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The Effect of Traditional Games on Dynamic Balance of Elementary School Students

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ABSTRACT

This study aims to determine the effect of traditional bamboo stilt games on the dynamic balance of elementary school students. Traditional games are used as a form of physical activity that is educational, fun, and in accordance with the characteristics of student development. The study used a quantitative approach with a quasi-experimental design (one group pretest–posttest design). The subjects of the study were 32 fifth-grade students of SD Negeri 118/VI Karang Berahi, Merangin Regency. The instrument used was the Modified Bass Test of Dynamic Balance. Data were analyzed using prerequisite tests (normality and homogeneity) and paired t-test. The results showed that the average value of students' dynamic balance increased from 20.13 ± 4.16 in the pretest to 25.84 ± 5.31 in the posttest. The results of the paired t-test showed a value of t = –14.399 with a significance level of p = 0.000 (p < 0.05), which indicates a significant effect. The conclusion of this finding shows that the traditional bamboo stilt game is effective in improving the dynamic balance of elementary school students and can be used as an alternative for educational and contextual Physical Education learning.

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Dynamic Balance;
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A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

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INTRODUCTION

Physical Education plays a strategic role in supporting the holistic development of students, encompassing physical, motor, cognitive, social, and emotional aspects. At the elementary school level, Physical Education not only serves as a means of improving physical fitness but also as a vehicle for building the foundation of basic movement skills, which are crucial for a child's success in physical activities and sports in later stages of development. Elementary school-aged children are in the fundamental motor skills phase, a crucial period for mastering locomotor, non-locomotor, and manipulative skills, which need to be developed through structured, varied physical activities appropriate to the child's developmental characteristics (Goodway et al., 2019).

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One important component of motor skills that needs to be developed early is balance, particularly dynamic balance. Dynamic balance is an individual's ability to maintain body stability while moving or shifting position from one place to another (Hrysomallis, 2011). This ability plays a crucial role in almost all movement activities, such as walking, running, jumping, and various sports skills. Low dynamic balance skills in elementary school students can impact limited motor skill mastery, reduced self-confidence in physical activity, and increased risk of injury during sports and games.

In the context of Physical Education learning in elementary schools, developing dynamic balance needs to be done through an active, enjoyable, and meaningful learning approach. Monotonous learning that is too focused on technical exercises tends to be less suited to the characteristics of elementary school-aged children, who have a need to move, play, and explore. Therefore, Physical Education teachers are required to design learning models that are not only physiologically effective but also engaging and appropriate to the child's world (Lloyd et al., 2015)

Traditional games are a form of physical activity that have great potential to be integrated into Physical Education learning. Traditional games inherently contain diverse movement elements, involving body coordination, agility, strength, and balance, making them relevant to the development of elementary school students' motor skills. Furthermore, traditional games are imbued with cultural, social, and educational values that contribute to the development of students' character, such as cooperation, sportsmanship, discipline, and a sense of responsibility (Mustafa & Mediatama, 2023).

Theoretically, dynamic play activities that challenge body balance can stimulate the neuromuscular and proprioceptive systems, thus positively impacting the improvement of dynamic balance skills (Shumway-Cook & Woollacott, 2007). Traditional games such as stilts, hopscotch, or gobak sodor require the ability to maintain body stability while moving and changing positions, thus involving the simultaneous integration of the visual, vestibular, and somatosensory systems.

Traditional games significantly contribute to the development of children's basic motor skills, including balance, coordination, and agility (Rahul et al., 2025). Traditional game-based learning is contextual, fun, and tailored to children's developmental characteristics, thereby increasing student engagement and the effectiveness of Physical Education learning (Waldo et al., 2025)). Furthermore, traditional games are seen as a strategic medium for integrating cultural aspects and character education into the learning process, thus providing a multidimensional impact on student development (Atikah & Priambadha, 2025; Maspupah et al., n.d.).

Previous research also shows that implementing traditional games in Physical Education lessons can improve various aspects of students' motor skills, such as agility, coordination, strength, and balance (Kusumawati, 2017; Nurhasan & Cholil, 2007) However, empirical studies specifically examining the effect of traditional games on elementary school students' dynamic balance through an experimental approach are still relatively limited. Most research focuses on general motor development, without emphasizing the dynamic balance component as a primary variable.

