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Game-Based Nawatobi Learning to Improve Students' Agility in Elementary Physical Education

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ABSTRACT

Purpose of the study: This study aims to improve students' agility through the implementation of game-based Nawatobi learning in elementary physical education. It focuses on enhancing student participation and motor skill development by applying a structured and engaging learning approach in classroom settings.

Methodology: This study used classroom action research with two cycles involving 26 sixth-grade students. Data were collected using observation sheets, questionnaires, and agility performance tests. Instruments included structured observation forms and student response questionnaires. Data were analyzed using descriptive qualitative techniques and percentage calculations to measure learning activity and improvement outcomes.

Main Findings: The findings show a significant improvement in students' agility and participation from the initial condition to Cycle I and Cycle II. Student activity, motivation, and engagement increased substantially. Most students achieved higher agility performance levels, indicating that the implementation of game-based Nawatobi learning effectively enhanced both motor skills and learning participation.

Novelty/Originality of this study: This study introduces a structured integration of Nawatobi as a game-based learning approach specifically targeting agility development. It combines motor skill assessment with student engagement analysis within a classroom action research framework, providing a practical and context-based model for improving physical education learning in elementary schools.

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1. INTRODUCTION

In the era of globalization, education is required to continuously adapt to produce superior and competitive human resources. Education is defined as a systematic process to develop students' potential holistically, encompassing cognitive, affective, and psychomotor aspects [1], [2], [3] National education policy states that learning must be oriented toward active participation and the holistic development of student potential [4]. International research shows that the quality of the learning process has a significant impact on learning outcomes

and student character . Therefore, optimizing the learning process is a crucial foundation in various fields of study, including physics education.

Physical education is an integral part of the education system, playing a vital role in students' physical, mental, and social development. Physical education focuses not only on mastering motor skills but also on developing healthy attitudes, values, and lifestyle habits [5]. Previous research has shown that pedagogically designed physical education can improve the physical fitness and motor skills of elementary school students [6]. Furthermore, activity-based physical education positively contributes to children's cognitive and emotional development [7]. Therefore, educational learning needs to be systematically designed and tailored to student characteristics..

One important component of physical education in elementary schools is the development of agility as the foundation of motor skills. Agility is an individual's ability to change body direction and position quickly and precisely, which is essential in various sports activities [8] . Studies in reputable journals indicate that agility is closely related to students' coordination, balance, and reaction time [9] . However, other research reveals that agility learning in elementary schools is often not optimally implemented due to limited learning methods and media [10] . This situation calls for innovations in learning that are more contextual and engaging for students.

Facts on the ground show that physical education learning in elementary schools still faces various practical obstacles. Limited facilities and infrastructure and teachers' low creativity in modifying learning are key factors contributing to the ineffectiveness of physical education [11], [12], [13] . A national study reported that conventional learning methods tend to make students passive and less enthusiastic about physical education [14] . This situation aligns with initial observations at Kemambang Public Elementary School, which showed low student attention and participation in motor agility lessons. Therefore, a learning approach tailored to the characteristics of elementary school children is needed.

A game-based learning approach is considered effective in increasing elementary school students' engagement and motivation to learn. Children's worlds are synonymous with play, so learning presented in the form of games is easier to accept and understand [15] . Scopus research indicates that game-based learning in physical education can significantly improve students' motor skills and learning interest [16] . Furthermore, game-based learning has also been shown to create a fun and meaningful learning environment [17] . Thus, the game approach has great potential for application in motor agility lessons.

Nawatobi, or jump rope, is a traditional game that has the potential to develop students' agility, coordination, and fitness. Studies show that jump rope can improve basic motor skills and physical endurance in elementary school children [18] . National research also revealed that modifying traditional games in physical education lessons can improve student engagement and learning outcomes [19], [20]. However, empirical studies specifically integrating Nawatobi into agility learning for elementary school students are still limited. This limitation constitutes a research gap in this study.

The novelty of this study lies in the systematic integration of the Nawatobi (jump rope) game into physical education learning as a structured pedagogical approach to improve students' agility. Unlike previous studies that generally examine traditional games in a broad context or focus primarily on learning outcomes, this research specifically emphasizes agility as a core motor skill and positions Nawatobi as a targeted instructional strategy. In addition, this study applies a classroom action research design, allowing for continuous improvement through iterative learning cycles, which provides more dynamic and context-based findings [21], [22] . The study also combines physical performance assessment with observations of student engagement, offering a more comprehensive understanding of both cognitive and psychomotor learning outcomes. Therefore, this research contributes new insights into how traditional games can be systematically designed and implemented to achieve specific learning objectives in elementary physical education.

