



An Instructional Model for Physical Education in the Next Era for Secondary School

Zhu Jinyuan¹, and Wisute Tongdecharoen²

Faculty of Sports Science and Technology, Bangkokthonburi University, Thailand

¹Email: zhujinyuan1210@gmail.com, ORCID ID: <https://orcid.org/0009-0008-5554-2866>

²Email: wisute.ton@bkkthon.ac.th, ORCID ID: <https://orcid.org/0009-0008-5233-7533>

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Abstract

Background and Aim: Over the past three years of the COVID-19 pandemic, both the external sports environment for youth physical exercise and the national education policy landscape have undergone significant changes. In light of these developments and to align with physical education instruction in the next era, ensuring high-quality physical education, and promoting the physical fitness of young individuals, this study aims to construct a physical education instructional model "CISSO" (collaborate, input, school, student, output) to better regulate and optimize the process of physical education learning management and improving the quality of learning management.

Methods: This study was future research conducted with phase 1 exploring the problem by reviewing literature and 5 experts through Semi-structured interviews, the PESTEL model, and the SIPOC model to analyze influencing factors, to draft physical education instructional concept model; phase 2 by questionnaires and modified Delphi to construct physical education instructional model "CISSO"; phase 3 connoisseurship to determine and evaluate the rationality of the CISSO model.

Results: The CISSO Model contains factors of Collaborate, Input, School, Student, and Output such as: (1) Collaborate: a collaborative educational approach guided by the government, led by schools, and supported by social organizations and families. (2) Input: The key to governing school physical education management is to take more measures to increase comprehensive "Input" in school physical education learning. (3) School: The CISSO model places a significant emphasis on aligning with the Curriculum Standards (2022 Edition), and revolves around key components such as "learning, practicing, competing, and evaluation," resulting in a new and cohesive state of physical education. (4) Student: accentuates the subjectivity of students, with a pronounced focus on fostering their psychological development through sports education, thereby progressively instilling positive exercise routines. (5) Output: It holds the promise of driving improvements in students' physical abilities and fostering a greater sense of contentment among parents with the school's physical education initiatives.

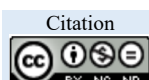
Conclusion: By implementing the CISSO model, educators and policymakers can gain a deeper understanding of the intricacies involved in managing physical education during the next era of education. The findings from this study will aid in making informed and wise decisions, enabling the formulation of effective strategies to optimize the learning experience of students in this dynamic educational landscape.

Keywords: Instructional Model; Physical Education; Next Era

Introduction

Promoting the healthy development of adolescents is a shared concern worldwide. In the new century, countries across the globe are actively seeking measures to address this pressing issue and are implementing policies aimed at enhancing the health of young individuals. Despite concerted efforts, consecutive national physical health tests conducted by the Chinese government have revealed that the decline in adolescent physical fitness remains unresolved (Li, H. J., & Gui, C. Y. 2020). Experts posit that insufficient physical exercise constitutes one of the primary reasons for the general decline in adolescent physical fitness (Shimoga, Erlyana, & Rebello, 2019). The key to enhancing the physical health and fitness levels of young people lies in guiding and motivating them to actively and independently engage in sports and physical exercise (Lee, S. W., et al., 2014; Rebar, A. L., et al., 2016; Rhodes, R. E., et al., 2018; Warburton, D. E., & Bredin, S. S., 2017). Especially three years after the outbreak of the COVID-19 pandemic, entering a relatively stable next-normal stage, significant changes have occurred in the external sports environment for youth physical exercise and the national

