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Egrang Batok Traditional Game on Measurement Material

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Abstract

Purpose: This study aims to analyze the application of traditional egrang batok game as a learning media on measurement material in elementary school.
Methodology: This study used a qualitative approach with subjects consisting of one mathematics teacher and 20 third grade students of SD Muhammadiyah Plus Malangjiwan Colomadu with the selection of interview subjects of one teacher and two students seen from the initial ability regarding measurement material. Data were collected through observation, interviews, and documentation, then analyzed using the Miles and Huberman interactive model which includes data reduction, data presentation, and conclusion drawing. Data validity was obtained through triangulation of sources and techniques.
Results: The results showed that the application of egrang batok game in measurement learning was associated with the practice of standard and non-standard units in measurement material. Students can understand the difference between standard and non-standard units through the activity of measuring step distance.
Applications/Originality/Value: The novelty of the research lies in the use of the traditional game egrang batok as a learning medium.
Keywords: egrang batok, traditional game, measurement, local culture.

Introduction

The merdeka curriculum is designed to provide a space of freedom for learners to explore their potential, interests, and abilities in depth through student-centered learning. This curriculum carries the concept of deep learning as one of the main approaches in realizing meaningful and sustainable learning (Sulaiman et al., 2024). The concept of deep learning in the Merdeka Curriculum includes three main aspects, namely meaningful learning, deep learning, and enjoyable learning (Rosiyati et al., 2025). These three aspects play an important role in developing students' critical, collaborative, and reflective thinking skills, including in learning mathematics (Firdaus & Satriawan, 2025). According to research (Campbell, 2025) confirms that happiness in learning mathematics plays an important role in optimizing student engagement. Joyful learning is important because it can foster interest in learning and student engagement so that learning is more optimal.

Joyful learning is a learning approach that emphasizes a pleasant learning atmosphere and makes students feel comfortable to be actively involved (Suwarni et al., 2024). In this approach, the learning process is designed so that students not only receive knowledge, but also enjoy every activity carried out in class. Learning becomes more lively through activities that are creative, collaborative, and in accordance with students' interests and abilities. The teacher acts as a companion who creates interesting learning experiences so that students are motivated to explore and understand the material more deeply (Azambuja & Barroso, 2022). Based on research (Erşen & Ergül, 2022) found that game-based learning effectively increases the fun atmosphere and student motivation in mathematics subjects.

In its application, joyful learning can be implemented through the use of traditional games as a learning medium that presents a pleasant atmosphere. Traditional games play a role in strengthening conceptual understanding through activities that are contextual, concrete, and in accordance with the daily experiences of students (Qirom & Juandi, 2023). In addition, the integration of local cultural values in it helps foster a sense of love for the nation's cultural heritage while improving social and motor skills. A study by (Debrenti, 2024) states that contextual game-based learning activities improve numeracy skills of elementary school students. Based on research (Kabuye Batiibwe, 2024) emphasizes that culture-based games help build a balance between cognition and emotion in mathematics learning.

Traditional games are part of the cultural heritage that has great potential to be integrated into the learning process in schools including in mathematics learning (Pawartani et al., 2024). Activities in traditional games not only involve physical and social aspects, but also foster the ability to think logically, count, and estimate, which is relevant to the mastery of mathematical concepts. Through games such as congklak, engklek, gobak sodor, bentengan, and egrang batok, students can learn various concepts such as numbers, patterns, measurement, speed, and comparison in a contextualized manner (Ayuningrum et al., 2024). research by (Ermawati et al., 2024) also shows that traditional games are effective in increasing students' participation and conceptual understanding of mathematics.

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One of the traditional games that has the potential to be a medium for learning mathematics in elementary schools is egrang batok. This game uses two coconut shells tied with a rope so that it can be used like footwear (Wicaksono et al., 2024) . The application of this game has begun to be applied in elementary schools, one of which is at SD Muhammadiyah Plus Malangjiwan Colomadu. The application of this game in teaching and learning activities provides a fun and challenging learning experience for students (Bhat et al., 2023). Research by (Ramos et al., 2024) shows that game-based physical activities such as stilts walking can improve space perception and motor skills that support math ability. Teachers play an important role in guiding students to reflect on play experiences into fun mathematical understanding.

