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Enhancing multi-skill development in 6-7-year-olds through the "Crocodile River," "Socorro," and "Meo Duoi Chuot" games in the kids' athletics level 1 program

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ABSTRACT

Background: The decline in children's physical activity in Papua poses a serious concern, particularly due to its negative impact on health and motor skill development. Limited multi-skill proficiency among young children contributes to reduced engagement in physical activities. Despite global efforts to promote physical literacy, few interventions have focused on culturally relevant and age-appropriate activities to improve multi-skills in early childhood, especially in underserved regions like Papua. **Research Objectives:** This study aimed to improve the multi-skill development of 6-7-year-old elementary school students through the implementation of the Kids' Athletics Level 1 program incorporating locally adapted games such as "Crocodile River," "Socorro," and "Meo Duoi Chuot." **Methods:** A quasi-experimental design using a one-group pretest-posttest approach was employed. A total of 50 students aged 6-7 years were selected via purposive sampling. The Indonesian Physical Fitness Test was used to assess outcomes, including sit-and-reach, one-leg standing balance, tennis ball catch-and-throw, shuttle run, and an 800-meter run. Paired-sample t-tests were conducted to evaluate differences between pretest and posttest scores. **Findings/Results:** The analysis revealed a statistically significant improvement in students' multi-skill performance ($p < 0.05$). The findings support the integration of the Kids' Athletics program into school curricula as an effective strategy to enhance motor competence in early childhood. **Conclusion:** The Kids' Athletics Level 1 model, enriched with culturally adapted games, proves effective in developing fundamental multi-skills in young children. Physical Education teachers are encouraged to adopt this model alongside other programs to optimize physical development in early learners, particularly those in low-activity regions such as Papua.

Keywords: Crocodile river; socorro; meo duoi chuot; kids' athletics; multi skill

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INTRODUCTION

The organization of the XX National Sports Week (PON) is the momentum for Papua to be declared a sports province (Papua, 2022). This is in line with the vision and mission of the President of the Republic of Indonesia, Mr. Joko Widodo, who will develop the talents of young Papuans and also athletes from other regions who are expected to train in Papua by utilizing the venues left over from PON XX (Kemenko PMK, 2021). Talent development is ideally carried out from an early age, therefore scouting of athletes needs to be done, especially in Papua. Childhood is a phase when children are very active in doing physical activity or sports (Anisah et al., 2020). Physical activity with sports in children is influenced by motor skills that are considered important in elementary sch children, namely gross motor skills (Ningrum, 2018). It further explains that early sports participation is a protective factor against sedentary behavior, stress, depression, and psychological problems (Alberga et al., 2012).

Sports participation at an early age is able to develop motor coordination by providing more opportunities to learn and perfect motor skills (Abhaydev et al., 2020). Motor skills are a driver, driving the overall process that occurs in the physical including the coordination process and the process of regulating physical conditions which are influenced by various factors including physiological factors and psychological factors to perform optimal movements, especially in sports movements (Chaeroni et al., 2022). Sports are all systematic activities to encourage, foster, and develop physical, technical, tactical, mental, and social potential (Kardi & Ita, 2023).

Sport is also considered a training strategy to stimulate intellectual processes such as attention, memory, creativity, and reasoning and strengthen abilities such as concentration, problem-solving, planning strategies, and creativity for children with special educational needs (Abhaydev et al., 2020). In recent decades a growing trend in every sport is grassroots development. Grassroots development is a combination of participatory approaches and local capacity building to empower communities to develop according to their own regional needs and values (Kennedy, 2017).

Based on this, the World Athletics Association (World Athletics) has developed a new concept that focuses on the developmental needs of children by inspiring children's sports enthusiasm and mutual interaction through the Kids' Athletics program. Kids' Athletics participants are all children aged between 4-14 years, including children who participate in various activities and have a special interest in athletics (World Athletics, 2019). The results of previous studies revealed that kids' athletics programs have a positive impact on most children's physical condition improvement with a variety of interesting exercise models, thus increasing children's motivation in physical activity while playing (Blatsis et al., 2015). The Kids' Athletics program aims to make athletics the most popular sport in schools to educate children about sports especially athletics, thus promoting a balanced and healthy lifestyle (World Athletics, 2019). The program also aims to address the issue of early specialization in training programs to improve performance at a young age and minimize burnout syndrome (Anisah et al., 2020). Other studies have also revealed that kids' athletics programs can improve students' academic performance, including physical education scores (Çalık et al., 2018).

