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Effects of the Traditional Engklek Game on Balance and Coordination in Grade 7 Students at SMP Swasta Bina Satria

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Abstract

Objectives. This study examined changes in balance and coordination following participation in *Engklek*, a traditional Indonesian game, among Grade 7 students at Bina Satria Mulia Private Junior High School during the 2025/2026 academic year.
Materials and Methods. The study used a one-group pretest–posttest design. Thirty-five students were randomly selected from a population of 75 Grade 7 students. Balance and coordination were assessed before and after the *Engklek* sessions. Pretest and posttest scores were compared using paired-samples *t* tests.
Results. Balance test times ranged from 7.8 to 12.1 at pretest and from 11.6 to 17.0 at posttest. Coordination test times ranged from 15.1 to 17.6 at pretest and from 13.6 to 15.9 at posttest. Pretest and posttest results differed significantly for balance, $t(34) = 22.50$, $p < .001$, and coordination, $t(34) = 53.66$, $p < .001$.
Conclusions. Students recorded longer balance times and shorter coordination times after participating in *Engklek*. The findings suggest that *Engklek* may be a useful activity for practising balance and coordination in junior high school physical education. The one-group design limits conclusions about whether the game itself caused the changes.
Keywords: Engklek, balance, coordination, traditional games, physical education

Introduction

Physical education plays a strategic role in supporting the holistic development of students—encompassing physical, motor, cognitive, social, and emotional aspects. At the junior high school (SMP) level, particularly in the seventh grade, students are in a transitional phase from childhood to early adolescence, a period marked by rapid physical growth and the development of movement capabilities. At this stage, enhancing fundamental and advanced motor skills—such as balance and coordination—is crucial; it serves as a foundation for more complex movement patterns and supports daily learning activities.(Winata et al., 2026)

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Physical education, often referred to as *penjas*, is a school subject centered on physical activity and exercise. It is taught across all educational levels, from kindergarten through elementary, junior high, and high school. This subject is essential because it directly relates to human physical health. The physical activities taught yield significant benefits for the body; when students are physically fit and refreshed, their ability to focus on their studies improves. Conversely, if a student experiences physical discomfort or pain, their ability to concentrate diminishes, which can lead to a decline in academic performance.(dewi sartika, 2026)

Consequently, physical education plays a vital role in fostering both academic achievement and physical fitness among students in various formal and informal educational settings. A healthy body and optimal physical condition are prerequisites for students to attain high levels of fitness and academic success; without them, the opposite may occur.(Winata et al., 2023)

Key components for achieving health and fitness through physical education include balance and coordination, which are essential for the proper functioning of a student's motor skills. Balance is required to maintain body position—whether in a static or dynamic state—while coordination serves to integrate the movements of various body parts in a harmonious and efficient manner. These abilities are fundamental to a wide range of physical education activities, sports, and the tasks of daily life. In reality, however, many junior high school students still exhibit levels of balance and coordination that are not yet optimal. This is evident in the difficulties students face when performing movements such as hopping on one leg, changing direction rapidly, or coordinating arm and limb movements simultaneously during physical education (PE) classes at school.(Devi Catur W, 2026)

In practice, the physical movements taught in PE classes influence how the body functions in daily life—specifically regarding balance and coordination. A lack of balance makes an individual prone to falling, while poor coordination hinders one’s ability to respond with controlled, purposeful movement. Consequently, it is essential for students to develop good balance and coordination, as these skills are fundamental to all aspects of their daily lives.(D.catur et.al, 2024)

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Furthermore, observations in the field indicate that the prevailing approach to physical education remains largely monotonous, dominated by drills focused on the technical fundamentals of formal sports, with insufficient emphasis on play-based learning. PE teachers frequently rely on direct instructional methods, which limits opportunities for students to engage in active, exploratory, and enjoyable physical movement. As a result, students' motivation and enthusiasm for physical education decline, which in turn prevents the optimal development of their motor skills.(Devi Catur W, 2026)

One factor contributing to the low levels of balance and coordination among students is the lack of varied and engaging physical activities during the learning process. Physical education in schools is often still oriented toward formal sports and the fundamental techniques of specific athletic disciplines, leaving little room for students to engage in active, enjoyable movement that aligns with their developmental characteristics. Furthermore, technological advancements and modern lifestyles have led students to spend more time on sedentary daily activities—such as using electronic gadgets or watching television—which negatively impacts their movement quality and physical fitness. This, combined with a monotonous approach to instruction, results in poor coordination and balance.(Acmad et al., 2021)

