



The Effectiveness of Circuit Training and Traditional Boy-Boyan Games on The Sprint Running Speed of Elementary School Students

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Abstract

Athletics learning in short distance running for elementary school students still faces various obstacles, especially low student participation due to the use of monotonous and less varied learning methods, resulting in suboptimal sprint learning outcomes. Game-based learning approaches are considered capable of increasing student engagement while also developing motor skills, including running speed. However, research specifically comparing the effectiveness of circuit training and traditional boy-boyan games on improving sprint speed in elementary school students is still limited. This study aims to analyze the comparative effectiveness of circuit training games and traditional boy-boyan games on increasing the speed of short distance running of elementary school students. The approach used is quantitative with a quasi-experimental design (pretest-posttest control group design). The research subjects amounted to 45 students in grade V who were divided into three groups, namely the circuit training group, the boy-boyan traditional game group, and the control group. The research instrument used a 40-meter sprint running test which was carried out at the pretest and posttest stages. Data analysis was carried out using parametric statistical tests through normality and homogeneity tests as prerequisite tests, followed by the One Way ANOVA test to determine differences between groups, and the Tukey HSD post hoc follow-up test to determine specific differences. The results showed that there was a difference in increased running speed between the treatment groups. The boy-boyan traditional game group showed a significant improvement compared to the conventional learning group ($p = 0.032$), while the circuit training group showed no significant difference. Descriptively, all groups experienced an increase in running speed after being given the treatment, but the most optimal improvement occurred in the traditional boy-boyan play group. The conclusion of this study shows that the traditional boy-boyan game is more effective in increasing the speed of short distance running of elementary school students than circuit training and conventional learning.

How to Cite

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INTRODUCTION

Physical Education, Sports, and Health (PE) learning, especially in short-distance running materials in elementary schools, still faces various problems, especially low interest and student participation in participating in the learning process. This condition is generally caused by the use of learning methods that tend to be monotonous and lack a variety of activities, so that students feel bored and less motivated to practice optimally. As a result, the development of students' biomotor skills, especially running speed. It has not developed optimally. According to Hartati & Kristianto (2019), the use of a game-based approach has been proven to be able to increase student involvement and active participation in Physical education learning. Research by Ahmad Fuazi et al (2024), showing that traditional games can increase student participation in physical education learning as well as develop basic motor skills. In addition, Mulyana et al., (2024) stating that active and varied learning also contributes to students' movement skills and speed, these findings are supported by re-search Novianto (2025) which shows that a variety of exercise activities involving dynamic movements such as changes of direction and acceleration can improve students' speed and movement performance.

In addition, the game-based learning approach has been proven to be able to increase student involvement and activity in physical education learning (Wang et al., 2024). Research By Squirrels (2018) shows that the play method is able to increase the motivation to learn short-distance running in elementary school students. In its implementation, methods such as circuit training and traditional boy-boy games can be used as a more varied learning alternative. Circuit training is a training method that is carried out through several posts to train physical components, such as strength, endurance, and speed. This is in line with Anisa et al (2023) His research shows that circuit training can have a significant influence on increasing students' running speed. Meanwhile, the traditional boy-boy game involves dynamic movement activities such as running, dodging and reacting quickly. So that it has the potential to increase the speed and agility of students (Wati et al., 2024). Thus, circuit training and traditional boy-boy games have the potential to increase running speed, however, the characteristics of the two methods are different, so it is necessary to study more deeply their effectiveness in physical education

learning, especially short-distance running athletics.

Previous research has shown that a game-based approach has a positive impact on physical education learning. Research by Sugihartini et al., (2024), showing that the application of traditional cat-and-mouse games has an effect on the improvement of 50-meter sprint running ability. Game-based learning can be a novel alternative to learning, thus creating a more interesting, varied, and less monotonous atmosphere for students. Research by Firnanda & Andrijanto (2025) That the application of small games in physical education learning can significantly increase students' active participation. In addition, Research by Margono & Utomo (2018) It also states that the game-based circuit training learning model is able to significantly improve students' sprint performance. Meanwhile, research on traditional boy-boy games shows that game activities can improve students' motor skills and speed. This is in line with research Aryati (2019) at junior high school 7 Sukabumi, his research showed that traditional game-based methods can have a significant influence on the ability to learn short-distance running ($t_{hit}=5.045 > t_{table} = 2.060$, $\alpha=0.05$). This confirms that the combination of circuit training and traditional games can be an effective strategy in improving students' sprint skills. So that with an innovative approach, it is hoped that a more effective method can be found to increase the speed of students' short-distance running. In addition, Faris Abdillah et al., (2018) saying that traditional games involve explosive moves that have the potential to increase speed and agility.