The proportion of physical activity in the population aged ≥ 10 years in Papua Province is dominant in the moderate category, namely 66.09% and less than 33.91% (Tim Riskesdas, 2018). Riskesdas data shows that there is still a low level of physical activity in Papua, so it is necessary to do sports massages starting from early childhood to the elderly. It is further confirmed that the results of research on the level of sports participation in Papua Province are 27.92% with a physical literacy index of 0.563 or 56.3% (Kogoya et al., 2022). Based on the fact that the level of physical activity in Papua Province is still minimal, therefore it is necessary to move to increase the physical literacy of school children, one of which is by implementing the Kids' Athletics program. Currently in Papua, especially in Jayapura City, kids' Athletics massaging has not been implemented optimally, so a breakthrough is needed to increase the physical activity of children in schools.

The results of the researcher's observations found several problems, namely the limited research on kids athletics learning models that are integrated with the elementary school curriculum in Indonesia, the lack of studies on the modification of tools, facilities, and kids athletics training models that are by the conditions of elementary schools in Indonesia, and not many studies have examined the impact of kids athletics on the development of multi-skills of elementary school students, especially in grade I and II students aged 6-7 years.

From the problems that occur it is necessary to conduct research to test the effectiveness of various learning approaches in kids athletics, conduct comparative studies of the implementation of kids athletics training models, and examine effective learning development strategies in elementary school students aged 6-7 years.

Based on the problems, this study will increase the multi-skills of children aged 6-7 years through the Kids' Athletics program including the Crocodile River, Socorro, and Meo Duoi Chuot training models. Multi-skills is a basic training program to develop basic skills such as walking, running, jumping, throwing, catching, rolling, and maintaining balance aimed at school children developed by Eastern European countries (Ningrum, 2018). Children who develop multiple skills are better able to adapt to the load in training. In addition, a multi-skill training program will lead to successful performance at the next stage of development.

Kids Athletics is a sport of athletics that has been modified for elementary school students (Inayah & Nurrochmah, 2021). The Kids Athletics level 1 program is an alligator river training method that develops basic skills including agility, balance, coordination, reaction and reactive movements, and spatial awareness. (Gozzoli et al., 2006; World Athletics, 2024). The effectiveness of the results of providing multilateral kids' athletic movements and the influence on the effectiveness of the kids' athletic training method on elementary school students (Achman et al., 2021). The Socorro training method develops basic skills including agility, bilateral movements, reactions and reactive movements, and spatial awareness (World Athletics, 2024; Australia, 2016; Gozzoli et al., 2006). The results of the study stated that Kid's Athletics recommended by the IAAF can be considered an effective program to improve motor and psychomotor abilities in students (Abhaydev et al., 2020). The Meo duoi chuot training method develops basic skills including agility, coordination, rhythm, and spatial awareness. Based on the description of the background of the problem, this study aims to improve level 1 muti-skills including basic skills in the form of agility, balance, coordination, reaction and reaction movements, rhythm, and spatial awareness (World Athletics, 2024; Gozzoli et al., 2006). Through the kids' athletics program, children will have good basic movements (Nurulfa et al., 2022).

METHOD

Research Design

The method employed in this study was a quasi-experimental design using a one-group pretest–posttest approach. This design involved three main stages: (i) administering a pretest to measure the dependent variables before the intervention, (ii) delivering the intervention by applying the Kids' Athletics training models—Crocodile River, Socorro, and Meo Duoi Chuot, and (iii) administering a posttest to measure the dependent variables after the intervention. This pre-experimental design was selected in line with the research objective, namely to improve the multi-skill levels of elementary school students through the Kids' Athletics Level 1 program, which incorporates the Crocodile River, Socorro, and Meo Duoi Chuot training models. Such a design was considered appropriate for assessing the immediate effects of the intervention.

Participants

The participants in this study were students from a public elementary school in Papua, with a total population of 107. From this population, 50 students (25 boys and 25 girls) were selected using a purposive sampling technique. The participants were aged between 6 and 7 years, with a mean age of 6.53 years. The intervention lasted for eight weeks, with two sessions conducted each week, during the period of May to June 2024.

