.4
<b>Age</b>	1	11-12 years old	55	15.2
	2	13-14 years old	54	14.9
	3	15-17 years old	105	28.9
	4	18 years old or above	149	41
<b>Area</b>	1	Eastern Fujian	69	19
	2	Southern Fujian	66	18.2
	3	Western Fujian	69	19
	4	Northern Fujian	84	23.1
	5	Central Fujian	75	20.7

As can be seen from the figure above, the proportion of male and female athletes in the sample is similar, most of the participants are over 18 years old, and the student swimming athletes from Fujian Province in the survey are more average.

#### 4.1.2 Sample Data

The 49 items of data in the questionnaire were statistically analyzed, including the number of cases, the minimum value, the maximum value, the average value, the standard deviation, the skewness and the kurtosis, to verify whether the information obtained by the survey obeyed the normal distribution.

Whether the data follows, the normal distribution will have a crucial impact on the subsequent analysis. After statistical analysis, it is found that the data distribution is relatively normal.

#### 4.2 Path Coefficient Size Significance

Path coefficient is an index to measure the strength of direct relationship between variables in structural equation model.

It reflects the degree to which a unit change in one variable affects the other, and is the weight when the path in the model connects two potential variables.

In a path model, each path has a path coefficient that quantifies the relationship between variables.

**Table 2: The Results of the Significance Test of the Path Coefficient of the Structural Equation Model in this Study**

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	Significant level	P Values
CAA -> SATM	0.313	0.313	0.039	8.028	***	0.000
DE -> SATM	0.311	0.307	0.040	7.706	***	0.000
ES_ -> SATM	0.203	0.203	0.037	5.527	***	0.000
LT -> SATM	0.146	0.151	0.038	3.826	***	0.000
MS -> SATM	0.094	0.095	0.040	2.348	**	0.019
SS -> SATM	0.126	0.128	0.036	3.450	***	0.001

As shown in the table above.

These data indicate that the factors of coaches and athletes, developmental environment, employment security, learning and training, and social security have a significant effect on swimmers' training management.

