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Enhancing Early Childhood Mathematical Skills through Contextual Digital Game-Based Learning: Evidence from the BEKANTAN Intervention in Indonesia

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Abstract

Early mathematical skills are crucial predictors of children's future success, yet they are often insufficiently stimulated during early childhood. This study investigates the effect of the digital game ``BEKANTAN"—an acronym for *Bermain Matematika di Hutan Kalimantan* (Playing Math in the Kalimantan Forest)—on the early math abilities of children aged 5–6 years in early childhood education. The study focuses on number knowledge, operations, geometry, algebra, measurement, and data analysis. This quantitative study used a pre-experimental One Group Pretest–Posttest Design. A total of 17 children were purposively selected from a population of 65, based on underdeveloped mathematical skills. Data were collected using a validated observation instrument and analyzed with SPSS 22, employing t-tests after normality and homogeneity tests. The results showed a significant increase in children's early math skills after using the ``BEKANTAN" game, with a p-value of 0.001. This indicates the effectiveness of digital games in supporting foundational mathematical development in early learners. The study highlights the potential of integrating context-based digital learning tools into early childhood education to make abstract mathematical concepts more concrete and engaging. The findings are significant for educators and curriculum developers seeking innovative approaches to early childhood instruction. However, the study's limitations include its small sample size and lack of a control group, which may affect the generalizability of results. Future research should involve larger, randomized samples and explore the game's impact on other developmental domains. Additionally, expanding the content of digital games to include environmental and cultural elements—such as Kalimantan's biodiversity—may enrich children's learning experiences while promoting local knowledge.

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Introduction

Early mathematics skills development begins in early childhood. Early mathematics is a foundational skill that supports children's school success (Ahmadi, Chuang, McClelland, Gonzales, & Beh-Pajooh, 2023). Academic abilities develop rapidly during the early school transition (Kim, Ahmed, & Morrison, 2021). Early mathematics and pre-reading skills form the academic foundation that starts in early childhood and strongly shape children's future prospects (Gashaj, Thaqi, Mast, & Roebers, 2023). Several researchers suggest that early math and literacy skills serve as predictors of later academic success (Ernst, Grenell, & Carlson, 2022), with early childhood math abilities being key predictors of future achievement (Mayer et al., 2023).

Early mathematics skills in young children are fostered through enjoyable teaching and learning experiences tailored to their interests and needs. Early math instruction involves counting and practical counting activities, such as sorting, matching, and pattern recognition. It also includes deeper understanding of core mathematical concepts: number, geometry, measurement, patterns, and basic operations like addition and subtraction (W. Chen, 2024). The National Council of Teachers of Mathematics categorizes kindergarten-level early math skills into six domains: number concepts, number operations, algebra, geometry, measurement, and data analysis (NCTM, 2006). Other experts describe early math as encompassing number concepts, everyday operations, geometry, measurement, and data processing using tables, charts, and graphs—including data interpretation (Saefurohman et al., 2021). Based on these frameworks, this study focuses on six key early math skills: number concepts, number operations, algebra, geometry, measurement, and data analysis.

Early math skills are essential for students' later understanding of formal mathematics (King & Purpura, 2021) and for arithmetic proficiency in primary school (Akhavein, Clark, Nelson, Espy, & Finch, 2023). For instance, proficiency in number operations is a strong predictor of long-term academic achievement (Douglas & Rittle-Johnson, 2024). Other studies highlight strong links between early math skills, self-regulation, and children's social skills (Devlin, Jordan, & Klein, 2022). Longitudinal research indicates that counting abilities predict future school success (Hannula-Sormunen, McMullen, & Lehtinen, 2019) and mathematical knowledge three to seven years later (Fyfe, Rittle-Johnson, & Farran, 2019).

Several factors influence the development of early math skills. Intervention studies show that high-quality informal experiences—such as shared book reading—can enhance children's math understanding (Purpura et al., 2021). Parental frequency of teaching counting at home is positively related to children's early math knowledge (Daucourt, Napoli, Quinn, Wood, & Hart, 2021). Emotional regulation (e.g., math anxiety) and the home learning environment also affect early math development (Gashaj et al., 2023). Preschool play-based environments predict improvements in both early mathematics and reading from preschool through first grade (Ndijuye & Benguye, 2023). Other influential factors include time spent playing (Miller et al., 2022), working memory (Bisagno, Cadamuro, & Morra, 2023), executive function skills (Ernst et al., 2022), and game-based learning (Brezovszky et al., 2019).

One notable trend is the rise of digital games (Behnamnia, Kamsin, Ismail, & Hayati, 2020). Ongoing technology advancements facilitate access and opportunities across domains (Genc, Çakmak, Çiftçi, & Hocaoğlu, 2024). Digital games are considered practical, engaging entertainment for all ages (Yalcin & Bertiz, 2019). Digital game-based learning promotes children's creative and critical thinking by offering immersive and insightful learning experiences (Behnamnia, Kamsin, Ismail, et al., 2020). Hooshyar et al. (2019) also report that digital games stimulate children to think creatively to solve everyday problems (Hooshyar, Kori, Pedaste, & Bardone, 2019).