Traditional games offer a potential alternative for addressing these issues. As many traditional games have been largely abandoned or forgotten, it is important to reintroduce them to students, showing them that these games can be both engaging and enjoyable. Beyond their cultural value and local wisdom, traditional games are rich in movement elements that stimulate students' physical and motor development. One such example is *engklek* (a form of hopscotch). This game requires players to hop on one leg, maintain body balance and stability, regulate their rhythm, and coordinate the movements of their legs, arms, and gaze simultaneously. Such activities directly engage components of both static and dynamic balance, as well as overall body coordination.

In addition to physical benefits, *engklek* offers advantages in psychological and social aspects. The game is simple, easy to play, and requires no expensive equipment. It fosters an enjoyable learning environment, which is expected to boost student

motivation and participation in physical education—ultimately leading to positive outcomes in the students' motor skill acquisition.

Observations conducted by the researcher at Budi Mulia Private Junior High School revealed that a large proportion of seventh-grade students still struggle with balance and movement coordination, particularly when performing activities that involve jumping, changing direction, or executing combinations of movements. Furthermore, the use of traditional games in physical education remains relatively limited and has not been optimally utilized as an instructional medium to enhance students' motor skills.

Based on a needs analysis conducted through field observations, it was found that 60–70% of students scored below the "good" category. This was determined using balance and coordination tests. In the static balance test (standing on one leg), some students could only maintain the position for 10–15 seconds, whereas the expected standard is over 20 seconds. Similar results were observed in coordination tests, such as those involving catching and throwing a ball or executing effective limb movements. These data indicate a need for instructional innovations specifically designed to improve students' balance and coordination.

Based on the description above, it is necessary to conduct research to scientifically examine the impact of the traditional game "Engkelek" on the improvement of balance and coordination among seventh-grade students at Budi Mulia Private Junior High School for the 2025/2026 academic year. This research is expected to make a tangible contribution to the development of physical education learning models that are innovative, enjoyable, rooted in local culture, and effective in enhancing students' balance and coordination abilities. Furthermore, the findings of this study are intended to serve as a reference for physical education teachers in selecting and implementing teaching methods that align with the characteristics and needs of their students.

Materials and Methods

Study Design

This study employs a quantitative research approach to examine the influence of two distinct variables and determine the strength of the relationship between them. The

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objective is to provide a systematic overview of the phenomenon under investigation—specifically, the impact of the traditional game *engklek* (hopscotch) on children's gross motor development. The study involves an independent variable—the traditional game *engklek* (X)—and two dependent variables: balance (O1) and coordination (O2). It is an experimental study utilizing a "One-Group Pretest-Posttest Design," in which a single group undergoes a pretest, receives an intervention (treatment), and is subsequently observed. This process aims to determine whether the traditional game *engklek* has a significant effect on balance and coordination, with a posttest administered to assess the extent to which the intervention was effectively received and integrated by the students.

Study Participants

Taking into account time, effort, and cost, the data collection process utilizes a sample drawn from a population that has been pre-stratified based on geographical area. Specifically, a "saturated sample" (also known as a census) is employed, in which every member of the population is included as a subject. Thus, based on the sampling technique described above, the author has selected a random sample, resulting in a total of 35 individuals serving as the research sample.

Statistical Analysis

Data analysis technique is the process of searching for and systematically organizing data obtained from data collection, then drawing conclusions so that the findings are easily understood by both the researcher and others. Based on the hypothesis, the statistical test employed is the t-test, as the data are normally distributed and homogeneous.

t-calculated = $Mx - My$

$\sqrt{(SDx)^2 + (SDy)^2}$

Where:

Mx: Mean of variable X

My: Mean of variable Y

SDx: Standard deviation of X

SDy: Standard deviation of Y

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N: Sample size for each variable

The decision-making criteria are as follows: If t-calculated < t-table, H0 is accepted and Ha is rejected.
If t-calculated ≥ t-table, H0 is rejected and Ha is accepted.