The findings of this study have important theoretical and practical implications for physical education. Theoretically, this research enriches the literature on game-based learning by demonstrating that traditional games such as Nawatobi can be effectively utilized to develop specific motor skills, particularly agility, within a structured instructional framework. Practically, this study provides a feasible and low-cost alternative for teachers to design engaging and effective learning activities, especially in schools with limited facilities and resources. The positive impact on students' participation and motivation also suggests that incorporating game-based approaches can enhance the overall quality of the learning process. Furthermore, this study highlights the importance of reflective teaching practices, where continuous evaluation and adaptation of teaching strategies can significantly improve learning outcomes. As a result, educators are encouraged to adopt more creative and student-centered approaches in physical education to optimize both skill development and student engagement [23].

Based on the description, this study has an urgency to present a learning model for movement agility that is innovative, contextual, and appropriate to the characteristics of elementary school students. The novelty of this study lies in the systematic application of the Nawatobi game approach in physical education learning to improve the movement agility of sixth grade students. This study also provides a practical contribution for teachers in overcoming limited resources through the use of simple and inexpensive games. Academically, this study enriches the study of game-based learning in elementary school physical education. Therefore, the purpose of this study is

to improve students' movement agility learning through the Nawatobi game approach (jump rope) in Physical Education and Orchestra lessons for elementary school students in the 2024/2025 academic year.

2. RESEARCH METHOD

2.1 Research Design

This study employed a Classroom Action Research (CAR) design aimed at improving students' agility through the implementation of game-based Nawatobi learning in physical education classes. Classroom Action Research was selected because it focuses on solving practical problems encountered during the learning process and improving the quality of instruction through continuous reflection and action. The research was conducted collaboratively between the researcher and the physical education teacher using a cyclical process consisting of planning, action, observation, and reflection stages [24].

The study was implemented in two cycles, where each cycle involved identifying problems, applying learning actions, observing student responses and performance, and evaluating the outcomes to determine necessary improvements for the next cycle. This design enabled the researcher to systematically monitor the effectiveness of the Nawatobi game in enhancing students' agility and participation during physical education learning activities.

2.2 Research Participants

The participants of this study were all sixth-grade students at an elementary school during the 2023/2024 academic year. The study involved 26 students consisting of 11 male students and 15 female students. The participants were selected using a total sampling technique because the entire population of the class was involved as the research subjects.

2.3 Research Instruments

Several instruments were used to collect the data in this study, including observation sheets, questionnaires, and agility performance assessments [25]. Observation sheets were used to evaluate students' participation, enthusiasm, cooperation, and involvement during the learning process. Questionnaires were administered to identify students' responses, motivation, and perceptions toward the implementation of game-based Nawatobi learning.

In addition, agility performance tests were conducted to measure students' agility improvement before and after the implementation of the learning cycles. The instruments were designed systematically to ensure that the collected data reflected both cognitive and psychomotor aspects of learning

2.4 Data Collection Techniques

Data were collected using qualitative and quantitative approaches [26]. Qualitative data were obtained through classroom observations and field notes, which described students' learning behaviors, participation, motivation, and interaction during the learning activities. Quantitative data were collected from agility performance assessments and questionnaire results to determine the level of improvement achieved by the students.

The data collection process was carried out in several stages. Initially, a preliminary observation was conducted to identify students' initial agility levels and classroom learning conditions. During the implementation of each cycle, observations were conducted continuously to monitor student engagement and the effectiveness of the learning activities. At the end of each cycle, students completed questionnaires and participated in agility performance assessments to evaluate the learning outcomes.

2.5 Teknik Analisis Data

The collected data were analyzed using descriptive qualitative and quantitative techniques. Qualitative data obtained from observations and field notes were analyzed descriptively to describe students' learning activities, participation, and responses during the implementation of the Nawatobi learning approach.

Meanwhile, quantitative data from observation sheets, questionnaires, and agility assessments were analyzed using percentage calculations to determine the level of improvement achieved in each cycle. The percentage of student activity and questionnaire responses was calculated using the following formula [27]:

$$P = \frac{F}{N} \, x \, 100\% \qquad ...(1)$$

Where:

- P= Percentage
- F= Frequency of observed responses or activities
- N= Total number of students

The results of the percentage calculations were then categorized into several achievement levels to evaluate the effectiveness of the learning implementation in each cycle.