However, most of the studies still examine circuit training and traditional game separately, and have not specifically compared the effectiveness of the two approaches to the short-distance running speed of elementary school students. Based on this, there is a research gap in the form of no study that directly compares the effectiveness of circuit training and traditional boy-boy games in increasing the speed of short distance running of elementary school students. Therefore, the formulation of the problem in this study is whether there is a difference in the effectiveness between circuit training and traditional boy-boy games on the speed of short distance running of elementary school students. This study aims to compare the effectiveness of the two methods in increasing students' running speed. The hypothesis of this study is that there is a significant difference between the use of circuit training and traditional boy-boy games on

the short-distance running speed of elementary school students. and which approach is more effective. This research has practical urgency for physical education teachers in designing more interesting and effective learning. The results of this study are expected to be a reference in improving the quality of learning, especially in short distance running athletic materials.

The novelty of this research lies in the comparative analysis between two game-based learning approaches, namely circuit taining and traditional boy-boyan games, which were studied directly in a research design on the variable speed of short-distance running of elementary school students. Thus, this research makes a new contribution to the development of a more varied, innovative, and contextual physical ed-ucation learning model according to the charac-teristics of elementary school students.

METHOD

This study uses a quantitative approach with a quasi-experimental design (pretest-posttest control group design). The quantitative approach is used because the data obtained is in the form of numbers and is statistically analyzed to test the research hypothesis. According to Siroj et al (2024), quantitative research is a method that uses numerical data to test hypotheses objectively. The research design involved three groups, namely two experimental groups and one control group given conventional learning treatments.

The population in this study is class V consisting of VA (22 students) and VB (23 students) classes in one of the elementary schools of Ban-dung Regency in the even semester of the 2024/2025 school year. The research sample was selected using the purposive sampling technique, which is the selection of subjects based on certain criteria that are relevant to the research objectives. These criteria include students aged 10-12 years, in good physical condition, and able to participate in learning activities. This technique was chosen so that the sample used was in accordance with the research needs and able to represent the phenomenon being studied.

The research instrument used a 40-meter sprint run test to measure students' running speed. This test is carried out at the pretest and posttest stages to find out the change in ability after being given treatment. According to Nurjama et al (2020)The 40-meter running test is an appropriate instrument to measure the speed of elementary school students aged 10-12 years. Measurements are made using a stopwatch in units

of seconds. The 40-meter run is done by running as fast as possible to the finish line on a straight, flat and non-slippery track with a dis-tance of 40 meters, Star can be done with cues such as flags, whistles, and generally using standing starts. Some of the criteria or assessment of the results of this sprint test are as follows: Criteria for 40 M sprint running research.

Table 1. Evaluation Criteria for the 40 M Sprint Run.

Age 10 to 12 Years		
male	Value	women
Sd - 6.3 seconds	5	SD - 6.7 seconds
6.4 - 6.9 seconds	4	6.8 - 7.5 seconds
7.0 - 7.7 seconds	3	7.6 - 8.3 seconds
7.8 - 8.8 seconds	2	8.4 - 9.6 seconds
8.9 - DST	1	9.7 - DST

Source : (Rizkiyani, 2020 p. 40)

This research procedure is carried out through three stages, namely pretest, treatment and posttest. The research was carried out for 15 meetings including pretest and posttest. The first experimental group followed a game-based circuit training learning that involved various training posts such as sprints, shuttle runs, and agility exercises. The second experi-mental group followed learning through tradi-tional boy-boyan games involving running, dodging and reacting quickly. Meanwhile, the control group followed conventional sprint learning that is commonly applied by teachers in schools, namely in the form of basic sprint running technique training combined with running through obstacles using cones, with a focus on mastering start, running phases, and finishing techniques that are carried out re-peatedly and structured according to the teacher's direction without game variation.

The data obtained is in the form of quantitative data from the measurement of students' running time. Data analysis using SPSS. Before the hypothesis test, a prerequisite test was carried out in the form of normality and homogeneity tests to ensure that the data met the as-sumptions of the analysis. Furthermore, the hypothesis test was carried out using the One Way ANOVA test to find out the differences between groups. If there is a significant differ-ence, it is followed by a post hoc test using the Tukey HSD method to find out the difference in more detail.