In recent years, digital game-based learning for early childhood education has gained momentum. Digital game-based learning and educational technology have become central to education systems (Behnamnia, Kamsin, Ismail, & Hayati, 2023). Digital devices make math learning more accessible and enjoyable for children (Emen-Parlatan, Ördek-İnceoğlu, Gürgah-Oğul, & Aslan, 2023). Increasing evidence supports play-based learning's role in promoting children's academic growth (Wickstrom & Pyle, 2023). Digital games are believed to enhance children's motivation and engagement (Behnamnia, Kamsin, & Ismail, 2020), and to develop early numeracy skills (Vanbecelaere, Cornillie, Sasanguie, Reynvoet, & Depaepe, 2021). Devices allow children to explore and grasp number concepts using their favorite platforms (Barrocas et al., 2019). Studies report that math apps on digital devices improve children's math skills by approximately 20% compared to control groups (Mayer et al., 2023). Another study found that after about five hours of digital game-based learning, children significantly outperformed controls in math knowledge and skills (Thai, Bang, & Li, 2022).

Globally, early learning policymakers, researchers, parents, and practitioners have recently expressed concern about persistent achievement gaps (SACMEQ, 2020), especially early math stimulation in preschool being overlooked (Mackintosh & Rowe, 2021). The ubiquity of digital devices offers promising learning opportunities, yet few early-childhood math applications are theoretically grounded and empirically tested (Barrocas, Bahnmueller, Roesch, Lachmair, & Moeller, 2023), and no known digital media highlight the variety of animals in Borneo's forests to stimulate early math skills.

This study explores the impact of the digital game "BEKANTAN," which features Borneo forest animals—such as the Irrawaddy dolphin, orangutan, sun bear, hornbill, and proboscis monkey—on stimulating early math skills in 5–6-year-olds in PAUD (early childhood education). Through this digital medium, children also learn about Borneo's animal diversity, distinguishing it from other digital media. A quantitative approach is used to provide robust evidence of the game's effects. The results are expected to offer new insights into how digital games can simultaneously introduce Borneo's animal variety and stimulate early math skills in young children.

Methods

This study employed a quantitative approach using an experimental method. The type of experiment used was pre-experimental, which was considered the most appropriate for this study. The research was conducted from July to October 2024.

Research Design

The study adopted a One Group Pretest-Posttest Design to examine the early mathematics skills of 5–6-year-old children before and after the intervention using the digital game ``BEKANTAN".

O_1	X	O_2

Figure 1. One Group Pretest-Posttest Design (Sugiyono, 2022)

Explanation:

- **X**: Treatment
- **O1**: Pretest score (before treatment)
- **O2**: Posttest score (after treatment)

Research Sample

The study population consisted of 65 children, and 18 participants were selected using non-probability purposive sampling. The sample was determined based on specific criteria, particularly children whose early math skills were not yet developed across indicators such as number concepts, operations, algebra, geometry, measurement, and data analysis.

Research Instrument

Data were collected through observation, using an instrument adapted from the National Council of Teachers of Mathematics (NCTM, 2006). The instrument consisted of six indicators with a total of 22 items.

Table 1. Blueprint of Early Mathematics Skills Instrument for Children Aged 5–6

No	Indicator	Sub-Indicator	Item Numbers	Total Items
1	Number knowledge	Understanding number concepts	1, 11, 21	3
		Relating numbers to objects	2, 12	2
2	Number operations	Adding numbers	3, 13	3
3	Geometry	Understanding plane shapes	4, 14	2
		Understanding directions	5, 15	2
4	Algebra	Creating picture patterns	6, 16	2
5	Measurement	Measuring height	7, 17	2
		Measuring length	8, 18	2
		Measuring weight	9, 19	2
6	Data analysis	Classifying objects	10, 20, 22	3

The validity and reliability tests of all 22 items showed that the instrument was valid (r-calculated > r-table) and reliable, with no items eliminated.

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Table 2. Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
0.807	22

Data Analysis

Data analysis was conducted using SPSS software. Prior to hypothesis testing, normality and homogeneity assumptions were examined. The Kolmogorov-Smirnov test was used to assess normality; a significance value greater than 0.05 indicated that the data were normally distributed. Homogeneity was tested using Levene's test, with the criterion that if the calculated X^2 value was less than the critical X^2 value at a significance level of $\alpha = 0.05$, the data were considered to have homogeneous variance. Following assumption testing, hypothesis testing was performed using a paired sample t-test, appropriate for a pre-experimental study with a One Group Pretest-Posttest Design.

Result

The results of the study are presented in several stages, beginning with the assumption testing, which includes the normality test to assess whether the sample data are normally distributed, and the homogeneity test to determine whether the sample comes from a population with homogeneous variance. After these assumptions were tested, hypothesis testing using a paired t-test was conducted to examine the effect of the ``BEKANTAN'' digital game on children's early mathematics skills. The results are detailed as follows:

Assumption Testing

Normality Test

The normality of the data was tested using the Shapiro–Wilk test. If the significance value is greater than 0.05, the data are considered to be normally distributed. Otherwise, the data are not normally distributed.