### 4.3 Theoretical Model Results

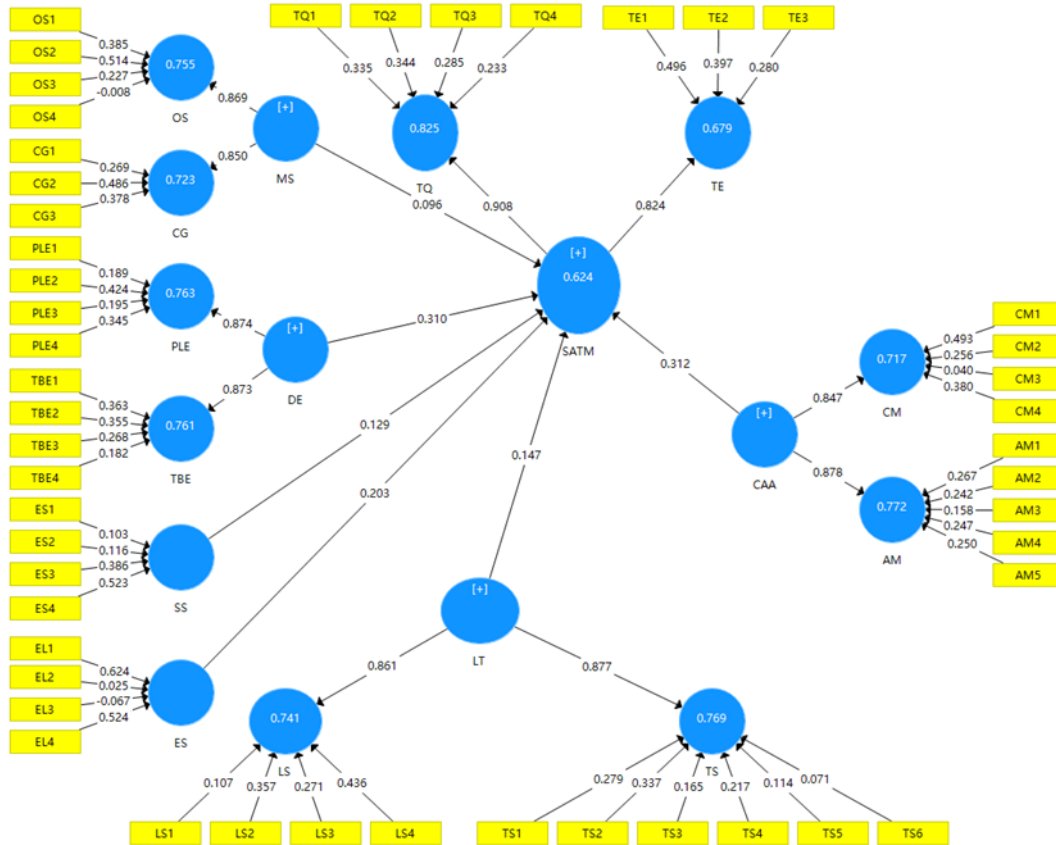


Figure 2: Theoretical Model Diagram

## 5. DISCUSSION AND RECOMMENDATION

### 5.1 Discussion

- (1) The relationship between management system and student swimming athletes training management system

Assumption 1 is established, the standardized path coefficient of management system on student-swimming athletes' cultivation management system is 0.079. i.e., the management system has a significant positive influence on students' swimming athletes' cultivation management system, the management system has a significant positive influence on students' swimming athletes' cultivation management system, then the organization and the cultivation goal setting and implementation will cooperate with each other in the whole cultivation system to form an organic whole.

This will provide more powerful support for student swimming athletes and prompt them to realize better development in sports skills and overall quality.

- (2) Relationship between development environment and student swimming athletes' training management system

Hypothesis 2 is established, the standardized path coefficient of the development environment on student swimming athletes' training management system is 0.261, which means that the development environment has a significant positive impact on the student swimming athletes' training management system, reflected in the improvement of the project's survival environment and talent pool environment.

This will create more favorable training conditions for student swimming athletes, which will help them achieve better development in cultural learning and skill enhancement.

- (3) The relationship between social security and student swimming athletes' training management system

Hypothesis 3 is valid and the standardized path coefficient of social security on student-swimming athletes' training management system is 0.106, which means that social security has a significant positive impact on student-swimming athletes' training management system. This indicates that the social security system has a positive impact on the athlete training management system. This helps to guarantee the overall health and comprehensive development of athletes and further improve the overall level of the cultivation system.

- (4) The relationship between economic security and student swimming athletes' cultivation management system

Hypothesis 4 is established, and the standardized path coefficient of economic security on the cultivation management system of student swimming athletes is 0.170, which means that economic security has a significant positive impact on the cultivation management system of student swimming athletes.

The regional economic level and the economic strength of each executive unit have a direct and significant positive effect on the economic security of student swimming athletes. Strong economic strength can provide more and more comprehensive resources for the cultivation of student swimming athletes, thus providing better protection for the growth of student swimming athletes. This will also help to promote the whole training system towards success and sustainability.

- (5) Relationship between learning and training situation and student swimming athletes' training management system

Hypothesis 5 is valid, the standardized path coefficient of learning and training on the training management system of student swimming athletes is 0.122, which means that learning and training have a significant positive influence on the training management system of student swimming athletes, and this influence is mainly reflected in the two aspects of learning and training. These two aspects of positive influence complement each other. By emphasizing the integration of learning and training, the development system will enable student-swimming athletes to achieve both athletic excellence and academic success in their competitive careers.



This not only contributes to the overall development of the individual student, but also improves the quality and level of the entire training management system.

