

Research on the Path to Enhancing the Level of Extracurricular Sports Activities in Primary Schools

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Abstract

Against the dual policy backdrop of the comprehensive implementation of the "Healthy China 2030" strategy and the deep rollout of the "Double Reduction" policy, school's extracurricular physical activity for primary school students has become a core educational vehicle for promoting students' physical and mental health, shaping well-rounded personalities, and enhancing overall literacy. This paper, using the systematic review method as the core research approach, thoroughly reviews and integrates domestic and international research, policy documents, and practice cases on primary school students' extracurricular physical activity in school over the past decade. By combining empirical survey data with theoretical analysis, it accurately diagnoses three prominent issues currently present in China's primary school extracurricular physical activities. The study clearly identifies that the core bottlenecks in improving primary school students' extracurricular physical activity levels in school are concentrated in three aspects. The study specifically recommends establishing a full-process closed-loop management system, providing solid evidence-based support and a practical, replicable, and promotable pathway to break the "low-quality, low-efficiency" vicious cycle in primary school extracurricular physical activity. This aims to promote the high-quality development of primary school physical education and the continuous improvement of adolescent physical health in China.

Keywords

Level of Extracurricular Sports Activities; Primary Schools; Role of Physical Education Teachers; Three-dimensional improvement model.

1. Introduction

1.1. Research Background

As China's education sector enters a new stage of high-quality development, the educational concept of "health first" has been incorporated into the core principles of educational policy. The "Healthy China 2030" Planning Outline explicitly proposes the strategic goal of "implementing a youth physical activity promotion plan, cultivating young people's interest in sports, basically enabling adolescents to master at least one sports skill proficiently, and ensuring that students have no less than one hour of physical activity at school every day." At the same time, the comprehensive implementation of the "Double Reduction" policy provides sufficient time guarantees and space support from the institutional level for extracurricular physical activities for primary school students, effectively alleviating the practical problems of excessive academic burden and the crowding out of physical activity time. This has created unprecedented policy opportunities and development conditions for the regularization, standardization, and high-quality implementation of extracurricular physical activities in schools.

Driven by the policy benefits, primary schools nationwide generally implement the basic requirement of "one hour of exercise every day," and forms of extracurricular physical activity such as extended breaks, post-class sports services, and after-school sports clubs have gradually become routine components of school education and teaching. However, in terms of practical outcomes, full coverage of time guarantees has not resulted in a corresponding improvement in physical health. The superficial prosperity of activity implementation contrasts sharply with the stagnation of students' physical health levels. According to the 2022 National Student Physical Health Monitoring data released by the Ministry of Education, 83.6% of primary schools strictly ensure that students have one hour of extracurricular physical activity per day, but the pass rate for physical fitness tests among primary school students is only 64.2%, and the excellence rate is less than 15% [1]. Issues such as overweight, obesity, and poor eyesight remain prevalent, fully exposing the deep-seated problems in current extracurricular physical activities, including "emphasizing form over effectiveness," "emphasizing duration over intensity," and "focusing on implementation over quality." There is a serious gap between "time-space guarantee" and "health benefits."

This gap is not caused by a single factor but is the result of multiple intertwined issues, including activity design, resource supply, teacher capacity, management mechanisms, and home-school collaboration. For a long time, primary school physical education in China has focused on classroom teaching, with extracurricular physical activities considered as "accessories" to classroom instruction, lacking systematic design, professional implementation, and scientific evaluation. At the same time, real challenges such as insufficient venues and equipment, a shortage of full-time physical education teachers, rough management procedures, and excessive safety concerns further restrict the improvement of activity quality. Against this backdrop, systematically reviewing the development status of extracurricular physical activities for primary school students, accurately identifying bottlenecks and constraints, and constructing evidence-based improvement paths based on scientific theory have become important issues that urgently need to be addressed in the current reform of primary school physical education and the promotion of adolescent health.

1.2. Significance of the Study

1.2.1. Theoretical Significance

This study integrates Self-Determination Theory, the concept of Physical Literacy, and Social Ecological Systems Theory for the first time to construct a three-dimensional quality enhancement model suitable for extracurricular physical activities of primary school students in China, enriching the theoretical system for improving the quality of school physical activities. By systematically reviewing domestic and international research findings, it clarifies the core connotations, evaluation criteria, and influencing mechanisms of extracurricular physical activities for primary school students, filling the gap in evidence-based research in this field in China. It also clarifies the role positioning and competency requirements of physical education teachers in activity implementation, providing a new research perspective for the theory of professional development of PE teachers and laying a theoretical foundation for subsequent related academic research.

1.2.2. Practical Significance

Based on the real-world bottlenecks diagnosed from empirical data and the proposed evidence-based pathways, this study can directly provide primary schools with operable, feasible, and quantifiable practical guidelines for organizing extracurricular physical activities. The proposed strategies, such as closed-loop management systems, hierarchical activity design, and home-school-community collaboration models, can effectively overcome practical problems schools face, such as monotonous content, insufficient resources, and chaotic management. It helps schools shift extracurricular physical activities from "task completion" to "quality

improvement and efficiency enhancement," effectively improving students' physical health, sports skills, and core literacy, aligning with the educational goals of the "Healthy China 2030" and "Double Reduction" policies.