Table 3. Shapiro–Wilk Test Results

Class	Statistic	df	Sig.	Interpretation
Pre-test	0.204	18	0.273	Normal
Post-test	0.165	18	0.416	Normal

As shown in Table 3, the significance values for both pre-test and post-test scores exceed 0.05, indicating that the sample data are normally distributed.

Homogeneity Test

Homogeneity was tested using Levene's Test for Equality of Variances.

Table 4. Levene's Test Results

Test	Levene Statistic	df1	df2	Sig.
Pre-test/Post-test	0.178	1	34	0.676

As shown in Table 4, the significance value obtained from Levene's Test (0.676) is greater than 0.05, indicating that the sample data come from a population with homogeneous variance.

Hypothesis Testing Results

Pretest Results of Children's Initial Mathematical Ability

The following presents the results of the pretest on the initial mathematical ability of children aged 5–6 years for each tested indicator.

Pretest Results on the Number Knowledge Indicator

The number knowledge indicator consists of five observed items: children reciting numbers from 1 to 20, counting the number of objects in a picture, naming number symbols, matching number symbols with pictures, and arranging numbers. The average pretest score for the item where children recite numbers from 1 to 20 was 2.4. The average pretest score for the item where children count the number of objects in a picture was 1.7. The average pretest score for the item where children name number symbols was 1.7. The average pretest score for the item where children match number symbols with pictures was 1.8. The average pretest score for the item where children arrange numbers was 1.9.

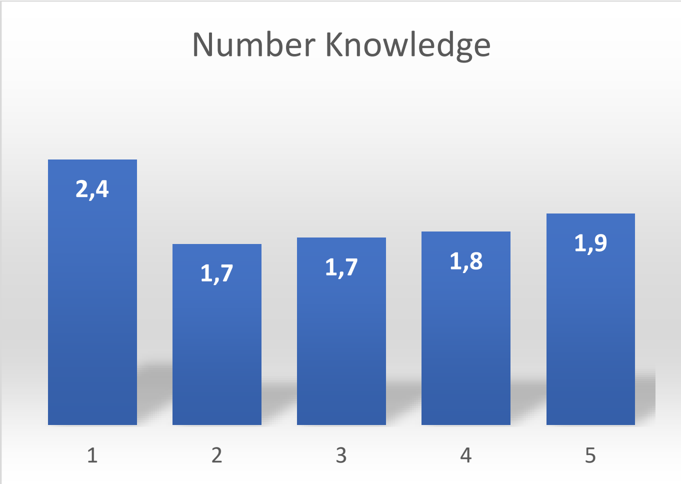

Figure 2. Average pretest scores on the number knowledge indicator

Pretest Results on the Numerical Operations Indicator

The numerical operations indicator consists of two observed items: children adding numbers and children naming operation symbols. The average pretest score for the item where children add numbers was 2.1. The average pretest score for the item where children name operation symbols was 1.5.

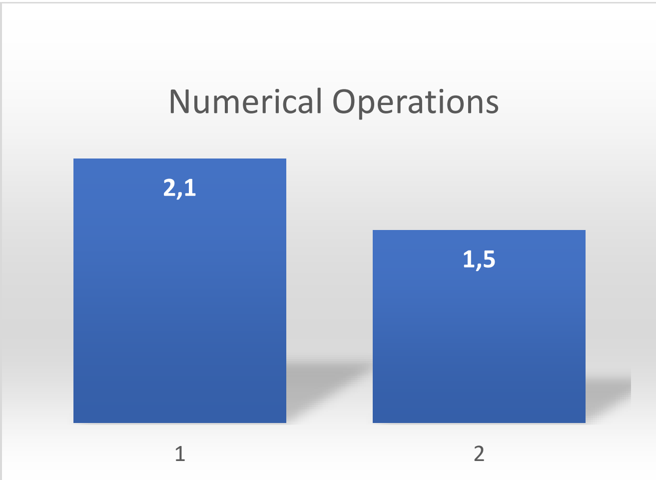

Figure 3. Average pretest scores on the numerical operations indicator

Pretest Results on the Geometry Indicator

The geometry indicator consists of four observed items: children pointing to plane shapes according to instructions, pointing to direction symbols according to instructions, naming plane shapes, and naming direction symbols. The average pretest score for the item where children point to plane shapes according to instructions was 2.1. The average pretest score for the item where children name plane shapes was 1.8. The average pretest score for the item where children name direction symbols was 2.2.