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METHODS

This study used a quantitative approach with a quasi-experimental design, employing a pretest-posttest model to determine the effect of traditional games on the dynamic balance of elementary school students. This design was chosen because it allowed researchers to compare the condition of the study subjects before and after treatment, allowing for more objective observation of the changes.

The study subjects were elementary school students selected using a total sampling technique, with all 32 fifth-grade students serving as the sample. This total sampling technique was chosen to ensure that the entire available population participated in the study, ensuring that the results could represent the overall condition of the group. The study group received treatment in the form of Physical Education learning that integrated the traditional bamboo stilt game, which was implemented over several learning sessions.

The research instrument used was a dynamic balance test adapted to the characteristics and abilities of elementary school students, the Modified Bass Test of Dynamic Balance. This instrument aims to measure students' ability to maintain body balance while performing controlled transitional movements. Data collection was conducted through two stages: a pretest administered before the treatment was administered and a posttest administered after the entire treatment series was completed.

The data obtained from the pretest and posttest results were then analyzed using inferential statistical tests. Prior to hypothesis testing, the data were first tested for their prerequisites using normality and homogeneity tests. Once the prerequisites were met, the hypothesis was tested using a paired sample t-test to determine whether there was a significant difference between the pretest and posttest results. The results of this statistical analysis were used as a basis for determining the effect of traditional games on the dynamic balance of elementary school students.

RESULTS AND DISCUSSION

Result

This study aimed to determine the effect of traditional games on the dynamic balance of elementary school students. Dynamic balance was measured using the Modified Bass Test of Dynamic Balance, which was conducted in two stages: a pretest (before treatment) and a posttest (after treatment). The study subjects were 32 fifth-grade students.

Before being given the traditional bamboo stilt game, all subjects took a pretest to measure their initial dynamic balance ability. Each student performed three trials, with the highest score being taken as the final score.

Based on the pretest data analysis, the average score was 20.125, with a maximum score of 28 and a minimum score of 14. This indicates that, in general, students' dynamic balance ability was still in the moderate to low category before the treatment was

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administered. Furthermore, the distribution of students' dynamic balance ability categories at the pretest stage is presented in the following table.

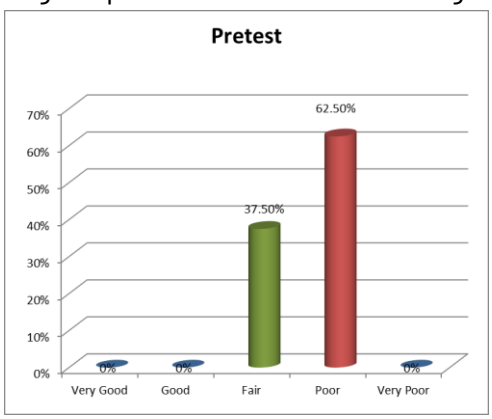

Figure 1.
Distribution of Pretest Dynamic Balance Categories

Based on the table, the majority of students fell into the poor category (62.5%), while the remainder fell into the adequate category (37.5%). No students fell into the good or excellent categories. This indicates that students' dynamic balance still needs to be improved through appropriate learning activities. After implementing the traditional bamboo stilt game for 12 sessions, students were given another posttest to determine changes in their dynamic balance abilities.

The posttest analysis results showed an increase in students' dynamic balance scores. The average posttest score increased to 25.844, with a maximum score of 37 and a minimum score of 18. This increase indicates an improvement in dynamic balance skills after students participated in structured traditional games.

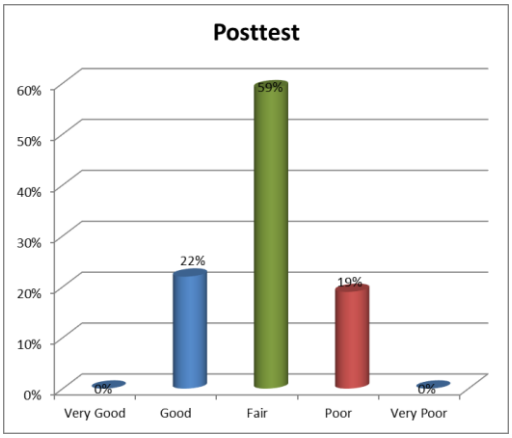

Figure 2.
Distribution of Posttest Dynamic Equilibrium Categories

The table shows a shift in student ability categories. The majority of students are in the adequate category (59%), and 22% have reached the good category. The number of students in the poor category decreased significantly compared to the pretest.