1.3. Research Ideas and Framework

This study follows the logical approach of "current situation diagnosis — bottleneck analysis — theoretical support — pathway construction — practical recommendations," employing multiple research methods including literature review, empirical data analysis, case studies, and comparative research to construct a complete analytical framework. First, by reviewing policy documents and empirical data, it comprehensively presents the current status of extracurricular physical activities for primary school students. Second, it deeply analyzes the core bottlenecks in activity improvement from the dimensions of content, resources, and management, with a focus on the role dilemmas of PE teachers. Third, it explains the theoretical support provided by Self-Determination Theory, the Physical Literacy concept, and the Social Ecological Model for activity enhancement, summarizing feasible experiences from domestic practice cases. Fourth, by drawing on mature experiences from developed countries such as the United States, Japan, and Northern Europe, it extracts localized insights. Finally, it constructs a three-dimensional quality enhancement model, proposing specific pathways from the perspectives of design, guarantee, and implementation, and provides targeted implementation strategies to form a complete evidence-based improvement system.

2. Current Situation and Bottleneck Analysis

2.1. Current Situation of On-Campus and Extracurricular Physical Activities for Primary School Students

Under the dual promotion of the "Healthy China 2030" initiative and the "Double Reduction" policy, on-campus and extracurricular physical activities for primary school students in China have achieved a fundamental transition from "none" to "existent" and from "scattered" to "routine." Institutional coverage of "one hour of exercise every day" has basically been realized, but the quality and implementation effectiveness of activities are still at an early development stage, showing the typical characteristics of "wide coverage, low quality, and homogeneity."

From the perspective of activity coverage, the nationwide implementation rate of on-campus and extracurricular physical activities in primary schools has exceeded 98%. Major recess sports activities and after-school service sports periods have become core carriers. Some schools have also set up extracurricular sports clubs, class sports activities, and fun sports games as supplementary forms. The duration of activities is basically stable at 60–90 minutes per day, meeting the basic requirements of the policy. However, in terms of activity forms and quality, most schools are still at the initial stage of "completing tasks and coping with inspections," without truly achieving the educational goal centered on students' healthy development.

In terms of activity content design, issues of homogeneity and formalization are extremely prominent. Research shows that in current on-campus and extracurricular physical activities for primary school students, traditional mechanical activities such as broadcast gymnastics, running exercises, and group walking account for 78%, while new interest-based activities such as rock climbing, orienteering, frisbee, and flag football account for less than 5% [2]. The implementation rate of traditional ethnic sports such as martial arts, shuttlecock, dragon and lion dance is only 8%. At the same time, activity forms remain fixed throughout the year, lacking dynamic adjustments based on seasonal changes, students' age characteristics, and interest needs. In winter, activities are mainly simple running and jumping; in summer, due to hot

weather, activity intensity drops significantly. The repetition rate of annual activity content exceeds 60%, making it difficult to stimulate students' interest in exercise.

In terms of activity organization, a "one-size-fits-all" model dominates. Research indicates that 73% of primary schools do not design hierarchical and categorized activity plans according to students' age, physical fitness, and exercise ability, conducting the same content, intensity, and format of activities school-wide [3]. This model causes younger students to be unable to handle the uniform activity intensity due to undeveloped physical growth, leading to insufficient exercise load; older students, on the other hand, lose interest rapidly due to overly simple content and lack of challenge, resulting in sustained decline in participation enthusiasm, ultimately creating a dual dilemma of "younger students unable to move, older students unwilling to move."

At the level of activity evaluation mechanisms, issues such as single evaluation standards and one-sided evaluation dimensions are common. Si Qi pointed out that 91% of primary schools evaluate the effectiveness of on-campus extracurricular physical activities only based on student attendance and the number of activities conducted, completely ignoring core evaluation indicators such as exercise load, skill acquisition, interest development, and emotional growth, resulting in activities being assessed 'only based on whether they occur, not how well they are conducted.' [4] Large-scale surveys in a certain province show that only 32% of students reach moderate or higher exercise loads during activities, while 68% of students are engaged in low-intensity activities, fully exposing the severe lack of scientific and professional activity design, making it impossible to achieve the core goal of improving physical health.

2.2. Core Bottleneck One: Prominent Constraints in Resource Supply

Insufficient resource supply is a fundamental and crucial bottleneck restricting the improvement of primary school students' extracurricular physical activity levels. This is specifically reflected in four aspects: space and venue, teaching staff, equipment, and management resources, forming an all-round resource constraint.

2.2.1. Severe Shortage of Space and Venue Resources

Venue space is the basic carrier for carrying out physical activities, but primary schools in both urban and rural areas in China generally suffer from insufficient activity area per student and rudimentary facility conditions. Research by Li Jingguo (2022) shows that the average activity area for urban primary school students is only 1.2m², while rural primary schools, restricted by school conditions, have even less per student, only 0.8 m², far below the national standard for primary school physical activity area per student. The severe lack of venue space directly forces activity forms to be simplified, with most schools only able to carry out low-intensity walking and running activities that do not require large areas. Skill-based and competitive projects like basketball, football, and gymnastics cannot be normally conducted. Field investigations in a county-level primary school show that 65% of classes, due to limited space, can only conduct simple activities in classrooms, corridors, or school walkways, with skill-based physical education activities at a zero implementation rate, severely restricting students' learning and improvement of athletic skills.