2.6 Research Procedure

The research procedure was conducted through two cycles consisting of planning, action, observation, and reflection stages. In the planning stage, the researcher prepared lesson plans, designed Nawatobi-based learning activities, developed observation sheets, questionnaires, and agility assessment instruments, and coordinated the implementation process with the physical education teacher. In the action stage, the researcher implemented physical education learning using game-based Nawatobi activities designed to improve students' agility, coordination, and participation. During the observation stage, the researcher observed and recorded students' learning activities, motivation, participation, and agility performance throughout the learning process using observation sheets and field notes. Finally, in the reflection stage, the researcher analyzed and evaluated the results obtained from each cycle to identify strengths, weaknesses, and necessary improvements for the next cycle. This cyclical process was carried out continuously to achieve optimal improvement in students' agility and learning participation.

3. RESULTS AND DISCUSSION

This classroom action research was conducted to improve students' agility through the implementation of game-based Nawatobi learning in physical education classes. The study was carried out in two cycles, with each cycle consisting of planning, action, observation, and reflection stages. Data were obtained from classroom observations, questionnaire responses, and agility performance assessments. The implementation of the Nawatobi learning approach aimed not only to improve students' motor skills but also to enhance their participation, motivation, and overall learning engagement during physical education activities [28].

Before the implementation of the action, preliminary observations revealed that students' agility and participation levels were relatively low. Most students appeared passive during physical education lessons and showed limited enthusiasm toward agility-related activities. The learning process was still dominated by teacher-centered instruction, where students tended to follow instructions mechanically without active involvement. As a result, the classroom atmosphere became less interactive and less supportive of psychomotor skill development. Initial agility assessments indicated that only a small number of students demonstrated satisfactory agility performance, while the majority were categorized at a low level. Several students also showed difficulties in maintaining body balance, movement coordination, and quick directional changes during physical activities [29]. These findings suggest that the conventional learning methods previously applied had not effectively supported the development of students' agility and motor coordination skills.

In Cycle I, the researcher implemented game-based Nawatobi learning as an alternative instructional strategy. Students were introduced to basic jump rope techniques, including single jumps, rhythm control, and coordinated movements. The teacher also incorporated simple game variations to create a more enjoyable learning atmosphere. During the learning process, students began to show increased interest and participation compared to the preliminary condition. Observation results demonstrated that students became more attentive to instructions, more willing to participate in physical activities, and more confident in trying movement tasks. The integration of games into learning activities appeared to reduce students' anxiety and boredom, creating a more active and student-centered learning environment.

The implementation of Cycle I also produced positive improvements in agility performance. Students gradually demonstrated better movement coordination and body control during jumping activities. The repetitive movements involved in Nawatobi training helped students improve balance, reaction speed, foot coordination, and movement rhythm, all of which are essential components of agility. Questionnaire results further indicated that most students enjoyed the learning activities because the games were perceived as fun, challenging, and different from conventional physical education lessons. Students expressed greater enthusiasm and motivation to participate because the activities resembled play rather than formal instruction [30].

However, despite these improvements, several limitations were still identified during Cycle I. Some students continued to experience difficulties in maintaining jumping rhythm and synchronizing body movements. A number of students also lacked confidence when performing more complex movement variations. Observation results showed that although participation levels increased, several students remained less active during group activities. In addition, the agility assessment results indicated that many students were still categorized at the moderate level rather than achieving optimal performance. These findings suggest that although the Nawatobi

approach had begun to produce positive outcomes, improvements in instructional strategies and classroom management were still required to maximize student learning outcomes.

Based on the reflection results from Cycle I, several improvements were implemented in Cycle II. The teacher provided clearer movement demonstrations, more structured instructions, and additional guidance for students experiencing difficulties. The learning activities were also modified into more varied and interactive game formats to increase student engagement. In addition, students were grouped collaboratively to encourage peer support and cooperative learning during the activities. These improvements aimed to create a more supportive and inclusive learning environment that could accommodate differences in students' physical abilities and learning pace.

The results of Cycle II demonstrated significant improvement in all observed aspects. Students showed substantially higher levels of participation, confidence, and enthusiasm during physical education learning activities. Most students actively participated in the Nawatobi games and demonstrated better concentration throughout the lesson. Observation data revealed that students became more cooperative, interactive, and motivated during the learning process. The classroom atmosphere also became more dynamic and enjoyable, indicating that the game-based learning approach successfully increased students' emotional engagement in learning [31].

The improvement in agility performance during Cycle II was also more significant compared to both the initial condition and Cycle I. Most students achieved the expected agility criteria, and several students demonstrated excellent performance in balance, movement coordination, and speed. Students were able to perform jumping movements more rhythmically and confidently, indicating that continuous practice and improved instructional strategies contributed positively to their motor skill development. Questionnaire results further supported these findings, showing that students responded positively to the implementation of Nawatobi learning. Many students stated that the activities increased their motivation, confidence, enjoyment, and understanding of movement techniques. Therefore, the findings indicate that the implementation of game-based Nawatobi learning effectively improved both psychomotor performance and student engagement in physical education learning.