To clarify the differences in measurement results before and after the treatment, a comparison of the average pretest and posttest scores was presented in the form of a bar chart and a change curve.

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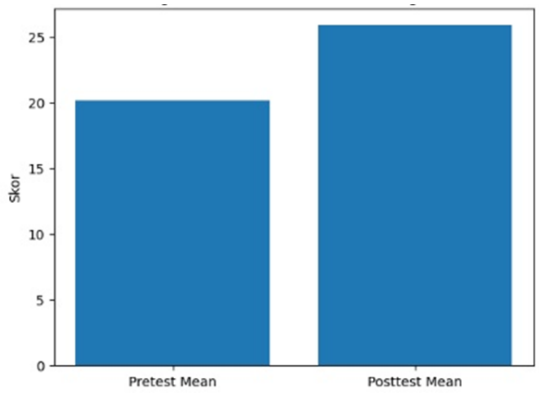

Figure 3.
Bar Chart Comparison of Pretest and Posttest Means

The bar chart shows that the average posttest score for students in dynamic balance was higher than the pretest score. This difference in average scores is clearly visible in the chart visualization, where the posttest bar is higher than the pretest bar. The average score increase of 5,719 points indicates a significant change after students participated in the traditional bamboo stilt game.

This score increase indicates that the traditional game activity positively impacted students' dynamic balance skills, as it required students to maintain body stability, coordinate movement, and maintain postural control while moving on narrow platforms. Furthermore, students' active involvement during the learning process through traditional games also contributed to improved motor skills and the body's response to changes in position.

The change curve shows a clear increasing trend from the pretest to the posttest stage. The rising line shows that the treatment given is able to consistently improve students' dynamic balance abilities.

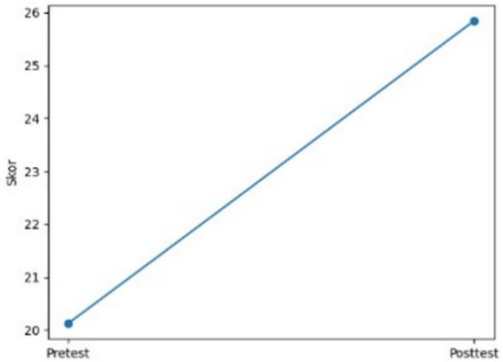

Figure 4.
Pretest and Posttest Score Change Curve

The upward sloping curve indicates that the treatment consistently improved students' dynamic balance abilities, not just in a small subset of subjects, but across the entire study group. This curve visualization provides a clearer picture of the differences in pre- and post-treatment measurement results, while also reinforcing the finding that students' dynamic balance abilities improved after participating in the traditional bamboo stilt game.

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Thus, based on the resulting curve pattern, it can be seen that posttest scores tended to be higher than pretest scores, indicating an improvement in students' dynamic balance abilities during the treatment process.

To clarify the proportion of students' dynamic balance ability categories after treatment, the posttest measurement results are presented in pie charts. Presenting the data in this chart format aims to provide a more easily understood visual representation of the distribution of students in each dynamic balance ability category, allowing for clearer differences in proportions between categories.

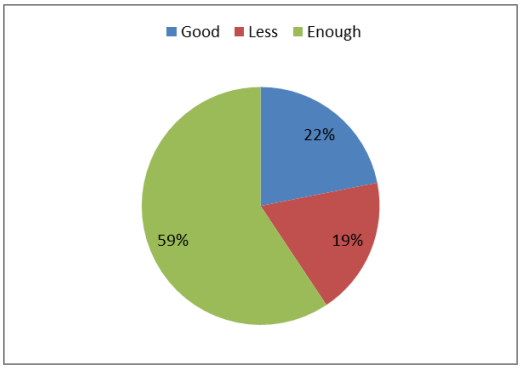

Figure 5.
Pie Chart of Posttest Category Distribution

The pie chart provides a comprehensive overview of the percentage of students in each dynamic balance ability category after the treatment. This visualization helps demonstrate the dominance of certain categories and the changes in the distribution of student abilities after participating in the traditional bamboo stilt game. Therefore, the use of pie charts in presenting posttest results complements the tabular data and strengthens understanding of the research findings.