The application of the egrang batok game at SD Muhammadiyah Plus Malangjiwan is directly related to mathematics learning on measurement material. Through the activity of walking on egrang batok, students are invited to understand the concepts of length, distance, and steps concretely through real experiences (Kuswanto & Rahmat, 2024). Before playing, students measure the height of the egrang, the length of the track, and calculate the number of steps needed to reach the finish line. Research by (Lee & Lee, 2021) confirms that physical experience-based learning can strengthen the understanding of geometry and measurement in elementary-age children. The egrang batok game not only serves as a means of entertainment, but also as an effective learning medium in strengthening mathematical concepts in a fun and meaningful way.

Measurement material is important to be taught at the elementary school level because it is one of the basic numeracy skills that play an important role in everyday life (Rediani, 2024). Through learning measurement, students not only learn about length, weight, time, and volume, but also develop logical, analytical, and critical thinking skills. Research by (Jie & John, 2024) shows that the use of *game-based learning* strengthens students' focus and math learning outcomes. Research by (Tampubolon et al., 2023) also confirms that a cultural game-based approach strengthens numerical literacy and a sense of inclusiveness in the primary classroom.

Previous research shows that the use of traditional games in learning mathematics has a positive impact on student motivation, participation, and concept understanding (Repuya et al.,2025). Research by (Harpina, 2025) states that the application of traditional games can create a more contextual and interactive learning process. Meanwhile, (Ermawati et al., 2024) confirms that culture-based activities can develop collaborative abilities and creativity of learners. Research by (Wulandari et al., 2024) adds that integrating cultural elements in mathematics learning can foster a deeper conceptual understanding and is relevant to real life. This is also in line with research by (Putri et al., 2024) which confirms that traditional games such as engklek and congklak contain ethnomathematical values that have the potential to improve students' logical and spatial thinking skills.

These studies show the significant benefits of traditional games in mathematics learning, most of which are still limited to improving learning outcomes in the classroom without linking them deeply to the cultural meanings behind game activities. The research gap arises because not many studies have explored how the traditional game of egrang batok can serve as a fun learning media in measurement material for students. Based on these conditions, this research has the novelty of using the traditional game of egrang batok as a learning media in measurement material. Traditional games egrang batok is not only used as learning media, but also as a means to strengthen the link between cultural experience and mathematical understanding. This study aims to analyze the application of the traditional game egrang batok as a learning media on measurement material in elementary school.

Method

This study used a qualitative approach with an ethnographic research design because it aligns closely with the aim of this study, namely to analyze the application of the traditional game egrang batok as a learning media on measurement material in elementary school. This approach enables the researcher to capture cultural, social, and instructional dynamics that emerge authentically throughout the learning process. The integration of observation, interview, and documentation techniques was intentionally structured to correspond with the research purpose, which is to illustrate how egrang batok activities facilitate student's conceptual understanding of measurement through hands-on experiences. Consequently, this methodological framework reinforces the study's goal of investigating contextual learning practices embedded in students' cultural settings. The research subjects consisted of mathematics teachers and third grade students. Participants in this study were deliberately selected through purposive sampling to identify and assess students' initial abilities related to the topic of measurement. A mathematics teacher was included in this study due to his previous involvement in culture-based teaching practices, while two students (AA and HF) were selected based on (1) active participation in learning with media and their understanding of measurement material (2) initial understanding of measurement material (3) participant's willingness to be interviewed . This selection approach was designed to ensure that the data collected represented dive rse learning responses and provided a comprehensive understanding of the effectiveness of using egrang batok games among students with different characteristics. Data collection was done through observation, interview, and documentation. Observation is used to see directly how the egrang batok game is applied to measurement material. Through observation activities, researchers can identify how students use the egrang batok game to measure the length of objects and the distance from one object to another related to the concept of non-standard units. Interviews were conducted with all informants to explore their perceptions, experiences and views on the learning process of measurement materials using the egrang batok game, so as to obtain a more in-depth picture of the usefulness of the egrang batok game. Documentation was used to

obtain visual evidence and supporting data that illustrates the real learning process of length measurement using the egrang batok game media. Data validity was obtained using triangulation techniques, both technical triangulation and source triangulation. Triangulation is done by comparing the results of various data collection methods and double-checking with data sources to ensure consistency and accuracy of information. This technique was chosen so that the data obtained is truly valid and can be academically accounted for. The collected data were then analyzed using the Miles et al., (2020) model, including data reduction, data presentation, and conclusion drawing and verification.