Instrument

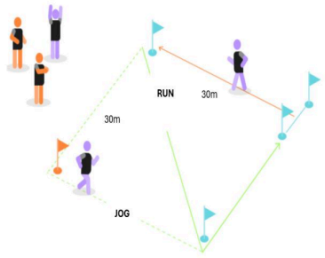
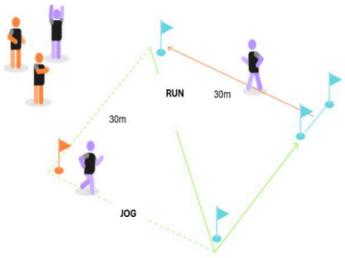
The instruments used in this study include tests and measurements of the Indonesian student fitness level, including (i) (i) the flexibility test with a validity value of 0.220 (valid) and a reliability value of 0.594 using a modified sit and reach and (ii) the one-leg stand test (balance) with an instrument validity value of 0.121 (valid) and a reliability value of 0.608. The tool used is a stopwatch to measure time; (iii) the ball throwing test (coordination) using a tennis ball with a validity value of 0.486 (valid) and a reliability value of 0.548 by using a stopwatch to measure time. 548 by using a stopwatch to measure how many catch the ball for 30 seconds; 4) running back and forth (agility) with a validity value of 0.533 (valid) and a reliability value of

0.539 with a size of 4 x 10 meters running back and forth measured by a stopwatch; and 5) a cardiovascular test (endurance) with a validity value of 0.304 (valid) and a reliability value of 0.580 measured by a stopwatch (Kemdikbud, 2024).

Research Procedures

Phase I of this study began with the collection of baseline data through a physical fitness pretest using the Indonesian Student Fitness Level, which included tests and measurements of flexibility, balance, coordination, agility, and endurance. In Phase II, three training models—Crocodile River, Socorro, and Meo Duoi Chuot—were implemented over eight weeks with a frequency of two sessions per week. The Crocodile River model involved a scenario in which players took turns rescuing a giraffe from a crocodile through a sequence of tasks, such as throwing an object at a target, jumping horizontally or across stepping stones, performing slalom runs, and vertically jumping to touch a target, with progression allowed only after completing each task. The Socorro model was conducted in a large playing area (approximately 15 × 15 m, adjusted to the number of players), where a chaser attempted to catch a runner. If a player was at risk of being caught, they shouted "Socorro!" to call for help, after which another player assisted by holding their hand. The pair then continued running together, with the rule that they could not be caught while holding hands but had to release after three seconds, and any player caught became the next chaser. The Meo Duoi Chuot model was carried out with one student acting as a cat and another as a mouse, while the rest of the students formed a circle by holding hands to create arches. The mouse started from one side of the circle and the cat from the opposite side, with both running in and out of the arches until the cat caught the mouse, at which point the roles were alternated. Finally, Phase III involved the posttest, during which students' multi-skills were reassessed using the Indonesian Student Fitness Level, including flexibility, balance, coordination, agility, and endurance.

Table 1. Exercise Sessions for 8 weeks with a frequency of 2 times/week

Week	Tuesday	Friday
Week 1-week 8	Warming up 10 minutes: 1. Jogging around a 30m x 30m field by running across the diagonal line each lap (5 minutes)  2. Static and dynamic stretching (5 minutes)	Warming up 10 minutes: 1. Jogging around a 30m x 30m field by running across the diagonal line each lap (5 minutes)  2. Static and dynamic stretching (5 minutes)
	Main Session (45 minutes): 1. Crocodile river (15 minutes) 2. Socorro (15 minutes) 3. Meo duoi chuot (15 minutes)	Main Session (45 minutes): 1. Crocodile river (15 minutes) 2. Socorro (15 minutes) 3. Meo duoi chuot (15 minutes)
	Cool Down (10 minutes) 1. Jogging 5 minutes 2. Stretching the body from the neck joint to the toes (5 minutes)	Cool Down (10 minutes) 1. Jogging 5 menit 2. Stretching the body from the neck joint to the toes (5 minutes)

Data Analysis

Data analysis in this experimental study was conducted in several stages. First, the collected data were prepared by ensuring that they were properly formatted, organized, and cleaned of errors or outliers. Second, descriptive statistics were calculated to provide an overview of the data distribution. Third, inferential analysis was performed using the Paired Sample t-test on the pretest and posttest values, with the assistance of SPSS version 29. The results were then presented in the form of tables and diagrams to illustrate the findings clearly. Finally, the outcomes of the pretest and posttest comparisons were interpreted to determine whether significant differences existed before and after the implementation of the Kids Athletics training methods, including Crocodile River, Socorro, and Meo Duoi Chuot. These interpretations were used to draw inferences about the effectiveness of the intervention and its implications for the broader population.

