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Traditional Engklek Game as a Play-Based Intervention for Improving Fundamental Locomotor Skills in Elementary School Children

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Abstract

Background of study: Fundamental Movement Skills (FMS) are essential for children's physical development and long-term participation in physical activity. However, increasing sedentary behavior among children has contributed to a decline in motor competence worldwide.
Aims and scope of paper: This study aimed to examine the effectiveness of the traditional Indonesian game Engklek in improving locomotor skills among elementary school students.
Methods: A quasi-experimental design with a non-equivalent control group pretest–posttest was employed involving 26 third-grade students (14 boys and 12 girls) from MI Al Hikmah Sendang, Indonesia. The experimental group (n = 13) participated in an Engklek-based intervention program consisting of eight sessions conducted over four weeks, while the control group (n = 13) followed the regular physical education curriculum. Locomotor skills were assessed using the Test of Gross Motor Development-2 (TGMD-2).
Results: The results showed a significant improvement in the experimental group's mean score from 70.40 to 87.29 ($p < .001$), whereas the control group demonstrated only a slight increase. An Independent Samples t-test confirmed a significant difference between groups at post-test ($t = 3.997$; $p < .001$).
Conclusion: The study concludes that the Engklek game is an effective and culturally relevant play-based intervention for improving locomotor competence in elementary school students. Integrating traditional games into physical education may provide a cost-effective strategy to promote motor development while preserving cultural heritage.

Keywords: Cultural Studies; Engklek Game; Locomotor Skills; Motor Development; Traditional Games

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INTRODUCTION

Fundamental Movement Skills (FMS) are widely recognized as the foundation for children's physical development and lifelong participation in physical activity. These skills include basic locomotor movements such as running, jumping, hopping, and skipping, which enable children to engage in various forms of physical activity and sports. Previous research has demonstrated that early mastery of FMS plays a crucial role in promoting physical activity participation, improving physical fitness, and supporting healthy development throughout the lifespan (Hulteen et al., 2018). However, increasing exposure to sedentary lifestyles and screen-based activities has contributed to a decline in motor competence among children worldwide.

Locomotor skills, such as hopping, jumping, and running, are essential elements that enable children to participate in various sports and daily physical activities. According to Santoso et al. (2024), these fundamental movements are crucial for elementary school students, especially in today's technology-driven era, where prolonged screen time and sedentary lifestyles often hinder natural motor development (Santoso et al., 2024). However, recent global evidence highlights a critical gap in physical engagement; approximately 81% of school-going adolescents do not meet the recommended daily

physical activity guidelines (Guthold et al., 2020). This inactivity is particularly concerning during the middle childhood period (ages 8–9), which serves as a vital 'window of opportunity' for mastering FMS before transitioning to more complex sports skills (Stodden et al., 2008).

In the Indonesian context, Physical Education (PE) often faces challenges where conventional, teacher-centered instructions predominate, leading to low student engagement and suboptimal motor development (Mas'odi et al., 2024). Addressing this issue, a recent meta-analysis by (Abadi & Nugroho, 2024) has significantly proven that traditional games are an effective and superior method for motor development compared to non-traditional approaches. From a global perspective, the use of jumping and hopping games as pedagogical tools is well-recognized. (Biino, 2024) emphasizes that game playing is an essential means for young children to learn fundamental motor skills, noting that variations of hopping games (similar to "The Week") are utilized internationally to foster coordination and health-related fitness. As highlighted by (Aliriad et al., 2023), the traditional game approach not only improves psychomotor learning outcomes but also significantly boosts students' motivation to learn physical education, bridging the gap between physical mastery and affective engagement. Consequently, there is a growing need for play-based innovations like 'joyful learning.' Traditional games, such as Hadangan and Engklek, offer unique movement mechanisms that enhance explosive leg strength, coordination, and dynamic balance (Bernhardin et al., 2023). While culturally popular, empirical evidence on Engklek's quantitative impact on TGMD-2 scores remains limited. Previous studies primarily explored social aspects without structured motor measurements (Akbari et al., 2009). Therefore, this study aims to examine Engklek's effectiveness among third-grade students at MI Al Hikmah Sendang, utilizing the TGMD-2 (Ulrich, 2000) to provide robust quantitative data on locomotor improvements.

METHODS

This study employed a quasi-experimental design with a non-equivalent control group pretest-posttest layout. The participants were 26 third-grade students at MI Al Hikmah Sendang, consisting of 14 boys and 12 girls, selected via purposive sampling. The research was conducted from February 12 to March 16, 2026.

The Test of Gross Motor Development-2 (TGMD-2) was used to assess locomotor skills. Raw scores (maximum 46) were converted to a percentage scale (0–100) for standardized analysis (Webster & Ulrich, 2017). The experimental group *(n=13)* participated in an 8-session Engklek intervention over four weeks (twice weekly), while the control group *(n=13)* followed the standard PE program. The intervention was progressively structured, covering adaptation, precision, speed, and complex obstacle phases.

Analysis plan Data were analyzed using JASP software. Normality was verified via Shapiro-Wilk *($p = .697$)* and homogeneity via Brown-Forsythe *($p = .949$)*. Hypothesis testing utilized Independent Samples T-test (Welch) for inter-group comparison and Paired Samples T-test for intra-group evaluation.