(6) Relationship between training subjects (coaches and athletes) and the training management system of student swimming athletes

Assumption 3 is valid, the standardized path coefficient of the cultivation subject on the cultivation management system of student swimming athletes is 0.262, and this effect mainly involves both coaches and athletes.

The positive influence of the training subject on student-swimming athletes' training management system is mainly reflected in the coaches' professional ability and coaching ability, and the athletes' active participation and self-driven.

The positive influence of these two aspects will jointly promote the cultivation management system of student swimming athletes in Fujian Province to realize the goal of comprehensively cultivating student swimming athletes and promote the comprehensive and sustainable development of competitive level and comprehensive quality.

## 5.2 Recommendation

The strategy of perfecting the model of student swimming athletes training management system in Fujian Province should perfect the management system and promote the overall sustainable development of swimming events. Optimize the development environment and improve the development foundation of student swimming athletes.

We will improve the social security system and enhance our capacity for overall planning and coordination. Multi-dimensional implementation of economic security, improve the comprehensive ability of athletes.

Deepen the "integration of sports and education" to ensure the all-round development of student swimming athletes in Fujian Province. Strengthen the main position of coaches and athletes, and establish a solid foundation for improving the training management system.

## 5.3 Future Research

The influencing factors of the training management system of student swimming athletes in Fujian Province are complex and extensive.

Therefore, the training management of student swimming athletes in Fujian Province should be regarded as an organic whole and cannot be analyzed separately.

From the practical point of view, this paper explores more potential influencing factors and optimizes the model of student swimming athletes training management system in Fujian Province, so as to further improve the model of student swimming athletes training management system in Fujian province and provide reference for the establishment of models in other provinces.

## Reference

- 1) Aquilina, D. (2016). A study of the relationship between elite athletes' educational development and sporting performance. In *Delivering Olympic and Elite Sport in a Cross-Cultural Context* (pp. 37-55). Routledge.
- 2) Huang, W., & Peng, Y. (2018). A comparative study on the management system of high-level student swimming athletes in Chinese and American universities. *Collection*, 4(184), 44-45.
- 3) Kang, B., Zhang, E., Liu, L., et al. (2022). Review and practice innovation of the dilemma of protection of professional development rights of Chinese athletes. *Journal of Guangzhou Institute of Physical Education*, 42(05), 75-83.
- 4) Shi, W., & Mao, L. (2009). Comparative study on management mode of school competitive sports in developed countries. *Journal of Beijing Sport University*, 32(10), 25-30.
- 5) Smith, J., & Johnson, A. (2018). Defining clear objectives and quality management in student swimming athletes development systems. *Journal of Sports Science and Coaching*, 25(2), 123-145.
- 6) Tao, R., Gong, B., & He, Z. (2010). Training of high-level athletes in universities. *Journal of Beijing Sport University*, (10), 86-89.
- 7) Wang, L., & Cao, G. (2015). Cultural literacy training of Chinese competitive athletes. *Sports Culture Guide*, (5), 7-12.
- 8) Wang, X., & Li, W. (2020). Research on the contradiction between training and development in learning organizations. *Journal of Organizational Management*, 30(20), 45-48.
- 9) Wu, J., Deng, S., & Lian, Z. (2010). The sociological attribution of training competitive sports talents in American schools. *Sports Culture Guide*, 11(97-99).
- 10) Yang, M., & Wu, Y. (2021). The value of school sports competition system under the background of physical education integration, the dilemma and the way to improve. *Guide of Sports Culture*, 10(96-102).
- 11) Zhang, L. (2014). The revelation brought by the new rise of Russian national competitive basketball. *Journal of Beijing Sport University*, (10), 130-135.
- 12) Zhao. (2007). A comparative study of school physical education in China, America, and Japan. *Journal of Beijing Sport University*, 30(51), 15-17.
- 13) Zhong, B., & Li, N. (2022). Strengthening youth sports and deepening the reform and development of sports schools under the background of sports education integration. *Journal of Tianjin Institute of Physical Education*, 37(06), 672-679.