RESULTS AND DISCUSSION

The results of the **Table 2.** Descriptive Test

descriptive analysis show that the running time in the pretest for the circuit training group had an average of 8.5327 seconds. After the intervention, the posttest time decreased to 7.6467 seconds. In the boy-boyan group, the pretest average was 8.3780 seconds and decreased to 7.3933 seconds in the posttest. Meanwhile, in the control group, the pretest average was 8.6333 seconds and decreased to 8.0240 seconds in the posttest. The reduction in running times across all three groups indicates an improvement in running speed after the intervention, with the largest decrease occurring in the boy-boyan group, thus indicating that this method has a more optimal effect compared to other methods in enhancing students' running speed.

Table 2. Descriptive Test

	N	Min	Max	Mean	Std. Deviation
PreX1	15	6,95	9,84	8,5327	0,86689
PostX1	15	6,16	9,71	7,6467	0,85436
PreX2	15	7,58	9,45	8,378	0,66817
PostX2	15	6,32	9,27	7,3933	0,82644
Precontrol	15	6,91	9,86	8,6333	0,9125
Poscontrol	15	6,34	9,72	8,024	1,010809

Assumption testing is conducted before hypothesis testing to ensure that the research data meet the requirements of parametric statistical analysis. In this study, assumption testing includes normality testing and homogeneity testing of the research data.

The results of the normality test using Shapiro-Wilk indicated that the pretest and posttest data across all groups had significance values ($p > 0.05$), confirming that the data were normally distributed. Furthermore, the results of the homogeneity test using Levene's Test also showed significance values above 0.05, indicating that the variances between groups were homogeneous. Therefore, all data met the assumptions required for performing parametric statistical analysis using One-Way ANOVA.

Table 3. Pretest One Way Anova

	Sum of Squares	df	Mean Square	f	Sig.
Between Groups	.496	2	.248	.367	.695

The results of the One-Way ANOVA test on the pretest data showed a significance value of 0.695 ($p > 0.05$), indicating that there were no differences in initial sprint running speed ability among the circuit training group, the traditional boy-boyan game group, and the control group.

These findings suggest that all groups had relatively equivalent initial abilities before the treatment was administered.

Tabel 4. Posttest One Way Anova

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,021	2	1,511	1,850	0,170

The results of the One Way ANOVA test on the posttest data showed that a significance value of 0.170 ($p > 0.05$) could be concluded that there was no significant difference between the circuit training group, the boy-boyan group, and the control group on the results of short-distance running speed. Although the ANOVA test results on the posttest data showed no significant difference between groups, further analysis is needed to see the increase in running speed that occurred during the treatment process. Therefore, an analysis of the gain data was carried out to determine the difference in the improvement in learning outcomes in each group.

Because the results of the ANOVA test on the pretest and posttest data showed no significant differences between groups, the analysis was continued using gain data. The gain data was obtained from the difference between the pre-test and posttest values which aimed to determine the amount of increase in running speed after being given the treatment. Using gain data, researchers can compare the improvement of abilities between groups more accurately because they have considered the initial conditions of each group. Before hypothesis testing, analysis prerequisites are first carried out, namely normality tests and homogeneity tests, to ensure that the data meet the assumptions of using parametric statistical tests.

The results of the normality and homogeneity tests on the gain data indicate that the data are normally distributed and homogeneous ($p > 0.05$). Therefore, the data meet the assumptions for conducting parametric analysis using the One-Way ANOVA test.

Tabel 5. Anova Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,136	2	0,568	3,678	0,034

The results of the One Way ANOVA test on the gain data showed that the significance value was 0.034 ($p < 0.05$). This shows that there is a significant difference between the circuit training group, the boy-boyan group, and the control

group in the increase in short-distance running speed. then the analysis was continued with a post hoc test using the Tukey HSD method. This test aims to determine the difference in increased running speed more specifically between the treatment group pairs.