1. Validity Test

Validity is a measure that indicates the degree to which an instrument is valid or accurate. An instrument with high validity is considered valid, whereas an instrument with low validity is considered less valid. An instrument is deemed valid if it is capable of measuring what it is intended to measure; an instrument that produces data inconsistent with the measurement objectives will result in low validity.
The method used is the Pearson correlation (specifically, the "corrected item-to-total correlation"), with the following criteria:
a. H0 is accepted if r-calculated > r-table (the instrument used is valid).
b. H0 is rejected if r-calculated ≤ r-table (the instrument used is not valid).

2. Reliability Test

A reliability test is used to measure the consistency of a questionnaire, which serves as an indicator for a variable or construct. An instrument is considered reliable if an individual's responses to the questions remain consistent or stable over time. In this study, the reliability test is conducted using the Cronbach's Alpha coefficient. With the following criteria:
a. If the Cronbach's Alpha value > 0.6, then it is reliable.

b. If the Cronbach's Alpha value < 0.6, then it is not reliable.

3. Normality Test
The normality test is intended to demonstrate that the sample data originates from a population that follows a normal distribution. In this study, the Kolmogorov-Smirnov test is used, with the following criteria for normality:
a. Test significance (α) = 0.05. If the Sig. value > α, then the sample originates from a population that follows a normal distribution.
b. If the Sig. value < α, then the sample does not originate from a population that follows a normal distribution.
4. Correlation Test

Product-moment correlation analysis is a form of bivariate analysis aimed at determining, through statistical means, the degree of association (strength or weakness) between variables.
a. If the r-value (calculated r) is accompanied by a significance (Sig.) value < 0.05, then the independent variable has a statistically significant influence on the dependent variable.

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b. If the r-value (calculated r) is accompanied by a significance (Sig.) value > 0.05, then the independent variable does not have a statistically significant influence on the dependent variable.

5. Hypothesis Testing (t-test)

Hypothesis testing in this study employs a t-test to examine the difference between the pre-test and post-test results in the experimental group, in order to determine the extent of the influence of the traditional game "engklek" (hopscotch) on the gross motor development of children aged 5–6 years. The method used is the Paired Sample t-test, which indicates whether the paired samples have undergone a significant change. The results of the Paired Sample t-test are determined by the significance value, which subsequently informs the decisions made in the study.

a. A significance value (2-tailed) < 0.05 indicates a significant difference between the initial and final variables. This suggests that the treatment applied to each variable has a meaningful effect.

b. A significance value (2-tailed) >0.05 indicates that there is no significant difference between the initial variable and the final variable. This suggests that the different treatments applied to each variable did not have a meaningful effect.

RESULTS

This study aims to determine the effect of the traditional game *engklek* (hopscotch) on the improvement of balance and coordination among seventh-grade students at Bina Satria Mulia Private Junior High School for the 2025/2026 academic year. Pretest data on balance and coordination were collected on March 14, 2026, followed by a training intervention consisting of 16 sessions, scheduled three times per week—specifically on Tuesdays, Thursdays, and Saturdays. Posttest data were collected on April 28, 2026.

The first step taken by the researcher is to identify the problem to be studied by observing the use of the traditional game *engklek* (hopscotch) to improve the balance and coordination of seventh-grade students at SMP Swasta Bina Satria Mulia for the 2025/2026 academic year, specifically assessing their level of mastery and enthusiasm during the training sessions. This is done to observe changes in the students' balance and coordination following the implementation of the training.

Before conducting the research, the researcher interviewed the teacher to gather information regarding the balance and coordination of the seventh-grade students at SMP Swasta Bina Satria Mulia for the 2025/2026 academic year. Subsequently, the researcher administered the training program and conducted a post-test.

Prior to applying the methodology, the researcher planned the training program, followed by the execution of the research stages.

The stages are as follows:

a. The researcher introduces themselves and explains the purpose and objectives of the research.

b. The researcher explains the traditional game *engklek*.

c. The researcher explains the balance and coordination training program.

d. After completing the training program—which consists of 16 sessions—the participants take a post-test using the designated instrument.

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Upon completion of the research, the results from the pre-test and post-test are obtained.