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educational policy environment. To better guide youth participation in physical exercise, the Ministry of Education of China issued the "*Compulsory Education Physical Education and Health Curriculum Standards (2022 Edition)*" in April 2022. The country provides support for physical education from a policy level and requires schools to prioritize students, develop their physical abilities, cultivate healthy behaviors, foster sportsmanship, and improve the effectiveness of students' physical education learning. Moreover, collaboration between various stakeholders, including governments, educational institutions, families, and communities, is essential in designing and implementing effective interventions (Pan, S. W., 2022; Yin, Z. H., et al., 2022). With the advancement of education reform in the next era and to continuously enhance the value of physical education in society, including schools, parents, and communities, relevant departments are constantly undergoing sports education reform and simultaneously improving the cooperation among families, schools, and communities. According to research findings, the integration of "family-school-community" is relatively mature both domestically and internationally, but research related to sports is still relatively weak (Chu, H., 2022; Jia, X., 2021). At the same time, due to the release of *Curriculum Standards (2022 Edition)*, the effectiveness of families, schools, and communities in promoting physical education for middle school students is increasingly prominent. In the actual implementation of policies, school sports are largely limited to within the school, and there is almost a disconnect between extracurricular training and competitions in school sports. Family sports participation is largely guided by the sports habits of parents, lack of effective communication with school sports, with insufficient family integration leading to the loss of children's family sports learning. There is a lack of participation by social organizations, community sports facilities, and large public sports venues that are aimed at the entire community population and do not reflect the youth group's special characteristics.

This study focuses on Guangzhou city as an example, to explore how to enhance the efficacy of the integrated "family-school-community" physical education teaching model in the implementation of the *Curriculum Standards (2022 Edition)*, to construct an educational instructional model involving multi-party collaboration among individuals, families, schools, and society. Guangzhou is one of the Chinese cities with the highest level of socio-economic development, as well as one of the cities with the richest educational resources and the highest educational level in the country. Its secondary school physical education teaching is at the forefront of the country and represents the highest level of secondary school physical education teaching in China.

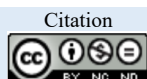
Objective

To construct an instructional model for physical education in the next era, take Guangzhou City as an example.

Literature Review

Through an extensive review of previous literature, scholars have reached a broad consensus regarding the various individual, school, family, and societal factors that influence physical education learning (Holt, Wagenaar & Saltzman, 2010). Bronfenbrenner (1986) proposed the Social-Ecological System theory, which posits that individual behavior is influenced by multiple layers of the environment. Individuals are nested within a series of interdependent environmental systems that are divided into four hierarchical levels: microsystem, mesosystem, ecosystem, and macrosystem. Scholars abroad have explored the problem of physical activity deficiency from the perspective of social ecology theory as early

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as the late 1980s. McLeroy (1988) was the first to apply social ecology theory to the field of health promotion and proposed the Social-Ecological Model, which describes the environment as multidimensional, including social, physical, and cultural aspects, all of which affect health behavior. Welk (1999) developed the Youth Physical Activity Promotion Model (YPAP), which opened up broader research avenues for promoting physical activity among adolescents. The model systematically and comprehensively summarizes the influencing factors and their interrelationships regarding adolescent physical activity. However, Spencer (2003) argues that the analysis of environmental variables in the YPAP model is not very accurate and does not consider policy variables.

The process of physical education learning management is jointly influenced and restricted by various factors, which can be simply summarized as external and internal factors. Based on the PESTEL model, sorts out the external environmental factors, indicating that the external factors affecting the management of physical education mainly include social environment (policy, economy, society), organizational environment (school), and family environment (Newell, 1986). These three aspects collectively determine the direction of future reforms in physical education management. The factors that directly affect the process of physical education management include two aspects: teacher teaching and student learning. As the main body of physical education learning, students' motivation, interest, and enthusiasm for participating in physical education learning also have a direct impact on the mode of physical education learning (Hu, X., et al., 2020; Norboev, 2021). In the context of China's progressing education reform, research about the integration of "family-school-community" has garnered growing attention. Nonetheless, the implementation of this concept within the realm of physical education remains relatively restricted and is predominantly in its theoretical development phase. While assessment standards are progressively enhancing, a substantial portion of the research predominantly revolves around theoretical frameworks and empirical investigations. This, however, is lacking comprehensive case demonstrations, particularly concerning the interplay between external contexts and individual influences. Considering the prevailing landscape of youth sports engagement in China, there remains a significant scope to enhance empirical inquiries grounded in an ecological model, encompassing multifaceted dimensions.