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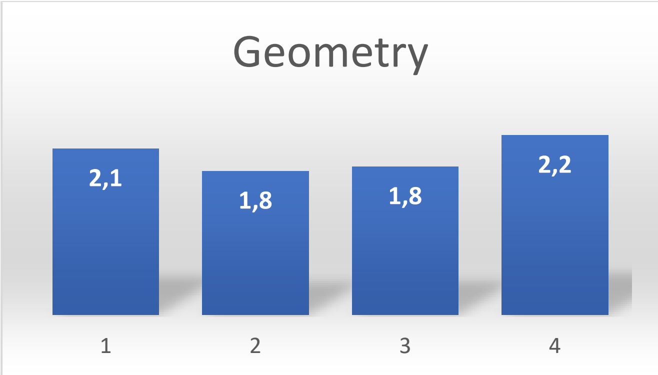

Figure 4. Average pretest scores on the geometry indicator

Pretest Results on the Algebra Indicator

The algebra indicator consists of two observed items: children identifying picture patterns and arranging picture patterns. The average pretest score for the item where children identify picture patterns was 2.3. The average pretest score for the item where children arrange picture patterns was 1.8.

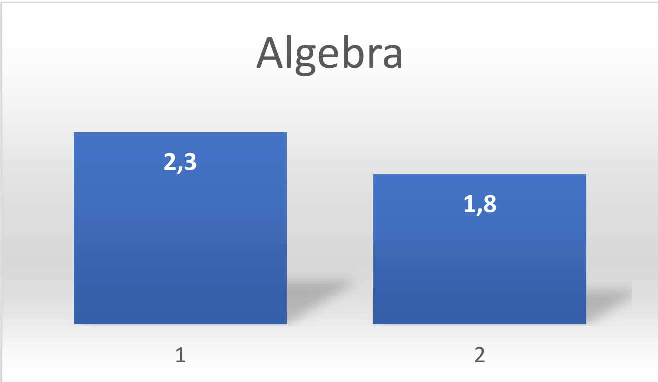

Figure 5. Average pretest scores on the algebra indicator

Pretest Results on the Measurement Indicator

The measurement indicator consists of six observed items: children measuring the height of objects, measuring the length of objects, measuring the weight of objects, comparing the height of objects, comparing the length of objects, and comparing the weight of objects. The average pretest score for the item where children measure the height of objects was 1.8. The average pretest score for the item where children measure the length of objects was 2.2. The average pretest score for the item where children measure the weight of objects was 1.2. The average pretest score for the item where children compare the height of objects was 2.6. The average pretest score for the item where children compare the length of objects was 2.2. The average pretest score for the item where children compare the weight of objects was 1.5.

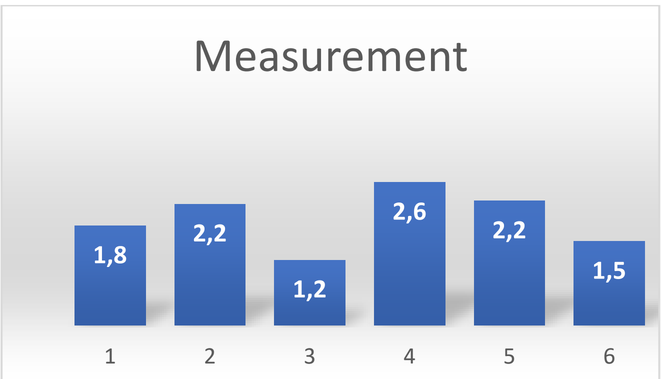

Figure 6. Average pretest scores on the measurement indicator

Pretest Results on the Data Analysis Indicator

The data analysis indicator consists of four observed items: children pointing to plane shapes according to instructions, pointing to direction symbols according to instructions, naming plane shapes, and naming direction symbols. The average pretest score for the item in which children pointed to plane shapes according to instructions was 2.1. The average pretest score for the item in which children named plane shapes was 1.8. The average pretest score for the item in which children named direction symbols was 2.2.

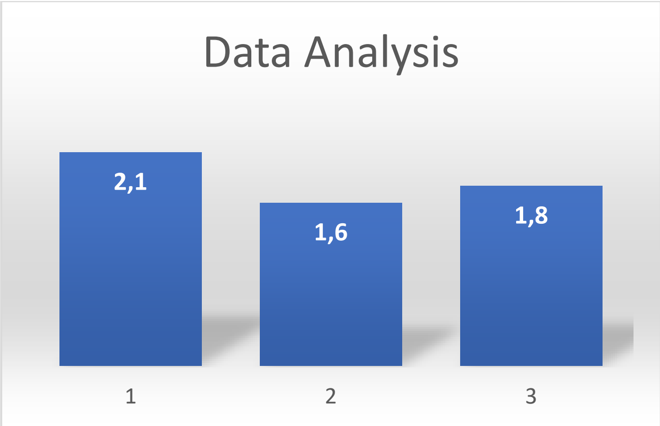

Figure 7. Average pretest scores on the data analysis indicator

Post-Test Results of Children's Initial Mathematical Ability

After the pretest, the children were given treatment using the digital game ``BEKANTAN'' to improve their initial mathematical ability while simultaneously introducing various animals found in the Kalimantan rainforest, such as the Irrawaddy dolphin, orangutan, sun bear, hornbill, and proboscis monkey, as shown in the figure below.

Figure 8. ``BEKANTAN'' Digital Game

The BEKANTAN'' digital game features 10 stations that stimulate six indicators of initial mathematical ability, namely number concepts, numerical operations, algebra, geometry, measurement, and data analysis. The following are examples of several stations in the BEKANTAN'' digital game.