RESULTS AND DISCUSSION

Based on the results of the research that has been carried out, data on the pretest and posttest of students' multi-skills improvement were obtained after participating in the Crocodile River, Socorro, and Meo Duoi Chuot training models for 8 weeks with a frequency of two sessions per week. Overall, the findings indicate a positive trend, where students demonstrated notable progress in several components of multi-skills after the intervention. These improvements suggest that the training models provided engaging and effective methods for enhancing students' physical abilities. The detailed results can be seen in Figures 1 and 2.

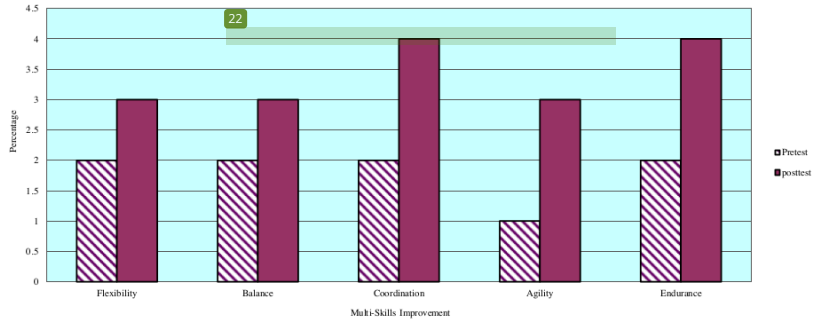


Figure 1. Male Students' Multi-Skills Improvement

This study found that the application of the Crocodile River, Socorro, and Meo Duoi Chuot training models had a positive impact on improving the multi-skills of male students. Specifically, flexibility increased by 30.43% and balance by 25%, both moving from the "less" to the "moderate" category. Coordination improved by 60% and endurance by 23.83%, shifting from the "less" to the "good" category, while agility improved by 39.10%, moving from the "very less" to the "moderate" category. These findings highlight the effectiveness of integrating game-based approaches into physical education, as they provide both enjoyment and measurable improvements in performance. Moreover, the use of culturally adaptable training models makes the program relevant and sustainable for elementary school settings. Based on these findings, it is recommended that physical education teachers incorporate the Crocodile River, Socorro, and Meo Duoi Chuot training models into their instruction to enhance the multi-skills of male students aged 6–7 years.

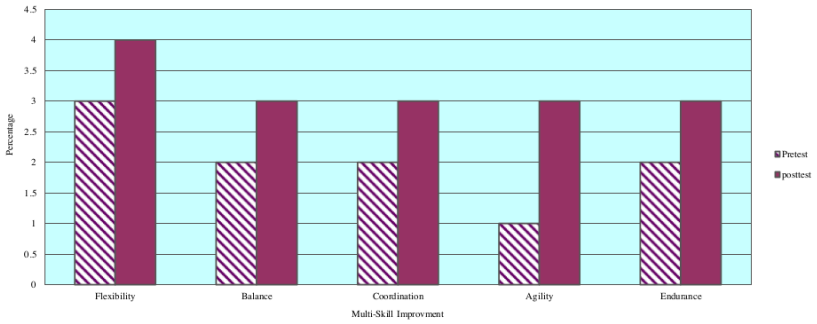


Figure 2. Female Students' Multi-Skills Improvement

Through this research, it was found that the application of the Crocodile River, Socorro, and Meo Duoi Chuot training model had an impact on improving male students' multi-skills. The findings on the flexibility improvement 10.34% component have increased from the moderate category to the good category, coordination improvement 40%, balance improvement 32.3%, and endurance improvement 20.28% have increased from the deficient category to the moderate category, and the agility improvement 32.30% component has increased from the very deficient category to the moderate category. Based on the results obtained, it is recommended that sports teachers apply the Crocodile River, Socorro, and Meo Duoi Chuot training models in learning to improve the multi-skills of female students aged 6-7 years.