Conceptual Framework

The objective of this study is to construct the physical education instructional model for a secondary school in the next era, and the researcher conducts according to the following steps:

Step 1 Analyzing the influencing factors of the instructional model for physical education and constructing the concept model

(1) Conduct a literature review, and apply the PESTEL model and the SIPOC model to respectively analyze the external and internal factors affecting the management of physical education.

(2) Based on the Social-Ecological System theory and SIPOC model, an outline for Semi-structured interviews with five experts in the field of physical education was developed and conducted.

(3) Summarize and analyze the content of expert interviews, based on which a survey questionnaire on the current state of physical education learning management is formulated (including both teacher and student questionnaires).

(4) Construct a concept model for physical education instruction in the next era.

Step 2 Analyze the current situation and explore the key factors that constitute the CISSO model



- (5) Content analysis for both teacher and student questionnaires.
 - (6) Analyzing the current situation of physical education instruction and exploring the reasons for the gap with the ideal state.
 - (7) Modified Delphi to explore the key factors that constitute the CISSO model.
- Step 3** Construct and Verify the physical education instructional model “CISSO”.
- (8) Applying Connoisseurship to test the validity of the CISSO model.

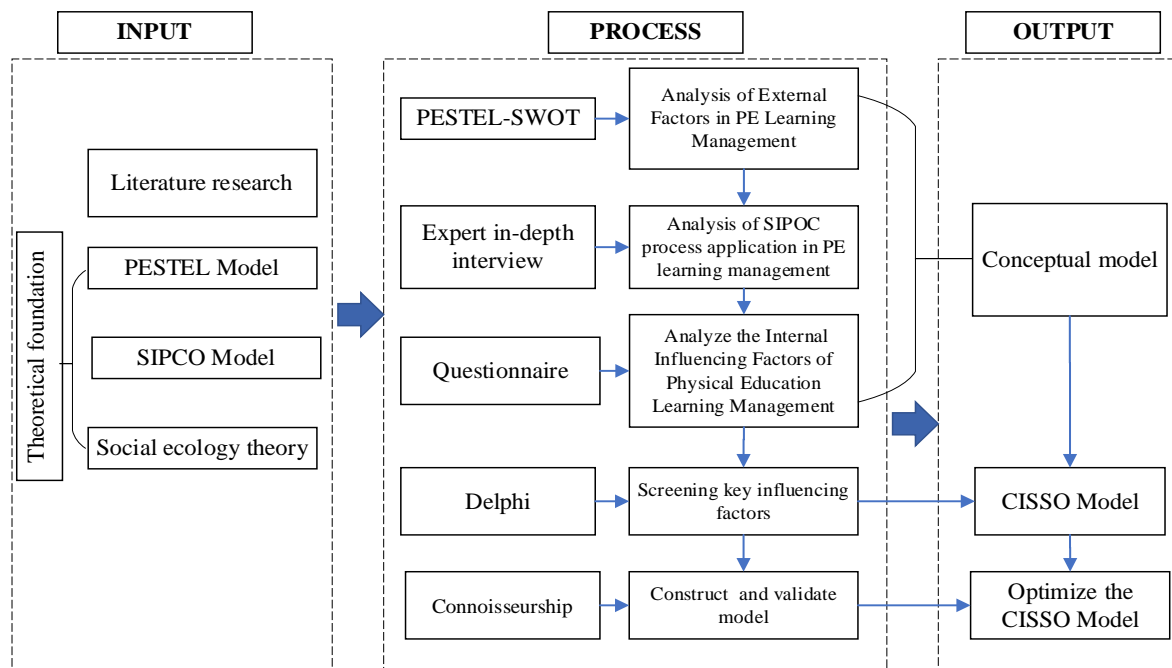


Figure 1 Conceptual Framework

Methodology

This study aims to explore the factors that affect physical education learning among secondary school students and to construct a physical education learning management model. Based on a literature analysis, a questionnaire on the current status of physical education learning for secondary school students (including student and teacher questionnaires) was produced according to the research purpose and distributed to students and teachers to investigate the current status of physical education learning and influencing factors. Then, a revised Delphi method was used to determine the influencing factors.