Figure 9. ``BEKANTAN'' Digital Game – Station 1: Counting with the Irrawaddy Dolphin

In Station 1, there are several activities, one of which is counting with the Irrawaddy dolphin to stimulate children's initial mathematical ability in the number concept indicator, while also introducing the Irrawaddy dolphin to the children.

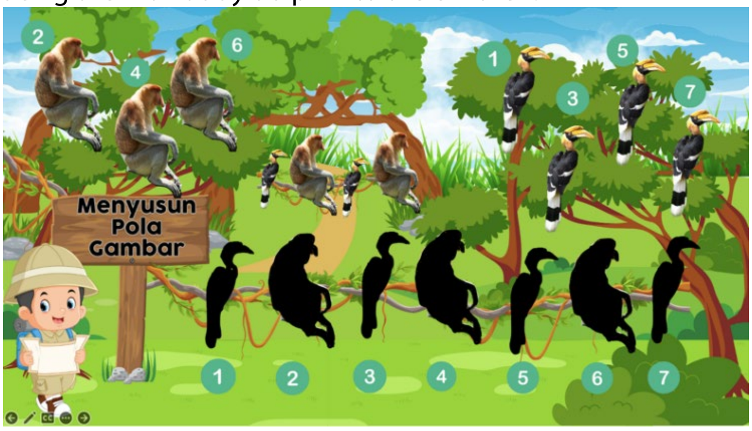

Figure 10. ``BEKANTAN'' Digital Game – Station 2: Arranging Picture Patterns

In Station 2, children engage in an activity where they arrange picture patterns. In the image above, children are asked to arrange pictures of the proboscis monkey and hornbill according to the given pattern. This station stimulates children's mathematical ability, particularly in the algebra indicator, while also introducing the proboscis monkey and hornbill to the children.

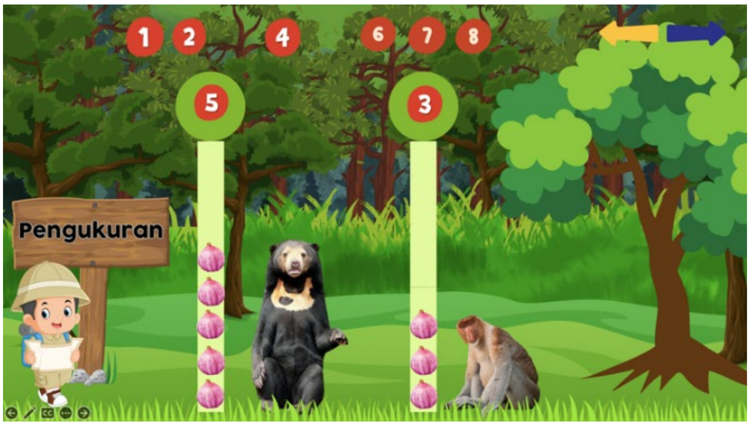

Figure 11. ``BEKANTAN'' Digital Game – Station 4: Measurement

Station 4 stimulates measurement skills, particularly in measuring the height and weight of animals and comparing the height and weight of two animals. For example, in the image above, children are asked to compare which animal is taller between the proboscis monkey and the sun bear.

After completing the activities at all 10 stations, a post-test was administered. The following presents the results of the post-test of initial mathematical ability in children aged 5–6 years for each tested indicator.

Post-Test Results on the Number Knowledge Indicator

The post-test was conducted after the children received ten treatment sessions, one of which stimulated number knowledge.

Figure 12. A Child Playing the ``BEKANTAN'' Digital Game – Learning Numbers

In this station, children were introduced to number concepts, such as the number symbol 4 being represented by four images of Irrawaddy dolphins. After ten treatment sessions, an increase in scores was observed for each item. For the item where children recited numbers from 1 to 20, the average score increased to 3.6. For the item where children counted the number of objects in a picture, the average score increased to 3.6. For the item where children named number symbols, the average score increased to 3.4. For the item where children matched number symbols with pictures, the score increased to 3.4. For the item where children arranged numbers, the average score increased to 3.9.

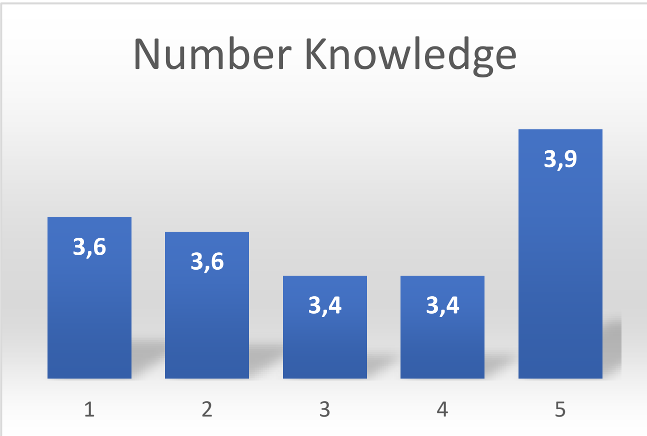

Figure 13. Average post-test scores on the number knowledge indicator

Post-Test Results on the Numerical Operations Indicator

In the numerical operations indicator, the children's average scores also increased. For the first item, where children added numbers, the average score achieved was 3.6. For the item where children named the symbols of numerical operations, the average score was 3.4.