2.2.2. Severe Shortage of Teaching Staff

Full-time physical education teachers are the core guarantee for the professional implementation of extracurricular physical activities in schools, but China has long faced a huge shortage of primary school PE teachers and a lack of professional capacity. Research by shows that the national shortage of full-time primary school PE teachers reaches 150,000, and 63% of primary schools rely on homeroom teachers or non-PE subject teachers in Chinese, Math, etc., to also guide extracurricular physical activities. Non-professional teachers lack systematic

physical education teaching skills, exercise load regulation abilities, and safety risk prevention knowledge, showing significant shortcomings in activity design, skill instruction, and safety management. They cannot provide students with professional exercise guidance and even pose risks of safety incidents due to improper guidance.

2.2.3. Imbalance in Equipment Supply and Utilization

Sports equipment is the material foundation for carrying out sports activities, but there are currently three major issues in primary school sports equipment: 'insufficient supply, idle waste, and low level of intelligence.' Research shows that the idle rate of traditional primary school sports equipment (jump ropes, shuttlecocks, basketballs, etc.) is as high as 47%, mainly because the equipment does not match the activity content and teachers do not know how to use it properly; meanwhile, the coverage rate of intelligent monitoring and teaching devices such as smart jump ropes, fitness bracelets, and heart rate monitors is less than 12%, unable to meet the needs for precise and scientific activity design and monitoring [5]. At the same time, rural primary schools and under-resourced schools also face problems such as insufficient quantity, poor quality, and aging or damaged equipment, making it difficult to support diverse sports activities.

2.2.4. Severe Lag in Resource Management Mechanisms

The rough management of resources further intensifies the contradiction of resource shortages. A special inspection by a local education bureau found that 34% of primary schools arbitrarily occupied or diverted extracurricular activity time for cultural lessons and exams, and 21% of schools falsified activity records or fabricated activity ledgers to pass inspections; meanwhile, school sports venues and equipment lack dedicated management and regular maintenance, resulting in extremely low resource utilization rates, creating the paradox of 'resource shortage coexisting with resource waste,' which severely restricts the normalized and standardized development of activities.

2.3. Core Bottleneck Two: Overly Coarse Management and Operational Mechanisms

Management and operational mechanisms are the institutional guarantee for the high-quality implementation of extracurricular physical activities in schools. However, at present, Chinese primary schools generally face coarse management problems such as institutional gaps, insufficient coordination, and lack of risk control, further exacerbating the inefficiency of activities.

2.3.1. Lack of Specialized Management Systems

Research shows that 82% of primary schools have not established specialized management systems for on-campus extracurricular physical activities [6]. There are no regulations to follow for activity planning, organization and implementation, assessment and evaluation, or safety assurance, resulting in extreme arbitrariness. Some schools treat extracurricular physical activities as "flexible tasks"; once exams, inspections, or changes in weather occur, the activities are canceled immediately. In one primary school, for example, the entire week's extracurricular sports activities were canceled due to a suddenly organized cultural course exam, severely disrupting the continuity and stability of activities. At the same time, 67% of schools' activity plans are completely disconnected from the national physical education curriculum standards, lacking systematic and scientific design, turning them into "free-range" activities.

2.3.2. Absence of Home-School-Community Collaborative Mechanisms

Families, schools, and communities are collaborative subjects that promote students' physical activities, but currently, there is a lack of effective linkage among the three, resulting in a "school fighting alone" situation. Research shows that 76% of parents have no understanding of the content, intensity, or goals of their children's on-campus extracurricular physical activities, and

only 29% of parents have ever participated in school sports volunteer services [7]. Parental support and participation in children's exercise are extremely low. Community sports facilities, professional coaches, and sports clubs are not effectively connected to schools, and thus cannot provide supplementary support. The sports ecosystem for collaborative education between home, school, and community has yet to be established.

2.3.3. Coexistence of Excessive and Missing Safety Risk Controls

Safety is a major concern for schools carrying out sports activities, but current school safety management shows a polarization of "over-control" and "lack of management." Forty-three percent of schools, worried about sports safety accidents and potential disputes between home and school, directly cancel high-risk and fun activities such as horizontal bars, parallel bars, jumping, and confrontational events, making activities dull and less engaging. At the same time, some schools have deficiencies in safety management. Sports facilities lack regular maintenance, and safety plans are incomplete. One school, for example, had a student safety accident due to aging horizontal bars that were not timely maintained, exposing serious gaps in the safety management mechanism.

2.3.4. Lack of Teacher Training and Incentive Mechanisms

Eighty-two percent of primary schools do not include guidance for on-campus extracurricular physical activities in the specialized training system for PE teachers, and 89% of schools do not include extracurricular physical activity guidance in teacher performance evaluations and professional title assessments. This results in PE teachers lacking motivation for professional development and work enthusiasm, further exacerbating the inefficiency of activity implementation.

2.4. Core bottleneck 3: Serious formalization of activity content

Activity content serves as the core carrier of extracurricular physical activities on campus. However, the current activity content faces the formalization issues of "homogenization, low intensity, lack of interest, and no skills," which cannot meet the development needs of students. Specifically, the activity content is mainly traditional collective drills, lacking personalized, interesting, and skill-based designs; the activity intensity is generally low, unable to achieve effective loads for improving physical fitness; the activity content is disconnected from classroom teaching, failing to achieve skill connection between inside and outside the classroom; the activities lack diverse educational values such as emotional, social, and cognitive development, reducing to mere "physical activities" rather than "physical education." The implementation of such formalized activities ultimately leads to students' lack of interest in sports, failure to improve physical health, and lack of skill acquisition, forming a vicious cycle of "low quality - low efficiency".