Table 6. Post Hoc Tukey HSD

Groups		Mean Difference (I-J)	Sig.
circuit training	Boy boyan	-0,09867	0,772
	Conventional	0,27667	0,143
Boy boyan	circuit training	0,09867	0,772
	Conventional	.37533*	0,032
Conventional	circuit training	-0,27667	0,143
	Boy boyan	-.37533*	0,032

The results of the follow-up test (Post Hoc) using the Tukey HSD method showed that there was a significant difference between the boy-boyan group and the control group ($p = 0.032 < 0.05$). Meanwhile, there was no significant difference between the circuit training group and the boy-boyan group ($p = 0.772$) or between the circuit training group and the control group ($p = 0.143$). These findings suggest that a significant increase in running speed occurred only in the boy-boyan group compared to the control group, whereas the circuit training method did not show a significant difference between the two groups.

This study aims to analyze the comparative effectiveness of circuit training games and traditional boy-boyan games on the speed of short distance running of elementary school students. This research is expected to be a reference in the selection of an effective teaching model to improve students' sprint running ability in physical education learning. The results of the hypothesis test showed that there was a difference in the increase in students' sprint running speed between treatment groups. Based on the results of the post hoc test on the gain data, it was found that the boy-boyan traditional game group had a significant difference in improvement compared to the conventional learning group ($p < 0.05$), while the circuit training group did not show a significant difference. Therefore, it can be concluded that the traditional boy-boyan game is more effective in increasing students' sprint running speed compared to other methods. This is supported by the characteristics of traditional games that are not only fun, but also able to stimulate creativity, agility and speed of thinking in children (Saputra et al., 2021). Thus, game activities provide a more

optimal stimulus of movement than conventional learning. This increase shows that the learning activities provided are able to provide optimal stimulus to increase the running speed of students.

This increase can be explained through the characteristics of the traditional boy-boyan game which involves running, dodging and reacting quickly. In addition, this activity is directly related to the main components in sprint running such as speed, acceleration and coordination of movement. This is in line with research Wati et al., (2024) which states that the traditional boy-boyan game can be directly attributed to the short-distance running material. In addition, the use of traditional games in learning has also been proven to be able to significantly improve the learning outcomes of short-distance running (Telaumbanau et al., 2025). From the aspect of movement mechanism, the increase in running speed is influenced by several important components such as muscle strength, start technique, acceleration and movement coordination. These components are the main factors that determine the performance of a sprint run (Pratama & Sitompul, 2024). Activities in the boy-boyan game that are dynamic and involve changes in direction and quick responses indirectly train all of these components simultaneously, thus having a more optimal influence on increasing running speed. Meanwhile, the circuit training group also showed an increase in running speed ability, but did not provide a significant difference. This is in line with research that shows that circuit training exercises have an effect on increasing students' sprint running speed (Syahrul Nur Afandi et al., 2024). However, circuit training exercises tend to be structured and repetitive, so the variety of exercises given is more limited compared to game-based activities. The effectiveness of exercises involving changes of direction and acceleration is also seen in shuttle run exercises which have been proven to be able to significantly increase students' speed, acceleration, and agility (Novianto, 2025). This characteristic has similarities with activities in the boy-boyan game, so it can explain

Based on previous theoretical and research studies, it can be concluded that the increase in student running is influenced by the type of physical activity carried out, especially activities that involve dynamic movement, movement variation, and response to game situations. Traditional boy-boyan games meet all these characteristics, so that they have a more optimal influence than conventional circuit training and learning methods. Although the results of this study showed differences in effectiveness, this study had limita-

tions, especially the absence of randomization of subjects, the limited number of samples in one school, and the relatively short duration of treatment. Therefore, further research is recommended to use a more rigorous experimental design with a wider sample and a longer duration.

CONCLUSION

The results of this study showed an increase in running speed from pretest to posttest in all treatment groups, which indicated a tendency to adapt positively after being given a learning intervention. However, research findings indicate that the traditional boy-boyan game provides more optimal improvement in sprint running speed compared to conventional learning, while circuit training provides improvement that is not yet as optimal as the traditional boy-boyan game. However, descriptive improvements were still seen in the circuit training group, which showed that the method still contributed to the improvement of students' running speed. The findings of this study show that game-based learning, especially traditional boy-boyan games, is more effective in increasing the running speed of elementary school students because it is in accordance with the developmental characteristics of children who tend to be active, enjoy playing, and learn through movement activities. In addition, traditional boy-boyan games involve dynamic, varied, and contextual movement activities, thus providing a more optimal stimulus of movement than conventional or rigidly structured learning. Further research is suggested using a more rigorous experimental design with a wider sample and longer duration.

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