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Comparisons of Physical Fitness Among Different Methods in Track and Field for Primary School Students

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Abstract

Background and Aim: In 2019, the data indicates that the time primary school students dedicate to outdoor sports falls short of the one-hour-per-day guideline mandated by the state and also reveals discrepancies based on gender and region. This study was to study the effect of different training in methods track and field on Physical Fitness in Primary School students and to the comparisons of different training in methods track and field on Physical Fitness in Primary School students.

Materials and Methods: This study is an experimental study. The subjects of this study were 60 fifth-grade students at Hui Min Primary School in Guangzhou City, China. This experimental study was conducted with 60 subjects (3 groups, 20 students in each group) by using the motor game training method, interval training method, and cycle training method. The duration of this training program was 8 weeks, and tests were conducted pre-test, after the 4th week, and post-test. The data were analyzed using means, standard deviations, one-way ANOVA repeated measurement, and post hoc pairwise with Bonferroni. The significant level was .05

Result: The results showed that the mean and standard deviation of the pre-test, after week 4 and post-test, respectively, were: (1) The mean comparison of physical fitness between game sports, interval training, and circuit training showed that all fitness was not significantly different. (2) The mean pairwise differences within the group, game sport, interval training, and circuit training between pre-test after week 4, pre-test with post-test, and after week 4 with post-test were significant.

Conclusion: All the different training methods in track and field, game sport, interval training, and circuit training can improve physical fitness for primary school students.

Keywords: Difference method training; Physical fitness; Primary school students

Introduction

In 2019, primary school students in grades 3-6 across the country spent an average of 4.7 hours a week participating in outdoor activities, with boys spending 5.1 hours and girls spending 4.3 hours. In urban areas, students spent 4.5 hours, while in rural areas, the average was 4.9 hours. These data indicate that the time primary school students dedicate to outdoor sports falls short of the one-hour-per-day guideline mandated by the state, and also reveal discrepancies based on gender and region. Additionally, according to the Dong, et al (2018) "Survey Report on Physical Exercise and Sports Consumption of Chinese Children and Adolescents" primary school students in grades 3-6 participated in an average of 2.6 types of outdoor sports per week in 2018, with boys engaging in 2.8 types and girls in 2.4 types. Urban areas saw an average of 2.5 types, while rural areas had 2.7 types. These findings suggest that outdoor sports activities for primary school students are not only relatively limited and repetitive but also vary based on gender and region.

Studies have proved that: primary school students insist on good physical education, active physical exercise, can make bone enhancement, promote growth and development, so that children's height is rapidly increased. Cocca, et al (2020) Because sports, muscle to the bone pull and gravity action, not only conducive to improve the shape and function of the bone, make the bone become thick and solid, solid, but also conducive to the correct formation of the spine, chest, pelvis, arch and other bones, but also make the mechanical properties of the bone is improved (Lee, (2021).

In addition, The effect of physical exercise on bone. Bone plays the role of a scaffold for the human body, plays a protective role for organs, and supports and lever the various movements of the human body (Yuliandra, et al, 2020)

The effects of physical exercise on joints. Through the study and exercise of physical education, the joint capsule, ligaments and tendons can be thickened, and extended, and the muscle strength and elasticity around the joint can increase. Choi, et al (2015) In this way, the range of joint movement will be increased, flexible and firm. For example, gymnasts, and acrobats, their flexibility is good, fully

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explained the amazing role of physical exercise. Chen, (2014) The effect of physical exercise on muscle. The muscles of children are in the process of development, the development speed of the muscles of the body is not balanced, and adhering to physical education learning and exercise can make the muscles in the shape, structure, composition, and function of obvious adaptive changes (Chiang, 2019)

In this paper, the effect of physical game method, interval training method, and circuit training method on the physical fitness of upper elementary school students was studied by using the experimental method combined with the field survey method. Geng (2023) Through the experimental method, we carry out experimental interventions on the senior primary school students to explore the effect of physical education game activities on the physical quality of the students and the results of the dimensions of the physical education game activities, and take the frequency of students' participation in school physical education as the basis of grouping to compare the differences of the different students' participation in physical education games in physical education classes. Lv, (1997) The results of the study were analyzed to confirm the effects of physical education games on the physical fitness of upper elementary school students. Ren (2023Combined with the results of the study, it provides reference for the development of physical education game activities in school physical education classes, and at the same time promotes the school students' physical education test from a single aspect of the test to a comprehensive test, which contributes to the development of the prosperity of school physical education, and then promotes the students to form a good habit of exercising the body, improves the current situation of the student's physical fitness and health, and lays the foundation for the realization of the lifelong physical education.