Table 2. Pretest and Posttest Results of Multi-Skills Level 1 Kids' Athletics

Gender	Indicators	Pretest Category						Posttest Category						Average result		P-Value
		Very Good	Good	Moderate	Less	Very Less	Sum	Very Good	Good	Moderate	Less	Very Less	Sum	Pretest	Posttest	
Male	Flexibility	0	1	3	12	9	25	2	4	10	7	2	25	11.5	15.0	0.003
	Balance	0	2	9	10	4	25	1	6	12	5	1	25	13	30	0.001
	Coordination	1	3	5	10	6	25	5	8	6	4	2	25	9	16	0.001
	Agility	1	4	7	4	9	25	5	4	7	6	3	25	00.18.32	00.13.17	0.002
	Endurance	1	3	6	12	3	25	6	8	6	5	0	25	05.35.00	04.32.50	0.003
Female	Flexibility	3	5	10	3	4	25	7	10	2	6	0	25	14.5	16.0	0.002
	Balance	0	2	9	13	1	25	4	7	10	3	1	25	11	20	0.003
	Coordination	0	2	3	12	8	25	1	5	8	6	5	25	4	7	0.003
	Agility	0	2	3	3	17	25	1	2	15	0	7	25	00.20.11	00.15.20	0.002
	Endurance	0	3	6	15	1	25	4	0	16	5	0	25	06.21.12	05.15.70	0.002

Based on the results of the data analysis, it was found that there was a significant difference between the pretest and posttest scores of the multi-skills level in Kids' Athletics after the application of the Crocodile River, Socorro, and Meo Duoi Chuot training models. For male students, the findings were as follows: (i) Flexibility showed a significant difference with a p-value of 0.003 (< 0.05), where the average pretest score was 11.5 (categorized as less) and the average posttest score increased to 15.0 (categorized as moderate). (ii) Balance showed a significant difference with a p-value of 0.001 (< 0.05), improving from an average pretest score of 13 (less) to 30 (moderate). (iii) Coordination showed a significant difference with a p-value of 0.001 (< 0.05), increasing from an average pretest score of 9 (less) to 16 (good). (iv) Agility showed a significant difference with a p-value of 0.002 (< 0.05), improving from an average pretest time of 18.32 seconds (very poor) to 13.17 seconds (moderate). (v) Endurance showed a significant difference with a p-value of 0.002 (< 0.05), with the average pretest time of 5 minutes 35 seconds (poor) improving to 4 minutes 32 seconds (good).

The multi-skills results found in female students include: (i) Determination obtained p-value 0.002 < 0.05 which indicates there is a significant difference between the average pretest result of 14.5 (moderate) with an

average posttest of 16.0 (good); (ii) Balance obtained p-value 0.003 < 0.05 which indicates there is a significant difference between the average pretest result of 11 (moderate) and the average posttest of 20 (moderate); (iii) Coordination obtained p-value 0.003 < 0.05 which indicates there is a significant difference between the average pretest result of 4 (less) and the average posttest of 7 (moderate); (iv) Agility obtained p-value 0.002 < 0.05 which indicates there is a significant difference between the average pretest result of 00:20:11 (very less) and the average posttest of 00.15.20 (moderate); (v) Endurance obtained p-value 0.002 < 0.05 which indicates there is a significant difference between the average pretest result of 06:21:12 (less) and the average posttest of 05.15.70 (moderate).

The purpose of this study is to see how much the multi-skills of students aged 6-7 years increase after doing Crocodile River, Socorro, and Meo Duoi Chuot training models. The findings of this study revealed that an 8-week training program with a training frequency of 2 times/week significantly improved multi-skills variables including flexibility, balance, coordination, agility, and endurance when compared to baseline conditions. Similar research also revealed that the kids' athletics training method is better in improving multi-skills compared to traditional methods (Petros et al., 2016). It is further confirmed that the kids' athletics program recommended by World Athletics is effective in improving motor skills in children even those who are sedentary (Abhaydev et al., 2020). Similar research also revealed that the kids' athletics program is effective in improving the multilateral of primary school students (Achman et al., 2021).

The crocodile river training model dominantly improves multi-skills of agility, balance, coordination, and flexibility (World Athletics, 2024). It is further explained that the skills that are improved through the crocodile river training model are walking, running, jumping, and throwing which are important skills for students to increase multi-skills. The Socorro training model dominantly increases agility and endurance (World Athletics, 2019). It is further explained that the skills improved through the Socorro training model are walking and running which are basic skills in athletics and sports in general. The Meo Duoi Chuot training model predominantly improves agility, coordination, flexibility, and endurance (World Athletics, 2024). It is further explained that the skills improved through the meo duo chuot training model are walking and running which are crucial skills for children aged 6-7 years. The dominant multi-skills improvement of each training model found in this study is shown in Figure 3.