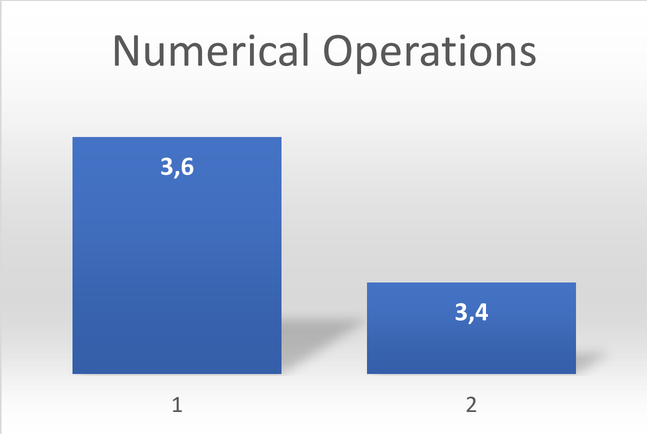

Figure 14. Average post-test scores on the numerical operations indicator

Post-Test Results on the Geometry Indicator

The children's average scores on all four observed items under the geometry indicator also increased in the post-test. For the item where children pointed to plane shapes according to instructions, the average score was 4. For the item where children pointed to direction symbols according to instructions, the average score was 3.7. For the item where children named plane shapes, the average score was 3.6. For the item where children named direction symbols, the average score was 4.

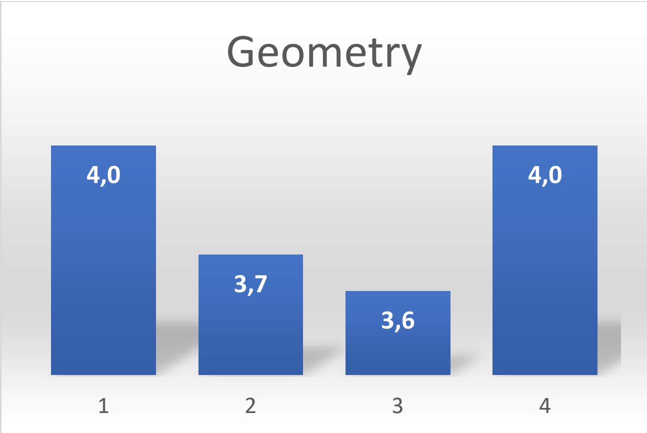

Figure 15. Average post-test scores on the geometry indicator

Post-Test Results on the Algebra Indicator

In the algebra indicator, the children's average scores also increased. For the first item, where children identified picture patterns, the average score was 3.4. For the item where children arranged picture patterns, the average score was 3.7.

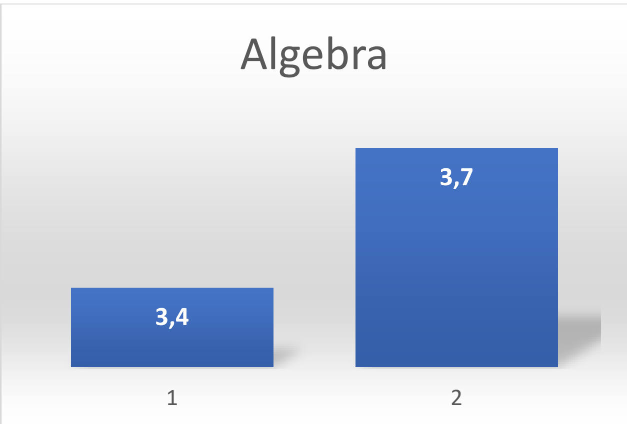

Figure 16. Average post-test scores on the algebra indicator

Post-Test Results on the Measurement Indicator

The children's average scores on all six observed items under the measurement indicator also increased in the post-test. Several games in the ``BEKANTAN" digital game were designed to improve children's measurement skills, as shown in the image below.

Figure 17. A Child Playing the ``BEKANTAN" Digital Game – Learning Numbers

In this station, children were asked to measure two orangutans and compare which one was taller. For the item where children measured the height of objects, the average score was 4. For the item where children measured the length of objects, the average score was 3.8. For the item where children measured the weight of objects, the average score was 4. For the item where children compared the height of objects, the average score was 3.8. For the item where children compared the length of objects, the average score was 3.4. For the item where children compared the weight of objects, the average score was 3.7.