3. Theoretical Path and Practical Exploration

3.1. Core theoretical Support

The improvement of primary school students' physical activity levels both inside and outside school cannot be achieved without the guidance of scientific theories. The three core theories of self-determination theory, physical literacy concept, and social-ecological systems theory provide comprehensive theoretical support for activity design, implementation, and evaluation.

3.1.1. Self-Determination Theory (SDT)

The Self-Determination Theory emphasizes that people's intrinsic motivation stems from the satisfaction of three fundamental psychological needs: autonomy, competence, and relatedness. When these three needs of an individual are met, their intrinsic motivation, enthusiasm, and persistence in participating in activities will be significantly enhanced [8]. Applying the Self-

Determination Theory to extracurricular physical activities in primary schools requires that the design of activities must respect students' right to autonomous choice, allowing them to independently select activity projects, forms, and partners. Through layered design and step-by-step challenges, students can gain a sense of competence in sports and experience the joy of success. Through collective activities and group cooperation, students' social relatedness needs are met. Relevant experimental research shows that in classes where students choose their own projects, their participation in sports increases by 35%, and their persistence in sports significantly enhances, fully confirming the practical value of this theory.

3.1.2. Physical Literacy Concept

This concept of physical literacy transcends the traditional sports cognition of "merely exercising the body" and requires that sports activities focus on the coordinated development of athletic ability, cognitive level, emotional attitude, and social skills. The core is to cultivate students' awareness, ability, and habit of lifelong sports. Based on the concept of physical literacy, primary school students' physical activities both inside and outside the school should not only focus on the duration and intensity of exercise, but also on the acquisition of sports skills, the improvement of sports cognition, the cultivation of positive emotions, and the shaping of cooperative spirit, so that students can achieve comprehensive development in physical, mental, social, and spiritual aspects through sports.

3.1.3. Social Ecosystem Theory

The social-ecological model posits that individual behavior is influenced by factors at multiple levels, including individual, interpersonal, organizational, community, and policy levels, and that single-dimensional interventions cannot achieve long-term improvement. When applied to extracurricular physical activities in schools, it requires the establishment of a four-in-one collaborative support system involving government, schools, families, and communities, integrating resources from multiple parties such as policies, venues, teachers, families, and society to form a comprehensive support network. An international case study shows that schools that integrate community resources to carry out extracurricular sports activities have increased student participation rates by 62%, fully demonstrating the importance of social-ecological support.

The three theories collectively point to three core characteristics of high-quality extracurricular physical activities in schools: first, meeting the standard of exercise load, with a proportion of moderate to high-intensity activities accounting for $\geq 50\%$; second, skill acquisition orientation, mastering 1-2 practical sports skills per semester; and third, social-emotional development, with a cooperation behavior occurrence rate of $\geq 70\%$, which clarifies the core standards for improving the quality of activities.

3.2. Exploration of Domestic Practical Innovation

Based on local conditions, some regions and schools in China have carried out a series of innovative practices of on-campus extracurricular physical activities, providing a feasible path to overcome the dilemma of formalization and improve the quality of activities, and have formed a replicable and scalable experience model.

3.2.1. Integrated Design Model of in-Class And Out-Of-Class Activities

The integrated design of both in-class and out-of-class activities is the core approach to addressing the disconnection between activities and classroom learning, as well as the inadequacy of skill acquisition. Shanghai has implemented the reform of "making primary school physical education more interesting", systematically integrating the sports skills and movement essentials learned in physical education classroom teaching into extracurricular physical activities such as recess and after-school services, achieving a seamless connection between classroom teaching and extracurricular practice, as well as progressive skill learning.

Practical data shows that this model has improved students' mastery of sports skills by 42%, significantly enhanced the pertinence and effectiveness of activities, and broken the disconnection dilemma of "learning skills in class but not applying them outside class".

3.2.2. Interesting Thematic Intervention Model

Fun-oriented design is the key to stimulating students' interest in sports and enhancing their participation in activities. Hangzhou has launched a special intervention project called "Happy Morning Exercise", which designs diversified activity formats such as physical fitness challenges, fun games, and skill challenges, tailored to the age characteristics of primary school students, replacing traditional and monotonous running exercises and radio calisthenics. Data shows that this project has reduced the BMI index of obese students by an average of 18.7%, and simultaneously improved students' interest in sports and physical health levels, verifying the effectiveness of the fun-oriented special intervention program.

3.2.3. Home-School-Community Collaborative Linkage Model

Collaboration among families, schools, and communities is a crucial approach to addressing resource scarcity and enhancing the reach of activities. Shenzhen has implemented the "Family Sports Check-in Program", extending extracurricular physical activities from school to home. Through various forms such as parent-child sports, family check-ins, and home-school interactions, parents are guided to participate in their children's sports activities. The practical results show that the participation rate of parents has increased from 12% to 67%, and the average daily extracurricular physical activity time for students has increased by 53 minutes, forming a positive situation of collaborative education between families and schools.

3.2.4. Modular Activity Design Pattern

Modular design is an effective method to address the issues of insufficient space and disorganized activities. The "15-Minute Fun Break" project implemented in Licang District, Qingdao, Shandong Province, divides campus space into three major modules: game area, skill area, and challenge area. Different activities are carried out in different areas, allowing students to choose and participate independently. This model has increased student participation from 68% to 94%, effectively alleviating the problems of limited space and disorganized activities, and achieving efficient activity implementation in a small space.