Results

This research produced findings obtained through three data collection techniques, namely interviews, observation, and documentation. Interviews were conducted with three subjects, one class teacher (AI) and two students (AA, and HF). Based on the results of the interview, it was found that the application of the traditional game egrang batok in learning mathematics about the concept of length measurement, especially in the material of standard and non-standard units. Teacher AI said that students looked more enthusiastic when learning through egrang batok game activities. According to her, learning becomes more lively because students not only play, but also learn to measure the height of the tool, calculate steps, and understand the comparison of measurement results directly. Observations were made when learning measurement material took place with third grade students of SD Muhammadiyah Plus Malangjiwan. Learning outside the classroom is then continued with a reflection of learning in the classroom. Documentation was done to strengthen the findings that the egrang batok game was successfully applied to measurement material. The three techniques show that game-based learning can foster a fun learning atmosphere and help students understand math concepts through real experiences. Of the 20 students in class III of SD Muhammadiyah Plus Malangjiwan, two students were used as research subjects based on their initial ability on measurement material and one class teacher as a facilitator.

Table 1. Subject

Name	Subject
AI (pi)	**S1 (Subject 1)**
AA (pa)	**S2 (Subject 2)**
HF (pa)	**S3 (Subject 3)**

Based on Figure 1, length measurement learning activities at SD Muhammadiyah Plus Malangjiwan are carried out outside the classroom by utilizing the traditional game egrang batok as a learning medium. Students seemed enthusiastic about participating in the activity by counting the number of steps taken on the track between trees. During the observation, it was seen that students tried to maintain balance while understanding the relationship between the length of the egrang rope, the number of steps, and the distance traveled. In this activity, nonstandard units, namely egrang steps, are used to estimate the distance simply. The teacher guides students to adjust the length of the rope so that the steps produced are more consistent so that the measurements become more proportional and easy to compare between participants. Learning using the egrang batok game is done with a track that connects the distance between objects with a post system. Each post that students pass is counted by how many steps taken and then recorded. This activity shows that egrang batok traditional game-based learning helps students understand the concept of length measurement concretely.

Based on the interview excerpts, AA students showed enthusiasm during the application of the egrang batok game outside the classroom. The egrang batok game is played by linking the measurement material of non-standard units by measuring the length of the distance between trees with the length of steps using the game. Learning becomes not monotonous as seen from AA students expressing excitement with the egrang batok game as a learning medium. Learning with egrang batok media is played by making a track to walk so that students' active involvement is seen during learning with egrang batok game media.

Figure 1. Learning outside the classroom

P : How do you feel when learning length measurement using egrang batok outside the classroom?
S2 : I am happy because I can learn while playing. When using egrang, I learned that the steps I take can be different from my friends, depending on the length of the rope.
P : What do you think you learned from this activity?
S2 : I learned that measurements must be made in the same way so that the results can be compared. If the rope is too long, the steps will be longer, so the measurement results will be different.
P : What was your favorite part of this activity?
S2 : I liked it the most when I could walk on the egrang and count my own steps. It's fun, and I don't get bored.
P : Do you feel that this activity helped you understand the lesson more easily?
S2 : Yes, because I can directly see and feel the difference in distance if the rope is long or short. So I understand better what measurement is and why there must be the same unit.
P : What do you think about the learning atmosphere outside the classroom?
S2 : It's fun. We can learn while playing in the yard. All my friends are excited, encouraging each other too. So learning feels fast and doesn't feel long.