Discussion

Gross motor skills encompass movements involving the entire body or large portions of it, utilizing the coordination of specific muscle groups; through these, children learn to crawl, throw, or jump. One key element of gross motor skills is balance—the ability to maintain the neuromuscular system in a stable state, allowing for efficient body control during movement. A second element is coordination; for instance, in the game of hopscotch, children must jump into drawn squares without touching the lines, which trains the synchronization between vision (the eyes) and leg movements. A third element is strength—the capacity of a muscle group to exert force during contraction. Children need to develop muscle strength from an early age; without it, they would be unable to engage in physical play activities such as running, jumping, throwing, climbing, or hanging. A fourth element is agility—the ability to rapidly and accurately change body direction and position while moving from one point to another.

Balance is a crucial component of physical fitness, serving to keep the body stable whether it is stationary or in motion. This ability relies on the synergy between the nervous system, muscles, vision, and the vestibular organs located in the inner ear. When these systems function effectively, an individual can maintain optimal body positioning across a wide range of activities.(Yulia & Winata, 2026)

In addition to balance, coordination plays a vital role in physical movement. It is the ability to integrate the movements of various body parts, resulting in actions that are effective, efficient, and purposeful. Good coordination enables more precise, rapid, and controlled movement, thereby reducing the risk of losing balance or sustaining injuries.

Regular practice helps improve both balance and coordination. Through repetitive exercise, the body adapts, enhancing the synergy between the nervous system and the muscular system. Such adaptations enhance the body's ability to control its position, maintain stability, and adjust movements in response to changes in body posture.

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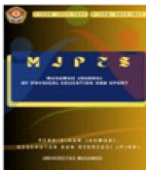
Based on the analysis above, the calculated t-values are 22.5 for balance and 53.66 for coordination, while the t-table value is 2.032. Comparing these figures against the t-table value at a significance level of $\alpha = 0.05$ with degrees of freedom (df) = n - 1 (35 - 1 = 34) reveals a significant difference. Consequently, the alternative hypothesis (Ha)—which states that "The traditional game of *engklek* (hopscotch) has an effect on the improvement of balance and coordination among seventh-grade students at Bina Satria Mulia Private Junior High School for the 2025/2026 academic year"—is supported.

Beyond developing gross motor skills, the game of *engklek* offers various other benefits that support student learning and development, including:

1. Serving as an engaging learning medium, preventing students from becoming bored during instructional activities.
2. Training students' concentration and focus.
3. Fostering a sense of discipline, as students must adhere to established rules.
4. Cultivating sportsmanship, teaching students how to accept victory and handle defeat.
5. Building self-confidence and the courage to perform in front of peers.
6. Preserving national culture by introducing traditional games to the younger generation.

In summary, the game of *engklek* provides numerous positive benefits for child development—particularly in the physical domain by training balance, coordination, strength, and agility. Furthermore, the game fosters cognitive aspects such as concentration and problem-solving, as well as social aspects like discipline and cooperation.

Thus, balance and coordination are interconnected components that support an individual's movement capabilities. Developing both components is crucial in physical education, as it facilitates the execution of various physical activities, enhances the quality of movement, and enables students to perform sports-related skills more effectively.



Acknowledgments

The results of the pretest and posttest on balance for 7th-grade students at Bina Satria Mulia Private Junior High School—involving a total of 35 students—showed that for the balance test, the fastest time was 7.8 seconds and the slowest was 12.1 seconds in the pretest, while in the posttest, the fastest time was 11.6 seconds and the slowest was 17.0 seconds. For the coordination test, the fastest time was 15.1 seconds and the slowest was 17.6 seconds in the pretest, whereas in the posttest, the fastest time was 13.6 seconds and the slowest was 15.9 seconds.

Based on the analysis, the calculated t-values (*t-count*) were 22.5 for balance and 53.66 for coordination, while the *t-table* value was 2.032. Comparing these figures against the *t-table* value at a significance level of α = 0.05 with degrees of freedom (*df*) = n - 1 (35 - 1 = 34) indicates a significant difference. Consequently, the alternative hypothesis (Ha)—which states, "There is an effect of the traditional game *Engklek* (hopscotch) on the improvement of balance and coordination among 7th-grade students at Bina Satria Mulia Private Junior High School for the 2025/2026 academic year"—is supported.

Conflict of Interest

Thank you to the teachers, students, and principal of SMP Swasta Bina Satria Mulia

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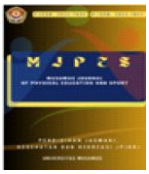

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