These practical explorations have fully demonstrated that a scientifically designed, systematically implemented, and coordinated intra-school and extracurricular physical activity program can effectively overcome the dilemma of formalization and inefficiency, achieving a fundamental leap from "time guarantee" to "quality improvement", providing valuable practical references for primary schools nationwide.

4. The Role Transformation of Physical Education Teachers

4.1. The Era's Requirements for the Role Transformation of Physical Education Teachers

Physical education teachers are the designers, organizers, instructors, and evaluators of extracurricular physical activities for primary school students, and they are the core entities responsible for enhancing the quality of these activities. With the advancement of the "Healthy China 2030" initiative and the "Double Reduction" policy, there has been a fundamental shift in the role orientation of physical education teachers, with a transformation from a traditional singular role to a diverse and composite one, which has become an inevitable trend.

4.1.1. The Limitations of Traditional Role Positioning

Under the traditional education model, the role of physical education teachers in extracurricular physical activities on campus is extremely singular. They primarily undertake

three basic responsibilities: imparting simple skills, supervising activity order, and maintaining sports safety. They are not required to engage in specialized activity design, tiered guidance, effect evaluation, or psychological support. This singular role orientation is completely unable to meet the requirements of high-quality physical education in the new era, and it fails to satisfy students' personalized, interesting, and skill-oriented sports needs. It has become an important factor restricting the improvement of activity quality.

4.1.2. New Composite Role Positioning

In the new era, physical education teachers are required to transform into three core roles in extracurricular physical activities on campus: first, learning guides, guiding students to independently choose sports activities, develop exercise habits, and cultivate lifelong sports awareness; second, program designers, combining student characteristics, venue conditions, and resource allocation to design scientific, fun, and tiered activity programs; third, psychological supporters, paying attention to students' emotional experiences and psychological changes during exercise, and cultivating students' sports character traits of perseverance, cooperation, and self-confidence.

4.2. Core Competency Requirements for the Role Transformation of Physical Education Teachers

To achieve the transformation from traditional roles to new composite roles, physical education teachers must possess three core competencies to support the professional and scientific implementation of activities.

Activity design ability: Proficient in professional techniques such as exercise load regulation, layered teaching, interesting design, and integration of in-class and out-of-class activities, capable of designing personalized activity plans that meet students' age characteristics, physical fitness levels, and interest needs.

Resource integration capability: Capable of effectively linking external resources such as families, communities, and enterprises, integrating various resources such as venues, equipment, and teachers, and developing school-based physical education courses and activity content.

Data application capability: Able to utilize digital tools such as smart wristbands and AI monitoring devices to collect data on students' exercise heart rate, workload, skill mastery, etc., and optimize activity design and provide precise guidance based on the collected data.

4.3. The Practical Dilemmas of Physical Education Teachers' Role Transformation

Despite the imperative need for role transformation, physical education teachers currently face three major structural challenges in the transformation process: a professional capability gap, work load pressure, and a lack of evaluation mechanisms, which severely hinder the transformation process.

4.3.1. Professional Competence Gap

Insufficient professional competence poses the greatest obstacle to the role transformation of physical education teachers. According to a survey, only 41% of physical education teachers have received specialized training in the design of extracurricular physical activities within their schools [9]. Most teachers lack professional competencies such as stratified teaching, monitoring of exercise load, and interesting design, making them unable to fulfill the requirements of their new roles. According to certain survey data, 82% of teachers explicitly stated that "lack of professional support" is the core challenge in role transformation, and their own abilities cannot meet the needs for implementing high-quality activities.

4.3.2. Workload Pressure

Excessive workload is a significant factor that dampens the enthusiasm of physical education teachers. Research indicates that 65% of physical education teachers are responsible for more than 12 physical education classes per week, while also overseeing all extracurricular physical activity guidance work, including recess, after-school services, and extracurricular clubs. The overload rate reaches 73%. The excessive workload leads to a dispersion of teachers' energy, preventing them from dedicating sufficient time to activity design and professional improvement, and forcing them to complete tasks passively.

4.3.3. Absence of Evaluation Mechanism

The absence of evaluation and incentive mechanisms poses a systemic bottleneck that hinders the professional transformation of teachers. According to research data, 89% of primary schools fail to incorporate the workload and quality of extracurricular physical activity guidance into their teacher performance evaluations, professional title assessments, and merit-based recognition systems [10]. Consequently, teachers' extra efforts go unrecognized institutionally and lack material and emotional incentives. Interviews with teachers in a certain region revealed that 73% of physical education teachers urgently desire "specialized training in activity design," while 61% call for "the establishment of a reasonable incentive mechanism," highlighting the practical demands of teachers.

4.4. Breakthrough Path for the Role Transformation of Physical Education Teachers

To overcome the dilemma of role transformation for physical education teachers, concerted efforts must be made from three dimensions: training enhancement, burden reduction and efficiency improvement, and incentive and security. Firstly, a systematic special training system should be established to enhance teachers' professional abilities. Secondly, teachers should be reasonably allocated to reduce their overload work pressure. Thirdly, a comprehensive evaluation and incentive mechanism should be established, incorporating extracurricular sports activity guidance into performance evaluation to stimulate teachers' work enthusiasm. Only by solving the practical difficulties of teachers can we truly achieve role transformation and enable physical education teachers to play a core role in improving the quality of activities.