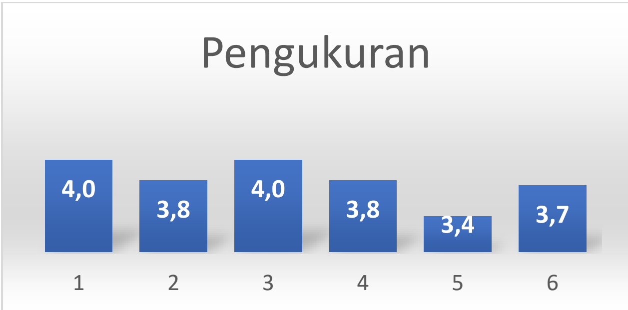

Figure 18. Average post-test scores on the measurement indicator

Post-Test Results on the Data Analysis Indicator

In the data analysis indicator, each observed item showed an increase in scores. For the item where children classified objects, the average score was 4. For the item where children identified the most common object, the average score was 4. For the item where children identified the least common object, the average score was 3.6.

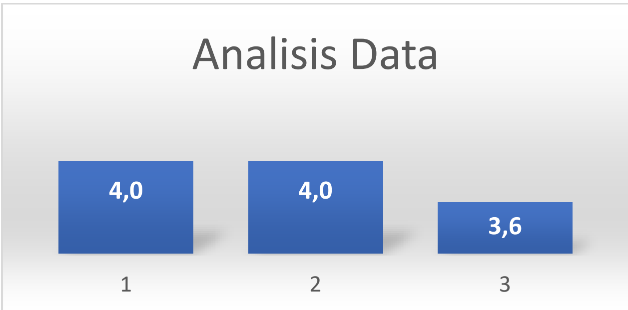

Figure 19. Average post-test scores on the data analysis indicator

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Comparison of Children's Initial Mathematical Ability Before and After Treatment

Overall, all observed items showed a significant increase in post-test scores.

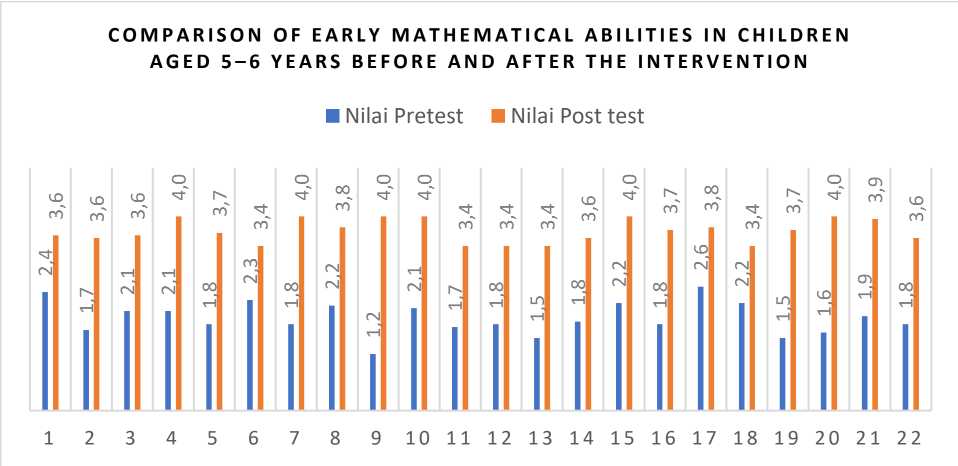

Figure 20. Comparison of average pretest and post-test scores in children's initial mathematical ability

The measurement indicator, particularly in measuring and comparing animal weights, showed the most significant increase. This is most likely due to the interactive features that allow children to directly measure and compare object sizes through digital visuals. Improvements were also observed in other indicators. For instance, in the item where children recited numbers from 1 to 20, the average score increased by 1.2. In the item where children counted objects in a picture, the average score increased by 1.9. In the item where children added numbers, the average score increased by 1.6. In the item where children pointed to plane shapes according to instructions, the average score increased by 1.9. In the item where children pointed to direction symbols according to instructions, the average score increased by 1.9. In the item where children identified picture patterns, the average score increased by 1.1. In the item where children measured object height, the average score increased by 2.2. In the item where children measured object length, the average score increased by 1.6.

In the item where children measured object weight, the average score increased by 2.8. In the item where children classified objects by type, the average score increased by 1.9. In the item where children named number symbols, the average score increased by 1.7. In the item where children matched number symbols with images, the average score increased by 1.6. In the item where children named operation symbols, the average score increased by 1.9. In the item where children named plane shapes, the average score increased by 1.7. In the item where children named direction symbols, the average score increased by 1.8. In the item where children arranged picture patterns, the average score increased by 1.9. In the item where children compared object height, the average score increased by 1.2. In the item where children compared object length, the average score increased by 1.2. In the item where children compared object weight, the average score increased by 2.2. In the item where children identified the most frequent object, the average score increased by 2.4. In the item where children arranged numbers, the average score increased by 2.0. In the item where children identified the least frequent object, the average score increased by 1.8. Based on this explanation, it is evident that the highest increase occurred in the measurement indicator.