Objectives

The purpose of this research is to be find out as follows:

1. To study the effects of different training methods track and field on Physical Fitness in Primary School Students.

2. To compare the effects of different training in methods track and field on Physical Fitness Between three groups

3.To compare within the group of different training in methods track and field on Physical Fitness between pretest, after week 4, and posttest

Literature Review

Lee, (2021) asserts that the current stage of physical development among elementary school students is influenced by various factors. With the development of the national economy and the improvement of people's living standards, issues such as over-nutrition and obesity have gradually plagued the physical and mental health of young people. Moreover, the continuous development of information technology has led to the excessive use of television, cell phones, and other communication devices. Consequently, children, who should be lively and active after school, are gradually becoming addicted to electronic games, movies, animations, and other entertainment, resulting in a decrease in exercise time and declining vision.

Geng (2023) emphasizes the importance of physical growth in the elementary school learning process. In addition to knowledge acquisition, physical fitness plays a crucial role in the development of students. The elementary school physical education program is identified as key to promoting the physical well-being of elementary school students. To achieve this, it is imperative for physical education teachers to enhance their understanding of the physical education needs of primary school students and effectively integrate physical education games into the teaching process. This approach aims to fully engage students in learning and enable them to attain comprehensive growth through physical education games.

Ren (2023) believes that physical education is pivotal in primary school students' learning journey. Cultivating students' interest in sports is deemed extremely important. Ren suggests that teachers should begin by understanding the purpose of physical education teaching and enhancing their ideological awareness. Despite the challenges posed by integrating sports games into teaching, Ren emphasizes its importance in enriching sports activities, stimulating students' enthusiasm for learning, and promoting the development of primary school students' interests.

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Ribas et al. (2023) present scholarly opinion on the traits of the "goal of game" concept. Described as the main-motor problem, this concept refers to challenges outlined in game rules that players aim to solve during game dynamics. They suggest that understanding the "goal of game" concept enables a deeper understanding of sports and traditional games, facilitates their classification based on specific criteria, and enhances their applicability to physical education. They propose a network model of intentions of play to comprehend game dynamics and design learning tasks effectively.

Cocca et al (2020) explores the application of the student-centered TGfU model in physical education (PE), highlighting its positive effects beyond the cognitive and psychological domains. Cocca's findings suggest that different physical fitness components increase significantly more through TGfU units than through traditional approaches to school sports. This indicates potential for broader use of the TGfU model in PE, benefiting students not only in commonly discussed areas but also in overall physical health and in creating more stimulating pedagogical environments.

Liu Dekun scholars believe that the cycle training method is one of the most used sports training methods in the process of physical education teaching, and it is also a commonly used method in the teaching of sports courses. Circuit training method mainly refers to the specific task of training as the basis, while creating a number of sports practice stations or practice points, at the same time, let the students by the prescribed training routes and sequences, to complete the exercise content of each training station and the requirements of the exercise cycle, and ultimately realize the sports training task of a method. Circular training method has great flexibility in the design of sports, and is a comprehensive and strong sport, through the use of circular training methods in the process of physical education, to a large extent, can enhance the student's interest in sports.