5. International Experience Reference

5.1. Practical Experience of Primary School Students' Physical Activities Both Inside and Outside School in Developed Countries

Developed countries such as the United States, Japan, and those in Northern Europe started early in the field of promoting youth sports, establishing a comprehensive policy system, resource guarantee system, and practical models, and accumulating rich and mature experience, providing important references for China.

5.1.1. United States: Comprehensive School Physical Education Program

The United States has implemented the "Comprehensive School Physical Activity Program," establishing a comprehensive support system encompassing "policy enforcement, resource guarantee, and professional support." At the policy level, legislation mandates that primary school students engage in at least 30 minutes of physical activity at school each day, which is incorporated into the core indicators of school education assessment. At the resource level, the government allocates \$50 per student annually for dedicated sports funding, ensuring the provision of venues and equipment. At the professional level, a training and certification system for physical education teachers has been established, requiring all physical education instructors to hold relevant certificates. Since the implementation of this program, the

compliance rate of physical activity among American youth has increased to 45%, and their physical health levels have significantly improved [11].

5.1.2. Japan: Happy Wednesday System

Japan has implemented a unique "Happy Wednesday" sports activity system, cancelling cultural classes every Wednesday afternoon and organizing personalized and distinctive sports activities across the entire school. The activities deeply integrate traditional culture and modern sports, encompassing both traditional Japanese sports such as judo, kendo, and sumo, as well as modern emerging sports like rock climbing, skateboarding, and hip-hop, fully satisfying students' diverse interests and needs. At the same time, Japan has introduced the "School Sports Promotion Law," which guarantees the development of school sports activities through legislation. As a result, the rate of students with excellent physical fitness has been increasing for ten consecutive years, and the obesity rate among adolescents remains at a relatively low level globally.

5.1.3. Nordic Countries: Nature Education Model

Nordic countries such as Finland and Sweden adopt the "nature education model" to carry out physical activities both inside and outside the school, fully utilizing natural environments such as forests, lakes, and countryside, and combining sports activities with nature education and outdoor education. Schools regularly organize students to carry out activities such as forest hiking, wilderness camping, and nature exploration, allowing students to exercise in nature and grow through sports. Data shows that Nordic children engage in moderate to high-intensity physical activities for up to 120 minutes daily, and the obesity rate among adolescents is only 3.2%, far lower than the global average, forming a unique physical education model.

5.2. Localization Insights From International Experience for China

Practical experience from developed countries indicates that policy and legislative support, stable resource allocation, fostering of distinctive culture, and collaboration among home, school, and community are core elements for enhancing the level of physical activity among primary school students both inside and outside the classroom. Considering China's national conditions, three major localized insights can be distilled:

5.2.1. At the Institutional Level: Accelerate Special Legislation and Strengthen Rigid Policy Guarantees

Drawing on Japan's "School Physical Education Promotion Law" and relevant educational legislation in the United States, we should accelerate the process of special legislation for school physical education in China, incorporate the time, content, quality, and resource guarantees for both extracurricular physical activities of primary school students into the legal framework, strengthen the rigid binding force of policies, and prevent the occupation and misappropriation of activity time, providing a solid legal guarantee for the implementation of activities.

5.2.2. At the Practical Level: Develop Localized And Distinctive Programs To Achieve Individualized Teaching

Abandoning the practice of blindly copying foreign models, we should base ourselves on our cultural traditions and student characteristics, deeply integrate traditional ethnic sports such as martial arts, shuttlecock, dragon and lion dances, and develop localized activity plans with Chinese characteristics, campus characteristics, and student characteristics. At the same time, we should adopt a hierarchical and classified design to meet the personalized needs of students of different ages and physical conditions, and achieve individualized teaching.

5.2.3. Evaluation Level: Establish A Dual-Track Evaluation Mechanism, Focusing on Comprehensive Development

Drawing on the process evaluation concept of developed countries, we abandon the single attendance rate assessment and establish a dual-track evaluation mechanism of "process evaluation + value-added evaluation". This approach not only focuses on the quality of the activity process but also pays attention to the enhancement of students' physical fitness, skills, and emotions, comprehensively evaluating the educational effectiveness of the activities.

After a pilot school combined international experience with local reality and optimized the extracurricular physical activity program, student participation in activities increased by 58%, and their mastery of sports skills improved by 32%. This fully demonstrates the feasibility and effectiveness of the localization and transformation of international experience.

6. Construction of Quality Improvement Path

Based on current situation diagnosis, bottleneck analysis, theoretical support, and experience reference, this study innovatively proposes the "educational-scientific-social three-dimensional quality improvement model". It constructs a complete evidence-based path for enhancing the level of physical activity of primary school students both inside and outside school, from three dimensions: design, guarantee, and implementation, to achieve comprehensive and systematic improvement in activity quality.

6.1. Design Dimension: Constructing A Systematic And Scientific Activity Framework

Design dimension is the core of activity quality improvement, focusing on educational enhancement. Through layered curriculum development, school-based resource library construction, and teaching mode innovation, a systematic, scientific, and interesting activity framework is established.