The findings of this study are consistent with previous research emphasizing the importance of game-based learning in improving students' physical and cognitive engagement. According to Pribadi et al. [32] , physical education activities designed through active and enjoyable approaches can significantly improve students' motor skill development and learning motivation. Similarly, Gungor et al. [33] explained that play-oriented learning creates meaningful learning experiences because students become more emotionally involved in the learning process. The repetitive movement patterns involved in Nawatobi activities also align with the findings of Sheppard and Lordu [34], who stated that agility development requires continuous practice involving coordination, balance, speed, and body control. Therefore, the positive outcomes observed in this study strengthen the argument that game-based learning can serve as an effective pedagogical strategy for developing elementary students' motor abilities.

Furthermore, the findings also support constructivist learning theory, which emphasizes that students learn more effectively through active participation and direct experience. The use of Nawatobi games enabled students to construct their understanding of movement patterns through repeated practice and interaction with peers. This condition encouraged students to become more independent, confident, and actively engaged in the learning process. The improvement observed from Cycle I to Cycle II also highlights the importance of reflection and adaptive teaching practices in classroom action research. Continuous evaluation allowed the teacher to identify instructional weaknesses and make improvements that better matched students' learning needs and classroom conditions.

Although previous studies have discussed the use of traditional games and game-based learning in physical education, most research has focused broadly on increasing student motivation, general physical fitness, or overall learning outcomes. Limited studies specifically examine the integration of Nawatobi as a structured instructional strategy to improve agility among elementary school students. In addition, many previous studies primarily emphasize quantitative learning outcomes without exploring classroom learning dynamics, student engagement, and reflective instructional improvements through classroom action research. Therefore, this study addresses the existing research gap by focusing specifically on agility development through a systematic implementation of Nawatobi learning while simultaneously examining students' participation, motivation, and learning experiences during the instructional process [35].

The novelty of this study lies in the systematic integration of Nawatobi as a game-based instructional approach specifically designed to improve agility in elementary physical education learning. Unlike previous studies that generally discuss traditional games in broader educational contexts, this research emphasizes agility as the central motor skill target and applies Nawatobi through structured classroom action research cycles. In addition, this study combines psychomotor assessment with observations of student engagement, participation, and motivation, providing a more comprehensive evaluation of learning outcomes [36], [37]. The iterative reflection process implemented in each cycle also contributes practical insights into how instructional improvements can optimize physical education learning effectiveness.

The findings of this study provide important theoretical and practical implications for physical education learning. Theoretically, this study strengthens the concept that game-based learning can effectively support psychomotor development, particularly agility and movement coordination among elementary school students. The study also contributes to the literature on traditional game integration in modern educational practices. Practically, the findings offer an alternative learning strategy for physical education teachers, especially in schools with limited facilities and infrastructure. Nawatobi is simple, affordable, and easy to implement, making it highly suitable for use in various educational settings. Furthermore, the study highlights the importance of creating active, enjoyable, and student-centered learning environments to improve participation, motivation, and learning outcomes simultaneously [38], [39].

Despite the positive findings, this study has several limitations. First, the study involved a relatively small number of participants from a single elementary school class, which may limit the generalizability of the findings to broader educational contexts. Second, the duration of the research was limited to two action cycles, meaning that the long-term effects of the Nawatobi learning approach on students' agility development were not fully explored [40]. Third, individual differences in students' physical abilities, coordination, and motivation may have influenced the learning outcomes, despite efforts to provide individualized guidance. Finally, the study primarily focused on agility improvement and did not examine other physical fitness components such as endurance, strength, or flexibility. Therefore, future studies are recommended to involve larger participant groups, longer implementation periods, and broader physical performance variables to obtain more comprehensive findings regarding the effectiveness of game-based Nawatobi learning in physical education.

4. CONCLUSION

This study concludes that the implementation of game-based Nawatobi learning is effective in improving students' agility and participation in physical education at the elementary school level. The findings show a consistent improvement from the initial condition through Cycle I to Cycle II, both in terms of student activity and agility performance. The use of Nawatobi games creates a more engaging, interactive, and enjoyable learning environment, which enhances students' motivation and involvement. Although some differences in individual abilities were observed, the overall results indicate that this approach successfully addresses the limitations of conventional teaching methods. Therefore, game-based Nawatobi learning can be recommended as an alternative and practical strategy for developing students' motor skills, particularly agility, in physical education.

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