RESULTS AND DISCUSSION

The descriptive analysis revealed that the experimental group achieved a significantly higher level of competence compared to the control group. As shown in Table 1, the experimental group's mean score increased from 70.40 during the pre-test to 87.29 in the post-test. Meanwhile, the control group only showed a slight increase from 62.71 to 71.57.

Table 1. Descriptive Statistics of Locomotor Scores (0-100 Scale)

Group	Test	N	Mean	Std. Deviation
Experimental	Pre-test	13	70.40	10.18
	Post-test	13	87.29	6.32
Control	Pre-test	13	62.71	11.19
	Post-test	13	71.57	12.69

The hypothesis analysis further supported these findings (Table 2). The Independent Samples T-test (Welch) yielded a t-value of 3.997 with a p-value of < .001. This indicates a highly significant difference between the post-test scores of the experimental and control groups, with a mean difference of 15.72.

Table 2. Independent Samples T-test (Welch) on Post-test

Variable	t	Df	p	Mean Difference	SE Difference
Post-test Score	3,997	17.62	< .001	15.72	3,933

Furthermore, the Paired Samples T-test for the experimental group confirmed a significant internal improvement from baseline to post-intervention *($t = 4.289$; $p < .001$)*. These findings prove that Engklek significantly enhances fundamental locomotor skills. This is a crucial finding because low motor competence in childhood is strongly linked to decreased physical activity in later life (Stodden et al., 2008). These findings prove that Engklek significantly enhances fundamental locomotor skills. Previous research highlights that motor competence is strongly associated with children's physical activity participation and overall developmental outcomes (Lopes et al., 2021).

The substantial increase in the experimental group occurred because the game requires intensive balance control and neuromuscular coordination through repetitive hopping and controlled landings (Bernhardin et al., 2023). Moreover, the intervention's success is attributed to the "joyful learning" environment. Traditional games provide more varied and engaging stimuli for motor memory compared to rigid, formal instructions (Akbari et al., 2009). This interpretation is expanded by a systematic review from (Wicahyani et al., 2024), which confirms that traditional games do not only impact the psychomotor domain but also significantly influence cognitive and affective aspects. While this study primarily measured locomotor scores, the high level of engagement observed aligns with Wicahyani et al.'s findings that traditional games boost learning motivation, self-confidence, and strategic thinking through hands-on experience.

Interestingly, the inclusive nature of Engklek ensures that both boys and girls can achieve similar proficiency levels, effectively reducing gender gaps in PE participation (Barnett et al., 2010). This finding is supported by (Verawati et al., 2022), who reported that locomotor games have a significant positive effect on improving gross motor skills among elementary school students. The transition from simple hopping to complex navigation in Engklek reflects the "window of opportunity" in Phase B students (ages 8–9), where children are most receptive to refining their Fundamental Movement Skills (FMS) (Bardid et al., 2015).

By utilizing TGMD-2 (Ulrich, 2000), this study provides standardized evidence that cultural-based interventions are not merely for recreation but are scientifically valid pedagogical tools. As (Trajkovik et al., 2018) suggested, traditional games often surpass standard PE methods because they offer a superior balance of physical challenge and student engagement, making them an ideal "zero-cost" solution for schools with limited sports infrastructure.

Utilizing local wisdom and traditional games in Physical Education is highly effective for both genders, particularly in school settings with limited resources like MI Al Hikmah Sendang. This study provides robust quantitative evidence for the effectiveness of cultural play-based interventions within the Phase B curriculum. The study's sample size *(N=26)* was limited to a single school, which may affect the generalizability of the results. Future research should involve a larger, more diverse population. PE teachers are strongly encouraged to adopt traditional games like Engklek as a cost-effective alternative to enhance student motivation and motor proficiency, as these games have been shown to surpass standard teaching methods in promoting active engagement (Trajkovik et al., 2018).

CONCLUSION

This study concludes that the traditional Engklek game is highly effective in improving fundamental locomotor skills for third-grade students at MI Al Hikmah Sendang. The intervention successfully increased mean scores significantly *($p < .001$)*, demonstrating that culturally rooted games can outperform conventional PE methods by providing a superior balance of physical challenge and student engagement. Corroborating recent systematic evidence (Wicahyani et al., 2024), it is evident that such games provide a comprehensive developmental impact across psychomotor and affective domains. Therefore, integrating Engklek into the school curriculum is strongly recommended as a cost-effective, engaging, and scientifically sound approach to modern physical education.

As a suggestion for future research, investigators should involve a larger, more diverse population and longitudinal designs to track skill retention over time. Furthermore, future studies could explore the development of more complex game activity models. As suggested by (Saputra et al., 2025), integrating social components like cooperation into traditional movement frameworks such as "Safety Corridor" or "Compact Sandals" models would provide a more holistic developmental approach for elementary students.

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AUTHOR CONTRIBUTIONS AND DECLARATIONS

The author was responsible for all aspects of this study, including conceptualization, research design, data collection, data analysis, interpretation of results, and manuscript preparation. The author has read and approved the final version of the manuscript. I confirm that this work is original, free from plagiarism, and complies with ethical standards. Author is fully prepared to accept any consequences in the event of any provision violations.

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