The reviewed literature provides insights into various aspects of physical education and its impact on elementary school students. Lee (2021) highlights the influence of modern lifestyles, such as over-nutrition and excessive screen time, on students' physical and mental health. Geng (2023) emphasizes the importance of physical fitness in elementary education and advocates for integrating physical education games to promote holistic student development. Ren (2023) underscores the pivotal role of physical education in students' learning journey and suggests enhancing students' interest in sports to enrich their learning experience. Ribas et al. (2023) discuss the "goal of game" concept, proposing a network model to comprehend game dynamics effectively in physical education. Cocca (2020) explores the positive effects of the student-centered TGfU model on students' physical health and pedagogical environments. Lastly, Liu Dekun scholars advocate for the use of circuit training methods to enhance students' interest in sports during physical education. Overall, these studies emphasize the importance of physical education in promoting students' physical health, engagement, and overall well-being.

Conceptual Framework

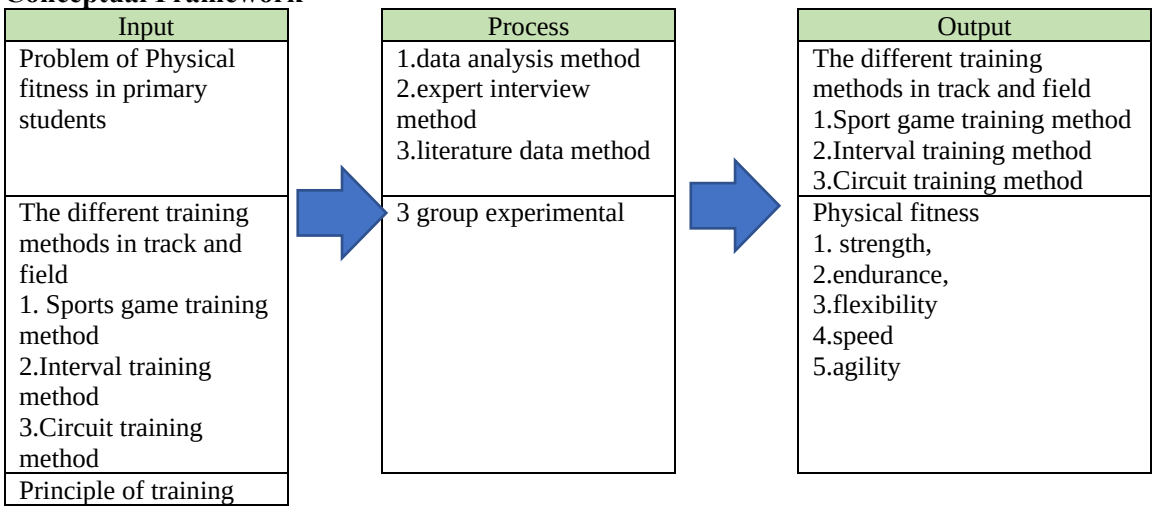

Figure 1 Conceptual Framework

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Methodology

Population: Sixty, fifth-grade students were designated from Guangzhou Hui Min Primary School; the age difference between the 60 students. 10-11years old Student.

Sample: Experimental grouping. By drawing lots for training methods into groups (Group A, Group B, and Group C). By draw lots for training methods into groups. Group A students were taught in the classroom using sports games training method, Group B students were taught in the classroom using the interval training method, and Group C students were taught in the classroom using the circuit training method. Before the start of the experimental group, height, weight, age, physical qualities of each of the three groups (Strength quality, Agility quality, Flexibility quality, speed quality, endurance quality) were statistically analyzed.

The inclusion criteria are as follows:

1) Be a fifth-grade student designated from Guangzhou Hui Min Primary School, in 2022

2) Those who do not have any injuries that hinder training must get the approval of the doctor.

3) Those who have passed the training readiness assessment according to the PAR-Q+ 2022 assessment form, The Physical Activity Readiness Questionnaire for Everyone.

4) Be a person who voluntarily agrees to participate in the program and signs the consent document.

The exclusion criteria were as follows:

1) Less time to participate in experiments 80% of the 8-week training period

2) Participants did not complete the test by the date and time specified by the researcher.

3) Have a medical condition or injury that prevents them from continuing the training.