Questionnaire

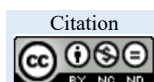
Population: According to the "Statistical Bulletin on the Development of Education in Guangzhou in the 2021 School Year", as of 2021, there are 427 secondary high schools in Guangzhou city, with 408,000 students and 32,500 full-time teachers.

Samples: Based on the basic principle of simple random sampling, if the sampling error is controlled within 5%, the sample size should exceed 400, which can achieve a reliability of 95%. In this study, 10 schools were conveniently sampled from 427 secondary schools in Guangzhou city, 8 PE teachers and 50 students of each school were randomly selected as survey subjects for the study. In the end, 62 effective teacher questionnaires and 483 student questionnaires were recovered.

Modified Delphi Method

This study aims to utilize the Modified Delphi Method as a survey and research tool in

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the field of physical education. To ensure the reliability and diversity of expert opinions, the selection of experts is a crucial step in the process. Referring to Goodman's recommendation (1987) that the number of experts should be between 15 to 50, we opted to include 19 experts in this study. These experts were carefully chosen based on specific criteria to guarantee their suitability and expertise in the domain of physical education research. The criteria for expert inclusion are as follows: (1) Possessing more than 15 years of experience in relevant research work in physical education with a senior professional title or above; (2) Holding over 10 years of experience in teaching management work in secondary schools as administrators; and (3) Having more than 10 years of experience as physical education teachers in secondary schools. The chosen group of experts represents various aspects of the field, including theoretical and practical application knowledge, to enhance the quality and diversity of insights obtained through the Modified Delphi Method survey.

Research Tools: (1) Phase 1 explore the problem by reviewing the literature and 5 experts through Semi-structured interview, the PESTEL model to analyze external influencing factors, the SIPOC model to analyze internal influencing factors, and then the physical education instructional concept model. (2) Phase 2 by questionnaires and modified Delphi to construct physical education instructional model “CISSO”. (3) Phase 3 connoisseurship to determine and evaluate the rationality of the CISSO model.

Data Collection: Collect status questionnaire: Questionnaires were distributed according to the sampling range, and the questionnaire form of the “Questionnaire Star” network was adopted. Questionnaire Star is an online platform, which can be used for surveys, exams, or voting. In the end, a total of 62 teacher questionnaires and 483 student questionnaires were ultimately collected. Collection of influencing factors: Compiled the *Evaluation Scale of Influencing Factors of Physical Education Learning Management for Secondary School Students in the next era (first round)* and sent the questionnaire to 19 experts in the field of physical education. The results of the first round of questionnaires will be counted and fed back to the experts, and the second round of questionnaires will be distributed. After two rounds of screening, the influencing factors of physical education learning management were finally determined.

Data Analysis: This study mainly used Software SPSS 22.0 for data analysis. Finally, at the end of a Delphi study, participants’ responses are summarized using the statistical average (mean or median) as a fundamental indicator in this study, facilitating the determination of the relative importance of specific indicators, it indicates a relatively high level of consensus among experts (Hsu & Sandford, 2007; Rowe & Wright, 1999). When using measures of dispersion, a precisely defined Median (Mdn) ≥ 3.5 or Inter-quartile range (IR) < 1.5 for a five-level rating scale is commonly used to define consensus (Von Der Gracht, 2012).

Results

Constructing the physical education instructional model

Based on the analysis of the above influencing factors, and form a Delphi expert questionnaire with 43 items. The main body divides the influencing factors into six aspects: government, student, teacher, school, family, and society. After the first round of survey, the results were fed back to the experts, and the above indicators to be deleted were retained in the second round of questionnaires and scored again by the experts. It indicates that the expert evaluation is consistent, and the consultation can be stopped. Finally, 25 factors that affect the construction of the PELM learning management model in the next era are determined.