After the length measurement learning activities are carried out outside the classroom through the traditional game of egrang batok, the teacher continues the learning process in the classroom as in Figure 2, as a form of reflection and concept reinforcement. At this stage students are asked to discuss the measurement results they obtained outdoors. The teacher directs them to write down the number of steps used when traveling a certain distance using egrang batok then compares it with the measurement results using ordinary footsteps. During the activity, students were active and eager to express their opinions. They try to understand the cause of the difference in measurement results, especially when the length of the egrang rope used is not the same among students. The teacher took advantage of the situation to emphasize the importance of uniformity of measuring instruments, even though the units used were still classified as non-standard. The lesson also used standard units such as meters and centimeters to compare standard and non-standard units. Students are asked to measure using measuring instruments such as rulers and meters to measure the length of the table and then know the length in standard units. This activity supports the application of standard and non-standard unit measurement material so that students can compare the length of an object with measuring instruments such as rulers and using egrang batok. Through this discussion, students seem more able to relate the theoretical concepts of measurement discussed in class so that students can know the comparison of standard and non-standard units. The two-stage learning approach of direct experience outside the classroom and concept reinforcement in the classroom shows the effectiveness of the traditional egrang batok game media in improving students' conceptual understanding of length measurement. This kind of learning process not only fosters interest in learning, but also trains students' critical thinking skills in understanding the relationship between measuring instruments, distance, and measurement results.

The interview snippet describes the views of a teacher and a student regarding the use of egrang batok as a medium in learning length measurement. The teacher explained that this activity allows students to understand concepts concretely through direct experience outside the classroom. She saw that students showed high enthusiasm, even those who were usually passive became more active, so the learning atmosphere felt more alive and fun. The reflection activity in the classroom is also considered to have a big impact because it helps students connect their play experiences with the concept of measurement, especially related to the difference in results due to the inconsistency of measuring instruments. From the interview excerpts, students said that it was easier for them to understand the material because they could see and feel the difference in distance when using egrang batok. He felt that this way of learning was much more fun than the usual learning, especially because he could move freely, play with friends, and then discuss it back in class. Despite having difficulty maintaining balance at the beginning, students admitted that they were able to adapt over time and still enjoy the whole learning process.

Figure 2. Learning in the classroom

P : How do you perceive the use of egrang batok in learning length measurement?
S1 : I think this activity is very effective to help students understand the concept of measurement concretely. When playing egrang outside the classroom, they can directly feel how the length of the step can change due to the different length of the rope.
P : How did the students respond during the activity?
S1 : They were very enthusiastic. Everyone wanted to try, even those who were usually passive became active. Because it was done outside the classroom, the atmosphere was more lively and fun. Children learn while moving and working together.
P : Do the reflective activities in the classroom have an impact on students' understanding?
S1 : Very impactful. Class discussions made students realize the connection between their experiences and the concepts learned. They began to understand that different measurement results arise due to the inconsistency of measuring instruments.

P : After learning in class, what do you understand from the activity of using egrang batok?
S3 : I understand that the measurement results can be different because the length of the rope is also not the same. When discussing in class, I just understood why measurements must use the same unit so that the results can be compared.
P : How do you feel about this way of learning?
S3 : It's very fun. I can learn while playing, then explain it again in class, so it's easier to remember and not boring.
P : Do you feel like you understand the lessons better than if you were to study in class?
S3 : Yes, I understand better. The problem is that when playing Egrang Batok, I can directly see and feel the distance. So it's not just hearing the explanation, but experiencing it myself.

Discussion

The results showed that the application of traditional egrang batok games in mathematics learning, especially on measurement material, was successfully applied and created an active, fun, and meaningful learning atmosphere for elementary school students. Based on the observation, the activities carried out outside the classroom showed the full involvement of all students. They seemed eager to ride egrang batok, count the number of steps taken and record the measurement results with enthusiasm. The teacher plays an active role in providing direction, helping students understand the relationship between the length of the egrang rope and the distance traveled, and guiding them to compare results systematically. Documentation of the activity shows expressions of joy and cooperation between students indicating that the learning process takes place naturally. The activity shows the successful implementation of the experiential learning strategy where students understand the concept of length and distance not only through symbols, but through concrete experiences they have themselves. This finding is in line with the opinion of (Netriwati et al., 2025) which confirms that empirical experience-based learning can strengthen students' conceptual understanding of measurement concepts.