4) Request to leave the research project

Research instrument: On the basis of theoretical training and literature review, a special training program was developed. The training program was developed through the sports game training method, interval training method, and cycle training method, divided into 4 training phases, 8 weeks of training time, 3 classes per week, 45 minutes per class, and consultant peer approval. The content validity of the training program was carried out by 3 specialists (trainers and sports scientists), who made comments and suggestions for improvement, and content validity was analyzed (Item-Objective Consistency Index: IOC). the IOC equaled 0.73.

This research was approved for human research board from Bangkok Thonburi University, Certificate No 218/2566 /issue date 19 November 2022 /expiry date.19 November 2023.

Data collection

Training methods	Groups	Testing time	Experimental time	Testing time	Experimental time	Testing time
1.Sports game training method	Group A	First test (first week)	1-4 weeks	second test (week 4)	5-8 weeks	post test (week 8)
2.interval training method	Group B	First test (first week)	1-4 weeks	second test (week 4)	5-8weeks	post test (week 8)
3.circuit training method	Group C	First test (first week)	1-4weeks	second test (week 4)	5-8 weeks	post test (week 8)

Data analysis methods: Data analysis methods refer to appropriate statistical analysis methods to analyze and study the large amount of data collected. SPSS26.0 statistical software was used to process and analyze the data, to compare the changes in the physical fitness values before, during and after the training of the three groups, and to test the changes in physical fitness indicators.

Data Analysis

1) Mean, standard deviation, and percentage.

2) One-way ANOVA repeated measurement, Bonferroni post hoc pairwise

3) Set a significance level of .05.

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Results

The results showed that:

The mean and standard deviation of the pre-test, after week 4 and post-test, respectively,

Table 1: The mean compares on posttest physical fitness between Group game sport, interval training and circuit training by one-way ANOVA

Variable	Source of variant	Sum of squares	df	MS	F	p
Muscle mass	Between groups	41.43	2	20.72	2.78	.07
	Within groups	424.73	57	7.45		
	Total	466.18	59			
% Fat	Between groups	30.01	2	15.01	3.02	.06
	Within groups	282.907	57	4.96		
	Total	312.92	59			
Run 800 m	Between groups	150.233	2	75.12	1.25	.30
	Within groups	463.95	57	8.14		
	Total	473.25	59			
Sit up	Between groups	8.93	2	4.47	.14	.87
	Within groups	1829.80	57	32.10		
	Total	1838.73	59			
Push up	Between groups	8.93	2	4.47	.73	.49
	Within groups	351.40	57	6.17		
	Total	36.33	59			
Sit and reach	Between groups	19.75	2	9.88	1.14	.33
	Within groups	494.94	57	8.68		
	Total	514.69	59			

*p< .05

The mean comparison of posttest physical fitness between game sports, interval training, and circuit training showed that all variables were not significantly different.

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Table 2: Pairwise comparisons in Sports games pretest, after week 4, and posttest

Variables	Test	Pre-test	After week 4	Post-test
Muscle Mass	Pretest	xxxxx	-3.46*	-6.38*
	After week 4		xxxxx	-2.92*
	posttest			Xxxxx
%Fat	Pretest	xxxxx	3.86*	7.07*
	After week 4		xxxxx	3.21*
	posttest			Xxxxx
800-meter	Pretest	xxxxx	13.00*	28.55*
	After week 4		xxxxx	15.55*
	posttest			Xxxxx
sit-up	Pretest	xxxxx	-9.500*	-17.300*
	After week 4		xxxxx	-7.800*
	posttest			Xxxxx
Push-up	Pretest	xxxxx	-3.20*	-4.90*
	After week 4		xxxxx	-1.70*
	posttest			xxxxx
Sit and reach	Pretest	xxxxx	-2.25*	-5.05*
	After week 4		xxxxx	-2.79*
	posttest			xxxxx

The mean pairwise post hoc differences within the group, game sport, interval training, and circuit training between pre-test, after week 4, pre-test, post-test, and after week 4 - post-test were significant.

Conclusion: All the different training methods in track and field, game sport, interval training, and circuit training can improve physical fitness for primary school students.