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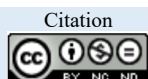




Table 1 Factors of affect the construction of the physical education instructional model in the next era

Serial number	Factors	Mdn.	IR.	CV
Government level	Educational development level	4	1	0.1148
	Educational environment	5	1	0.1132
	National Education Policy	5	1	0.1071
	School sports fund investment	4	1	0.1869
Student Level	Learning interest	5	1	0.1289
	Learning motivation	5	1	0.1107
	Learning attitude	4	1	0.1148
	Level of sports skills	4	1	0.1366
Teacher level	Sports Morality	4	1	0.1533
	Teaching Implementation Ability	5	1	0.1132
	Teacher Professionalism	4	1	0.1499
	Personal professional development	5	1	0.1071
School level	Leader's attention	4	1	0.1366
	School management	5	1	0.1107
	Education resources	5	1	0.1369
	Teaching objectives	4	1	0.1373
	Teaching organization form	4	1	0.1147
	Teaching content	4	1	0.1135
	Teaching evaluation	4	1	0.1347
Family level	Teaching conditions	4	1	0.1135
	parental satisfaction	4	1	0.1319
	Family support	4	1	0.1373
Social level	Family sports interaction	4	1	0.1447
	Social sports atmosphere	4	1	0.1147
	Social organization support	4	1	0.1347

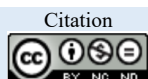
Mdn.>3.5, IR<1.5, CV<0.25

After statistical analysis of the data from the experts' second feedback, it can be seen from Table 1 and Table 2, that the consistency coefficient of the experts on the factors affecting factors of affect the construction of the physical education instructional model is $W=0.631$ (W between 0.6 and 0.8 indicates a high level of consistency), P values less than 0.01 ($p = 0.000$). Therefore, experts have a high recognition of the 25 factors that influence the construction of the learning management model.

Table 2 Consistency Test Statistical of the influencing factors for the Delphi

Expert consultation	Consistency coefficient (<i>Kendall W</i>)	Degrees of freedom (df)	Significance (P value)
Factors	0.631*	43.337	0.001

$W>0.5$ with *





The improvement measures were developed based on the identified causes, leading to the creation of the physical education instructional model, as Figure 2.

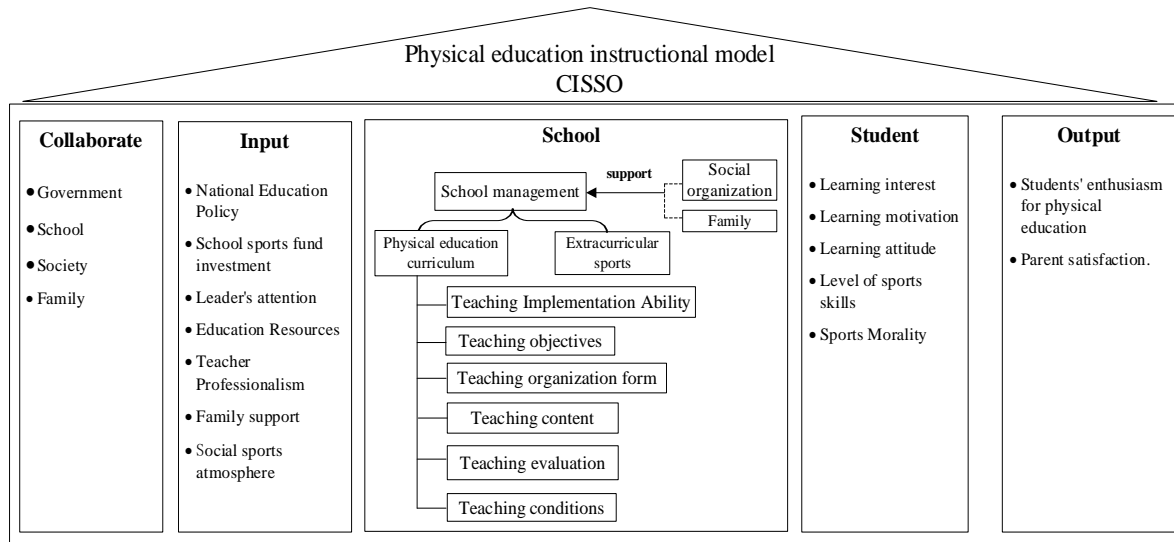


Figure 2 physical education instructional model “CISSO”

Collaborate: Physical education learning management involves various suppliers such as the government, schools, and social organizations. The policy guidance and support from the government, the emphasis on physical education by school leaders, and the necessary support from social organizations are all crucial.