Table 5. T-Test Results

Paired Samples Test										
		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	95% Confidence Interval of the Difference: Upper			One-Sided p	Two-Sided p
Pair 1	Before treatment – After treatment	-39.50000	5.30538	1.25049	-42.13830	-36.86170	-31.588	18	<,001	<,001

Based on the comparison of pretest and post-test scores and the results of the T-Test using SPSS 22 software, the significance value was found to be 0.001, which is less than 0.05. This indicates that H_0 is rejected and H_1 is accepted. Thus, it can be concluded that the BEKANTAN'' digital game, which features various animals from the Kalimantan rainforest, has an effect on the initial mathematical ability of children aged 5–6 years in early childhood education (PAUD). These results show that children who actively used the BEKANTAN'' digital game experienced improvement, as the game provided a new experience for them to operate digital games while simultaneously stimulating their mathematical ability and introducing them to various animals they may not have known before. Additionally, ``BEKANTAN'' is an interactive digital game that includes engaging animal visuals and imagery of the Kalimantan rainforest, enriching children's knowledge of their surrounding environment.

Discussion

This study aimed to examine the influence of the digital game BEKANTAN'' on early mathematical abilities in children aged 5–6 years. The results of the data analysis indicate that early mathematical skills in children aged 5–6 years can be significantly influenced by the digital game BEKANTAN,'' with a significance value of 0.001, which is less than 0.05. Therefore, it can be stated that the digital game ``BEKANTAN'' serves as a modern educational medium suitable for use in early childhood. Digital learning media combined with gameplay provide children with a sense of understanding while playing; children can enhance various aspects such as knowledge, skills, and language through this medium (Maryani, Rosidah, & Yuzandi, 2023).

Play is a fundamental basis for child development and a key driving force in designing educational activities during childhood (Nacher, Garcia-Sanjuan, & Jaen, 2016). In today's society, as children grow older, they spend more time playing digital games (Bulut, Samur, & Cömert, 2022). There is extensive literature acknowledging the importance of digital game-based learning (Vanbecelaere et al., 2020). Digital games are increasingly used in primary and secondary education, as they have been proven to improve cognitive skills (Blumberg, Sahni, Randall, Teeter, & Mann, 2024). Findings by Behnamnia, Kamsin, Ismail, et al. (2020) show that digital game-based learning provides deep learning experiences and can foster children's critical thinking skills. Other studies also reveal that the use of educational digital games actively enhances children's creative thinking (Behnamnia, Kamsin, & Ismail, 2020).

Similar to previous research that utilized digital games to stimulate various child development abilities, the digital game used in this study, namely ``BEKANTAN,'' was also employed as a learning medium to stimulate children's early mathematical skills. Mathematics is considered a core discipline (Sun, Ruokamo, Siklander, Li, & Devlin, 2021); however, it remains a challenging subject for many students due to its complexity (Xiang, Zhang, Liu, Wang, & Shang, 2025). Early mathematics education is crucial for future success, as it can predict mathematical and academic achievement into adolescence (DePascale & Ramani, 2024). In mathematics education, digital game-based learning is regarded as a foundational learning tool that helps students acquire conceptual knowledge (Meletiou-Mavrotheris & Prodromou, 2016).

The improvement in post-test scores for early mathematical skills among children aged 5–6 years across all indicators—including number knowledge, number operations, geometry, algebra, measurement, and data analysis—supports previous research findings that digital math games are effective tools for fostering positive math experiences in children (Moyer-Packenham et al., 2019). Digital games also enhance children's ability to transfer mathematical knowledge (Vanbecelaere et al., 2020). The application of mathematical skills is essential in our daily routines and forms the foundation for many disciplines (Hussein, Ow, Elaish, & Jensen, 2022). Therefore, based on the research findings, it can be concluded that early mathematical abilities are crucial to stimulate from an early age, and these skills can be fostered through the use of digital games.

Beyond supporting mathematical development, the BEKANTAN'' game introduces children to various animals native to the Kalimantan rainforest, such as the Irrawaddy dolphin, orangutan, sun bear, hornbill, and proboscis monkey. These animals are featured as characters in the game, enriching the learning experience. The growing popularity of digital games can be attributed to their broad application across learning domains (Alam, 2022). Game-based learning is widely used to improve educational outcomes in various fields (C.-H. Chen, Shih, & Law, 2020). BEKANTAN" thus serves dual functions: promoting mathematical learning and enhancing environmental awareness.

The findings of this study suggest that digital games can serve as alternative or even primary media for stimulating early mathematical skills. At the same time, such games can broaden children's knowledge of their environment. For instance, through ``BEKANTAN," children not only learned math but also became familiar with Kalimantan's native wildlife. However, the current version of the game is limited to animal themes. Future development could expand to include other elements, such as plant species in Kalimantan's forests, to support a wider range of early childhood learning objectives. This would increase both the educational scope and environmental relevance of the game.

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Conclusion

The digital game BEKANTAN" has an effect on early mathematical abilities in children at early childhood education institutions (PAUD). The hypothesis testing results show a significant difference in children's early math skills before and after being exposed to the BEKANTAN" digital game. The significance value was 0.001, which is less than 0.05, indicating that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. Therefore, it can be concluded that there is a significant difference in early mathematical ability scores before and after the treatment with the ``BEKANTAN" digital game. The findings demonstrate that children's early mathematical abilities improved following the intervention. This indicates that digital games have a positive impact on children's skills, particularly in early mathematics. Future research is expected to develop a variety of digital games that can stimulate children's abilities in other developmental domains.

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