6.1.1. Development of Hierarchical Course Modules

Deeply integrate the concept of sports education, and develop tiered and progressive curriculum modules tailored to the physical and mental development characteristics of students of different grades:

Lower grades (grades 1-2): Design a "game-based physical fitness" module that combines sports with games and subject knowledge, such as "skip counting challenges" and "number obstacle runs", to stimulate interest in sports through fun;

Middle grades (grades 3-4): Design a "basic skills" module, focusing on mastering basic sports skills such as skipping ropes, kicking shuttlecocks, and dribbling basketballs;

For senior grades (5th-6th grade): Design a "Progressive Special Skills" module, advancing in a step-by-step manner from "basic movements" to "combined skills" and then to "tactical coordination", such as learning specialized skills in basketball, football, gymnastics, etc.

Each module is designed with three levels of objectives: basic proficiency, expansion and improvement, and creative challenge, forming a vertically coherent and horizontally connected curriculum system. Through layered design, a pilot school saw an increase in basketball skill mastery among third-grade students from 38% to 76%, fully validating the effectiveness of this model.

6.1.2. Construction of School-Based Curriculum Resource Repository

Establish a standardized and systematic school-based sports activity resource library, covering three dimensions and 20 types of projects:

Project dimensions: including traditional sports such as athletics and gymnastics, emerging sports such as frisbee and flag football, and ethnic traditional sports such as martial arts and shuttlecock;

Difficulty dimension: divided into 5 levels based on skill complexity, meeting the needs of students at different levels;

Organizational dimension: Design three modes: collective practice, group confrontation, and free creation.

Each project comes with 12 standardized documents, including teaching design templates, learning situation analysis tables, evaluation scales, and safety plans, enabling the reuse and efficient preparation of activity plans. A primary school in Hangzhou has increased the reuse rate of activity plans by 65% and the efficiency of teacher preparation by 4 times through the construction of a resource library, significantly reducing teachers' workload.

6.1.3. Innovative Application of 5E Teaching Model

Introduce the 5E teaching model (Engage, Explore, Explain, Extend, Evaluate) into extracurricular physical activities in schools, and reconstruct the activity process:

Participation stage: Stimulate students' interest through VR scenarios, story introduction, and other methods;

Exploration stage: Students are divided into groups to independently design activity plans and test their feasibility;

Explanation stage: Teachers explain sports skills and load knowledge, establishing scientific cognition;

Extending stage: Integrating knowledge from disciplines such as Chinese, mathematics, and science to achieve cross-disciplinary education;

Evaluation stage: Adopt a diversified evaluation approach combining peer evaluation, data monitoring, and teacher evaluation.

Taking the "obstacle running" project as an example, this model has increased students' motivation to participate in sports by 52% and reduced their cognitive load by 37%, achieving the coordinated development of "sports + cognition + emotion".

6.2. Guarantee Dimension: Build A Multi-Dimensional and Collaborative Support System

The dimension of support is the foundation for enhancing the quality of activities. Focusing on scientific support, we aim to build a comprehensive and sustainable support system through spatial expansion, increasing teacher resources, and collaboration between home, school, and community.

6.2.1. Space Expansion Project

Breaking through the constraints of physical space, we aim to build a spatial network featuring "intensive training on campus + extracurricular expansion":

Campus space: Adopting a "dynamic and static zoning" design, it divides the space into physical training areas, skill practice areas, game activity areas, competitive competition areas, and leisure relaxation areas, making rational use of fragmented spaces such as corridors, rooftops, and corners;

Off-campus space: Connect with community parks, sports venues, and country campsites, implement the "City Crossing Plan" and "Nature Exploration Plan", and expand activity space. A school in Beijing has effectively alleviated the problem of venue shortage by increasing the activity capacity per unit area by 2.3 times through space renovation.

6.2.2. Teacher Increase Plan

Establish a diversified teaching faculty system featuring "dual-channel recruitment + mentor-based training":

Professional channel: Targeted recruitment of talents with a master's degree or above in physical education, requiring a professional sports coaching certification;

Transformation Path: Offer specialized training in sports and health management for non-physical education teachers, enabling the professional transformation of part-time teachers;

Mentorship training: A mentor team consisting of experts from universities and senior physical education teachers conducts regular training and lesson case discussions.

Through this program, the pilot school in a certain location has increased the proportion of full-time physical education teachers from 45% to 68%, and the rate of teachers with excellent professional abilities has increased by 29 percentage points.

6.2.3. Home-School-Community Collaboration Mechanism

Develop the "Sports Bank" digital platform and establish a sustainable home-school-community participation model: Parents earn points through parent-child sports, volunteer services, and check-in supervision. These points can be exchanged for rewards such as sports equipment, event tickets, and the title of "Sports Expert Family", thereby stimulating parents' enthusiasm for participation. Through this mechanism, a school in Shenzhen has seen an increase in parents' annual participation time from 9.2 hours to 57.6 hours, fostering a positive ecosystem of collaborative education among home, school, and community.

6.3. Implementation Dimension: Establish A Dynamic, Closed-Loop Optimization Mechanism

Implementation dimension is the key to enhancing activity quality. Focusing on social collaboration, we establish a dynamic optimization mechanism of "monitoring - feedback - improvement - enhancement" through dynamic adjustment, intelligent monitoring, and teacher capability enhancement.

6.3.1. Dynamic Adjustment Mechanism

Establish a closed-loop management system for "three-color warning":

Green range (exercise load intensity 60%-70%): maintain the current plan;

Yellow range (load < 60% or > 70%): Adjust the intensity and form of activities in a timely manner;

Red range (abnormal for three consecutive weeks): Initiate special rectification and redesign the plan.