Input: With the guidance and support of policies, sufficient government, school, and social resources have been invested in funds, teaching resources, and human resources to continuously improve the investment status of middle school sports learning management, ensuring funding and effectively expanding channels for funding. The internal and external environment of secondary school sports learning management is continuously optimized to lay a foundation for improving management levels. Schools cooperate with government departments and social organizations to build regional sports teaching resource platforms and promote the equalization of high-quality physical education resources.

School: The organizational management of schools, the development and implementation of physical education programs and extracurricular sports activities, and the support from social organizations and families are all parts of the process. In this process, the school should implement national policies, seize opportunities such as education informatization and the implementation of new curriculum standards, strengthen organizational management, continuously optimize the process of physical education, implement new curriculum standards in teaching practice, develop characteristic sports programs according to local conditions, establish a sound physical education supervision and evaluation system, and gradually optimize the "learn-practice-compete-evaluate" teaching system. At the same time, by constructing an integrated teaching mode of in-class and extracurricular activities, the integration of family and community sports should be promoted. Additionally, it is necessary to actively seek social support to solve the problem of insufficient physical education resources in schools, realize the sharing of high-quality regional physical education resources, and carry out rich and diverse extracurricular sports activities.

Student: From the national level, the management of secondary school physical



education learning is an important means for the country to improve the physical health of adolescents. From the school level, physical education learning management in school is an important part of school education and teaching. From the perspective of students, physical education learning management is an important guarantee for improving students' physical health, enhancing students' initiative in physical education learning, and cultivating students' core sports literacy.

Output: All the work of secondary school physical education learning management revolves around students, with the pursuit of promoting the comprehensive development of students' physical and mental health. At the same time, parents' satisfaction with their children's physical health development and the effectiveness of physical education learning can also reflect whether the physical education learning management model is effective.

Discussion

Collaborate: The CISSO model underscores the establishment of a cooperative educational ecosystem, steered by governmental policies, spearheaded by schools, and bolstered by social organizations and familial structures. This culminates in a synergistic management model encompassing schools, families, society, and the government (Fang & Shi, 2020). Building upon this foundation, an escalation in the allocation of funds for school physical education and the promotion of balanced development of superior physical education resources facilitate the diversification of educational input and equilibrium of educational resources (Huang, Yu, & Wu, 2021).

Input: The CISSO model emphasizes increasing the investment in school physical education learning management through various measures, addressing issues such as funding, physical education teacher allocation, sports venue facilities, use of online teaching resources, research activities of new curriculum standards (2022 Edition), and optimization of teaching projects. Sports participation can promote the generation of social capital and has the potential to become an important means of cultivating social capital (Coalter, 2007; Putnam, 2000). Compared with previous management models, the CISSO model emphasizes the need to expand channels for school sports funding, encourage and guide social capital to support school sports development, and increase investment through multiple channels (Howie & Stevick, 2014; Huang, Zhang, & Ge, 2019).