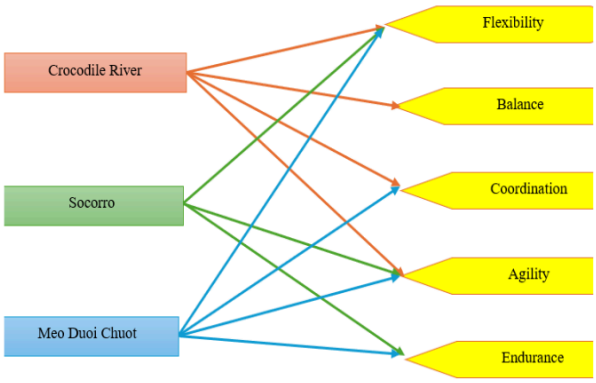


Figure 3. Dominant Multi Skills Improved

Based on the findings through the application of the kids' athletics training model, it is hoped that it can be implemented as an effort to improve students' multi-skills from an early age. Similar research shows that kids'

athletics activities can be used as a medium to shape and develop student motor movements, through kids athletics students will learn various basic motor movements in the form of games and a fun atmosphere (Yusup & Agus, 2021). The kids' athletics training model has a significant impact on students' multi-skills and numbers in athletics (Başkaya et al., 2023). Other research also reveals that Kids Athletics is a form of game method that is suitable for elementary school children as stimulation of gross motor skills (Yusup & Agus, 2021). There is a significant effect of the Kids Athletics program on the basic movement skills of running, jumping, and throwing in children (Tazah, 2020). It is further explained that the development of kids' athletics is a brilliant idea so that elementary school children can get to know basic athletic movements from an early age as a foundation for becoming athletes (Putra & Bafirman, 2020). Similar research revealed that the Kid's Athletics program in schools can improve students' life skills and by implementing the Kids Athletics training model students can face various challenges of everyday life (Nugraha et al., 2022). In addition, physical education programs in general have been proven to enhance students' physical abilities, highlighting the importance of PE teachers designing optimal programs that support students' growth and development (Zhang, 2023). In this regard, Kids' Athletics offers a promising model, as its variety of training activities helps ensure that students remain engaged and motivated in the learning process.

Kids' athletics provides ample room for the development of multi-skills that play an important role in the development of basic human movement functions, kids' athletics training models also use facilities and infrastructure that are easily obtained (Tomáš, 2016). The kids' athletics program influences improving multi-skills (Halimah, 2019). The Kids' Athletics game model can be used and advised to PE teachers to be able to develop Kids' Athletics material (Hars et al., 2023). Kids athletics is a set of tools intended for children's sports activities in introducing the basics of athletic movements in the form of games, stimulating physical growth and development maintaining health, and avoiding boredom in children (Hindriani et al., 2018). The Kids Athletics program provides space for children to compete in groups gradually, with fun, and by age and development (Belal & Ahmed, 2020). Through experiments on school-aged children, they found a significant impact of kids' athletics training models such as Crocodile River, Socorro, and Meo Duoi Chuot on children's general movement performance (Jakubík & Broďáni, 2023).

CONCLUSION

The findings of this study demonstrate that multi-skills can be improved in primary school students aged 6–7 years through participation in the Kids' Athletics program, specifically using the Crocodile River, Socorro, and Meo Duoi Chuot training models. An eight-week intervention with two sessions per week was sufficient to enhance flexibility, balance, coordination, agility, and endurance. From a theoretical perspective, the combination of these three training models has a significant influence on the development of students' multi-skills, while practically, the Kids' Athletics program can be effectively integrated into physical education to support the growth and optimization of students' abilities. It is therefore recommended that physical education teachers incorporate the Kids' Athletics program alongside other learning activities to maximize students' skill development. However, this study had several limitations, including a relatively small number of participants, a short intervention period, and a focus only on lower-grade students. Future research is encouraged to involve larger samples, longer durations, and multiple grade levels across several schools to obtain more comprehensive and generalizable results.

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CONFLICT OF INTEREST

The authors of this article declare that they have no conflict of interest in the conduct of this study.

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