Through this mechanism, a certain school adjusted the rope skipping activity to an "intermittent rope skipping challenge", which increased the heart rate compliance rate from 40% to 82%, achieving precise regulation of activity load.

6.3.2. Construction of Intelligent Monitoring Platform

Integrating three major modules: physiological monitoring, behavior recognition, and emotion perception, we have built an intelligent activity monitoring platform. Through the smart wristband, we collect heart rate and blood oxygen data, utilize AI visual analysis to assess movement quality, and employ micro-expression recognition to evaluate the pleasure level of exercise. This platform automatically generates a "personal exercise portrait" for students, including visual reports on skill development, exercise preferences, social relationships, and more. A school in Shanghai has seen a 68% increase in the relevance of activity design and a 41% decrease in the rate of safety accidents through the application of this platform.

6.3.3. Teacher Capacity Improvement Project

Build a lifelong learning ecosystem and implement a project to enhance teachers' abilities:

Training content: Covering core modules such as exercise load regulation, stratified teaching, first aid skills, digital sports, and child psychology;

Evaluation and Incentive: Establish a "credit bank" system that directly links training outcomes with professional title evaluation and job promotion.

Through this project, the pass rate of physical education teachers' professional competence in a district of Hangzhou has increased from 54% to 91%, significantly enhancing the professionalization level of the teaching staff.

7. Conclusion and Suggestions

7.1. Research Conclusion

Through systematic review and empirical analysis, this study draws the following core conclusions:

Currently, primary school students in China have achieved full coverage of physical activities both inside and outside school. However, there exists a prominent contradiction of "having organization but lacking design, having duration but lacking intensity, and having implementation but lacking effectiveness", resulting in serious deficiencies in activity quality and educational effectiveness.

The core bottlenecks impeding the enhancement of activity levels are the formalization of content, resource constraints, and extensive management. Physical education teachers face structural dilemmas, including ambiguous role cognition, insufficient professional competence, and a lack of support system.

Self-determination theory, physical literacy concept, and social ecosystem theory provide solid theoretical support for activity enhancement, while domestic practical innovation and international experience offer practical references for path construction.

Constructing a "three-dimensional quality improvement model encompassing educational, scientific, and social aspects" and exerting efforts in the three dimensions of design, guarantee, and implementation to establish a full-process closed-loop management system is the core evidence-based path to break the cycle of "low quality - low efficiency".

7.2. Specific Paths for Breaking Through Bottlenecks

7.2.1. Breakthrough of Design Bottleneck: Three-Dimensional Evaluation Model

Establish a three-dimensional evaluation model of "exercise load - skill acquisition - emotional experience": set a load benchmark with a proportion of medium to high-intensity activities $\geq 50\%$; develop a skills list of 1-2 items per semester; use a positive affect scale to assess activity satisfaction, achieving scientific and precise activity design.

7.2.2. Breakthrough of Resource Bottleneck: Three-Tier Supply Network

Establish a three-tier resource supply network consisting of "school basic layer - community shared layer - enterprise expansion layer": schools are equipped with standardized equipment kits, communities establish sports resource sharing warehouses, and enterprises donate intelligent equipment, achieving efficient utilization and balanced allocation of resources.

7.2.3. Breakthrough of Management Bottleneck: Closed-Loop Management Mechanism

Implement a closed-loop management approach of "target management - process monitoring - dynamic adjustment": develop an annual activity quality white paper, establish a system of weekly monitoring, monthly reporting, and quarterly analysis, implement red, yellow, and blue warning interventions, and enhance the level of refined management.

7.3. Implementation Strategy Suggestions

7.3.1. Basic Layer Construction: Three Core Projects

By 2026, the standard configuration of sports load monitoring equipment for primary schools nationwide will be completed, achieving full coverage of scientific monitoring;

Develop an AI-based exercise prescription system that generates personalized activity plans based on students' physical fitness data;

Establish an urban-rural sports resource sharing alliance to promote the allocation of high-quality resources to rural areas and underprivileged primary schools.

7.3.2. Support Layer Construction: Three Types of Core Talents

Implement the "Thousand Sports Teachers Plan" to cultivate 1,000 senior sports instructors within three years;

Establish sports and health records for all students to achieve dynamic tracking of physical fitness data;

Develop a home-school collaborative sports app that integrates full functionalities including check-in, interaction, guidance, and evaluation.

7.3.3. Guarantee Layer Construction: Three Long-Term Mechanisms

Incorporate the implementation of extracurricular physical activities within schools into local government education assessments, and strengthen policy enforcement;

Establish a special fund for youth sports development, with an annual investment of no less than 1 billion yuan, to ensure the construction of venues and the organization of activities;

Establish a comprehensive student sports injury insurance system, simplify the claims process, and eliminate schools' concerns about safety.

7.4. Research Outlook

The evidence-based enhancement pathway for primary school students' extracurricular physical activities within school established in this study provides scientific guidance for practical implementation, but further improvements are still needed in subsequent research: firstly, expanding the scope of empirical research to verify the universality of the three-dimensional quality enhancement model; secondly, deepening the application of digital tools in activity monitoring and evaluation; and thirdly, exploring differentiated enhancement pathways for schools in different regions and with different educational conditions. In the future, it is necessary to continue to focus on enhancing the quality of primary school students' extracurricular physical activities within school, promoting the high-quality development of school physical education, safeguarding the healthy growth of young people, and facilitating the comprehensive realization of the "Healthy China 2030" strategic goal.

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