The successful application of the egrang batok game was also reinforced by the results of interviews with the teacher and two students. The teacher explained that this activity provides a different learning experience because students can directly see the effect of different rope lengths on measurement results. Two students interviewed stated that they understood the lesson more easily because they could "see the results themselves" and felt that "learning becomes more fun than in class." This suggests that this traditional game was successful in helping students build understanding through concrete and fun experiences. The documentation of the activity also showed how students discussed, observed each other's measurements, and worked together to obtain the most accurate results. This finding supports the view of (Lie et al., 2024) which states that concrete experience-based learning is able to bridge abstract concepts with real contexts close to students' lives.

After the activity outside the classroom, the teacher facilitates a reflection session in the study room. Students write down their measurement results, then compare and discuss the cause of the difference in results. In this process, some students show analytical skills by concluding that the difference in results is caused by the length of the egrang rope or inconsistent steps. The teacher then guides them to draw the meaning of the importance of unit uniformity in the measurement process. The class documentation shows a conducive learning atmosphere, full of curiosity, and colored by the active participation of all students. The teacher assesses that through this activity, students can connect their play experiences with the basic concepts of measurement naturally and independently. These results show that learning through egrang batok is not only successfully implemented, but also effective in leading students to build deeper conceptual understanding. This result is in line with research (Tadzkiroh & Hidayati, 2023) which emphasizes that the use of concrete media can help students understand abstract concepts more meaningfully and stick in long-term memory.

The integration of local cultural values through the egrang batok game also enriches student's learning experience and makes math learning more contextual. This activity not only teaches the concept of measurement concretely, but also fosters a sense of love for the nation's culture. (Sulistyowati & Mawardi, 2023) revealed that local culture-based

mathematics learning can strengthen the numeracy and critical thinking skills of elementary school students. (Fatimatuszahro & Hanifah, 2025) adds that traditional games such as congklak can help students understand the concept of numbers and patterns in a concrete and fun way. (Ermawati et al., 2024) also shows that cultural game-based learning creates a learning atmosphere that is inclusive and adaptive to cultural differences in the classroom. Research by (Miratunnisah, 2024) found that culture-based games are effective in fostering cooperation, responsibility, and student independence. In addition to these findings, this study also indicated that the consistent use of non-standard units through egrang batok steps plays an important role in building students' initial understanding of measurement standards.

The egrang batok game is also proven to improve student's mathematical reasoning skills. When comparing different measurement results, students practice to think logically and analyze the data they obtain. This kind of activity encourages the development of critical thinking skills while increasing sensitivity to the accuracy of measurement results. Research by (Apriani & Mahendra, 2025) explains that the use of educational games can strengthen students' rational thinking skills in understanding basic math concepts. In line with that (Harefa & Suastra, 2024) found that the integration of traditional games in mathematics learning becomes a concrete medium that helps students understand abstract concepts through real experience and reflection on learning outcomes. When students compare variations in measurement results between individuals, they can identify that differences in the length of the egrang rope result in variations in distance traveled.

Overall, the results of the study showed that the application of egrang batok game in mathematics learning on the topic of measurement was successfully implemented well and in accordance with the learning objectives. This activity makes students more active, focused, and understand the concept of length and distance in real terms. The learning process runs smoothly and conducive, with the support of the teacher as an effective facilitator in directing students to link play activities with measurement concepts. The success of this implementation proves that traditional games can be a relevant, efficient, and contextual learning tool to strengthen students' conceptual understanding of measurement materials in elementary schools.

Conclusion

This study concludes that the traditional game egrang batok can be a learning medium for measurement materials in elementary schools because it helps students understand the concepts of length, distance, and the difference between standard and non-standard units through direct learning experiences that are fun and close to their lives. Playing activities make students more motivated, actively involved, able to work together, and trained in critical thinking when comparing and interpreting measurement results, while the teacher's role is to guide the exploration and reflection process so that learning remains directed and meaningful. In addition to strengthening mathematical understanding, the integration of culture-based games also fosters students' appreciation of local culture, so that learning not only improves cognitive competence but also supports character building according to the principles of the merdeka curriculum.

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