Discussion

Through the study, the comparative means of 800(s), sit-ups, Push-up, sit and reach (cm), Muscle Mass (kg), and %Fat were as follows: the difference between the pre-test after week 4 and the pre-test after week s was significant (*P< .05). This is a good reflection of the fact that all the three training methods have significantly improved the physical fitness of the students in different groups respectively.

Research shows that in the learning process of elementary school, in addition to knowledge learning, physical growth is also very important for students, and the physical education program in elementary school is the key to promoting the physical fitness of elementary school students. For elementary school physical education teachers, only by strengthening the understanding of the physical education learning needs of primary school students and effectively integrating physical education games into the process of physical education teaching, can they fully arouse the students' interest in learning, so that the students can obtain comprehensive growth in the process of physical education games. (Geng, 2023)

The purpose of the interval training method is to effectively improve the students' physical fitness level within a limited period. Therefore, the means to be used is different from person to person, teachers should not only make more effort on the practice methods, but also study the teaching materials carefully, select the practice methods that suit the students' physical conditions and meet the students' interests, to let the students experience the fun in the practice, and guide the students to develop a lifelong habit of physical education.

The use of circuit training method is conducive to improving students' comprehensive ability, circuit training method is conducive to increasing students' interest in sports, circuit training method is conducive to eliminating students' fatigue, and circuit training method is conducive to enhancing students' level of sports training (Liu, 2019).

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Recommendation

Research Recommendations: Due to time issues and short training cycles, there was no experimentation and data collection involving the entire school population, as well as no development of additional training methods to make improvements in the physical fitness of elementary school students.

Practical Recommendations: In the process of implementing and carrying out the improvement of the physical fitness of students in schools, it is necessary to evaluate and experiment with the fun, effectiveness, and rationality of training methods.

References

Chen, B. (2014). On the Use of Circuit Training Method in Improving Sports Comprehensive Ability. *Youth Sports,* 6, 49-51.

Chiang, M. S. (2019). The use of circuit training method in strength training of track and field athletes. *Sports Style*, 12, 34-38.

Choi, S.H., Kuo, K., & Yang, W. (2015). On the Deficiency and Improvement of Repetition Training Method, Interval Training Method, and Continuous Training Method. *Sichuan Sports Science,* 4, 54-60. doi:10.13932/j.cnki.sctykx.2015.04.14.

Cocca, A., Baca, J., Hernández-Cruz, G., & Cocca, M. (2020). Does A Multiple-Sport Intervention Based on the TGfU Pedagogical Model for Physical Education Increase Physical Fitness in Primary School Children?. International *Journal of Environmental Research and Public Health.* 17 (15), 5532. Doi:10.3390/ijerph17155532.

Dong, Y., Yang, Z., & Wang, X. (2018). Survey Report on Physical Exercise and Sports Consumption of Chinese Children and Adolescents. *Chinese School Health,* 39(9), 1297-1300.

Geng, M. (2023). Exploring the impact and integration of applying sports games in elementary school physical education. *Test and Research,* 21, 79-81.

Lee, Y. T. (2021). On the role of sports games on the physical health of primary school students. *Elementary School Students (Lower Decade),* 8, 91-98.

Liu, D. (2019). The effect of the use of circuit training method in physical education on teaching effectiveness. *Talent,* 5, 33-38.

Lv, W. (1997). What is the difference between the interval training method and the repetition training method? *Chinese Sports Coach,* 4, 40-50.

Ren, F. (2023). Analysis of the influence of teaching physical education games on students' interest in elementary school. *Chinese Martial Arts*, 7, 117-119.

Ribas, J.P., Hernández-Moreno, J., Díaz-Díaz, R., Borges-Hernández, P.J., Ruiz-Omeñaca, J.V., & Jaqueira, A.R. (2023). How to understand sports and traditional games and how to apply it to physical education. On the "Goal of Game". Front Sports Act Living. 28 (5), 1123340. doi: 10.3389/fspor.2023

Yuliandra, R., Nugroho, R. A., & Gumantan, A. (2020). The Effect of Circuit Training Method on Leg Muscle Explosive Power. *Active: Journal Of Physical Education, Sport, Health and Recreation,* 9(3), 157-161.

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