The pie chart shows that the majority of students are in the sufficient category (59.4%), followed by the good category (21.9%), and the poor category (18.8%). There are no students in the very poor category, indicating an improvement in overall dynamic balance quality. The results of the paired sample t-test showed a significance value of 0.000 ($p < 0.05$). Therefore, the alternative hypothesis (Ha) is accepted and the null hypothesis (H_0) is rejected. This means that the traditional bamboo stilt game has a significant effect on the dynamic balance of elementary school students.

Discussion

The results of the study indicate that the traditional bamboo stilt game significantly improved the dynamic balance of elementary school students. This finding is supported by an increase in the average dynamic balance score from the pretest to the posttest, as well as statistical test results showing a significant difference after the treatment. This improvement indicates that the traditional game can serve as an effective motor stimulus in Physical Education learning in elementary schools.

Theoretically, dynamic balance is an individual's ability to maintain body position while moving or relocating, involving coordination between the muscular system, the nervous system, and sensory systems such as visual, vestibular, and proprioceptive

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(Bompa Tudor & Haff, 2009) At elementary school age, balance skills are still developing, requiring varied and repeated movement stimuli for optimal development. The traditional bamboo stilt game fulfills these characteristics because it requires students to control their posture while moving on narrow and unstable platforms.

The improvement in students' dynamic balance in this study can be explained through the principle of specific training. The bamboo stilt game directly trains the ability to maintain balance while moving, resulting in physiological and neuromuscular adaptations aligned with the demands of the movement. According to Schmidt and Lee (2014), repeated practice tailored to the desired skill will result in more effective improvements in motor performance. Therefore, structured bamboo stilt play activities conducted over several sessions significantly contributed to improving students' dynamic balance.

Furthermore, the distribution of categories showed a shift in student abilities toward better ones after the treatment. In the pretest, the majority of students were in the poor category, while in the posttest, most students were in the fair and good categories. This shift indicates that traditional games not only increase average scores quantitatively but also improve the overall quality of dynamic balance skills. This aligns with the findings of Goodway et al., (2019), who stated that the development of basic motor skills in children will significantly improve if they are provided with rich movement experiences appropriate to their developmental stage.

From a pedagogical perspective, traditional bamboo stilt play also offers advantages as a learning medium because it is fun, contextual, and suited to the characteristics of elementary school-aged children. According to Lutan, (2001), effective Physical Education learning is learning that actively engages students, provides meaningful movement experiences, and fosters intrinsic motivation to move. Traditional games allow students to learn without pressure, allowing motor adaptation to occur naturally and sustainably.

In addition to physical aspects, the traditional bamboo stilt game also contributes to the development of students' psychosocial aspects, such as self-confidence, courage, and perseverance. When students successfully maintain balance and complete challenges in the game, they gain successful experiences that can boost their self-confidence. This aligns with Rahul et al., (2025) view that game activities in Physical Education play a crucial role in shaping students' character and positive attitudes.

Although the results show a significant effect, this study has several limitations. The single-group design without a control group makes it impossible to directly compare the results with other learning methods. Furthermore, the limited treatment duration allows for the possibility of external factors influencing the results. Therefore, future research is recommended to use a more robust experimental design involving a control group, extending the treatment duration, and combining various types of traditional games to examine broader effects on students' motor skills.

Overall, the results of this study strengthen the theoretical framework that states that game-based physical activity, particularly traditional games, plays a significant role

in improving children's dynamic balance skills. The integration of traditional bamboo stilt games in Physical Education learning is not only effective in improving students' physical abilities, but also contributes to the preservation of local culture and the creation of a more meaningful learning process.

CONCLUSION

Based on the research results and discussion, it can be concluded that the traditional bamboo stilt game has a significant impact on the dynamic balance of elementary school students. This is evidenced by an increase in the average score of students' dynamic balance from the pretest to the posttest, and is further supported by statistical test results showing a significant difference after the treatment.

The improvement in students' dynamic balance skills occurs because the traditional bamboo stilt game requires students to maintain body stability, control posture, and coordinate movements while moving on narrow platforms. This activity provides effective stimulation to students' neuromuscular and sensory systems, allowing dynamic balance skills to develop optimally through repeated and structured practice.

Therefore, the traditional bamboo stilt game can be used as an effective alternative to Physical Education learning to improve the dynamic balance of elementary school students. In addition to contributing to the development of physical abilities, the implementation of traditional games also supports the creation of enjoyable, meaningful learning, and is oriented towards preserving local culture in the school environment.

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