School: CISSO model Strengthen the coordination between in-school and out-of-school activities, and emphasize that physical education activities should be centered around students. Whether it is the content of the physical education curriculum, the setting of extracurricular sports activities, or the selection of teaching methods, it should all adhere to the basic philosophy of student-centeredness (Zhang, 2017; Chen, 2020). In terms of setting educational content, it is important to focus on the differences in students' interests and hobbies to set teaching projects that are novel, fashionable, and meet the learning needs of students. Through unit teaching, students are taught comprehensively to reduce the influence of test-oriented education on their physical education learning (Li, et al., 2021). At the same time, attention should be paid to differences in students' physical fitness, skill levels, and other aspects, and more scientific methods such as hierarchical teaching methods should be introduced to provide differentiated teaching for students in different situations (Liu, 2020; Gong, 2021). In addition, it is necessary to quickly promote the transformation of the role of physical education teachers from teaching dominators to teaching guides and supporters, guiding students to develop learning plans based on their actual situation cultivating exercise habits, and cultivating students' good exercise habits. The CISSO model guides schools to establish a learning



community of physical education teachers (Hord, 2004; Thomas, Wineburg, Grossman, Myhre & Woolworth, 1998). It leverages the endogenous power of physical education teacher development, promotes the overall and comprehensive development of physical education teachers, and realizes the leadership and professional development of physical education teachers through professional autonomy and development assistance (Hargreaves, Stoll & Louis, 2007; Zhang & Sun, 2022).

Student: CISSO emphasizes the student-centered approach, placing importance on promoting students' psychological development through physical education and gradually cultivating good exercise habits. The program aims to stimulate students' interest in physical education, cultivate good learning motivation, and cultivate students' core competencies in physical education. Based on the cultivation of certain athletic abilities, CISSO aims to continually improve students' moral and behavioral levels in physical education, and develop a lifelong awareness of physical health and fitness.

Output: Based on cultivating the students' core physical literacy, it is suggested to assist them in acquiring 1-2 athletic skills (Zhang, 2019; Shao, et al., 2020; Ji, 2022). In addition, family income and structure are key factors in determining the likelihood of children's participation in youth sports (Kirk et al., 1997), family cultures were the chief factor underpinning individuals' propensities to play sports (Birchwood, Roberts & Pollock, 2008). Parents' satisfaction is also one of the indicators for measuring the effectiveness of the CISSO model.

Recommendation

Collaborate

1. Establish a working mechanism for collaborative supply of government and other social forces.
2. Ensure funding for physical education in schools, with a reasonable allocation of expenditure for physical education from the general funds of secondary schools, giving priority to supporting physical education in rural schools.

Input

1. Incorporate school sports expenditures into the annual education budget to ensure consistent funding.
2. Enhance the allocation and reinforcement of physical education faculty according to the established student-teacher ratio standards.
3. Facilitate the coordination and integration of nearby community sports facilities, with designated hours for facilitating physical education lessons and after-school sports activities for secondary school students.
4. Devise and implement regional platforms for physical education resources to ensure comprehensive access to high-caliber educational materials.
5. Refine school physical education content to align with the specific requirements of students.

School

1. Heightened focus on the professional advancement of physical education instructors.
2. Enhanced integration of the new curriculum standards into daily physical education routines.
3. Recommendations are put forth for schools to meticulously analyze the new curriculum standards to formulate and implement unit-based teaching strategies.



4. Construct a comprehensive and inventive physical education curriculum that encompasses elements such as learning, practicing, competing, and assessment. 5. Advocating for schools to augment the array of extracurricular sports offerings. 6. Expedited amalgamation of home, school, and societal aspects.

Student

1. Respect for Development Laws: Consideration for students' physical and mental development laws and personalized needs is essential in physical education.

2. Scientific Development: Physical education should adopt scientifically developed approaches to ensure effective learning.

3. Hierarchical Teaching: Implementing hierarchical teaching involves categorizing students based on their physical fitness and sports foundation levels.

4. Differentiated Teaching: Differentiated teaching within hierarchical levels tailors instruction to individual students' abilities and needs.

5. Comprehensive Development: Hierarchical and differentiated teaching enhances students' holistic development.

6. Progress and Improvement: Students of different levels can continuously progress and improve within their existing skill range.

Output.

1. Enhancing the depth and breadth of physical education curriculum within educational institutions.

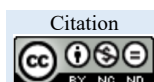
2. Fostering parental involvement and endorsement of students' participation in physical education activities.

3. Adhering to the principles governing students' physiological and psychological growth, and accommodating their unique requirements.

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