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Influence of Multiplication Game Suit on Numeration Skills of V-Class Students of SD State Sokoharjo

Pengaruh Suit *Game* Perkalian Terhadap Kemampuan Numerasi Siswa Kelas V SD Negeri Sokoharjo

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Abstract

Multiplication is a basic operation in mathematics and plays an important role in elementary school math learning to study increasingly complex mathematical content at the next levels. This research is based on the lack of numeracy skills among fifth-grade students at SD Negeri Sokoharjo, particularly in multiplication calculations. The main objective of this research is to determine the effect of the numeracy skills of fifth-grade students at Sokoharjo Public Elementary School through the use of multiplication rock-paper-scissors games. This study adopts a one-group pretest-posttest quasi-experimental design to investigate the effect on the population of fifth-grade students at SD Negeri Sokoharjo. The data collection techniques used include tests. All fifth-grade students were made the sample for the research. Quantitative data analysis is conducted using descriptive and inferential statistics, including normality tests, homogeneity tests, and hypothesis tests to examine the significance of the research results. This research was conducted by administering a pre-test before carrying out the multiplication suit game activity and a post-test after carrying out the multiplication suit game activity. Analysis of pretest and posttest data shows a significant increase in the average scores of the students. The initial score of 37.00 increased to 58.00 by the end of the study, indicating a rise of 21 points. Additionally, calculations using SPSS show a substantial increase with a significance value (2-tailed) of 0.008 < 0.05, indicating a significant change in pretest and posttest scores before and after the test. It can be explained that the use of multiplication rock-paper-scissors games has proven to improve the numeracy skills of fifth-grade students at SD Negeri Sokoharjo.

Keywords: *Numeracy, mathematics, multiplication, educational games, elementary school.*

Abstrak

Perkalian ialah operasi dasar pada matematika dan memegang peranan penting dalam pembelajaran matematika sekolah dasar untuk mempelajari konten matematika yang kian rumit pada tingkat berikutnya. Penelitian ini didasari oleh kurangnya keterampilan numerasi siswa kelas V SD Negeri Sokoharjo terutama dalam perhitungan perkalian. Tujuan utama penelitian ini adalah untuk mengetahui pengaruh kemampuan numerasi siswa kelas V SD Negeri Sokoharjo melalui penggunaan permainan suit perkalian. Penelitian ini mengadopsi desain pra-eksperimen one-group pretest-posttest untuk menyelidiki pengaruh pada populasi siswa kelas V SD Negeri Sokoharjo. Teknik pengumpulan data yang digunakan meliputi tes. Seluruh siswa kelas V dijadikan sebagai sampel penelitian. Analisis data kuantitatif dilakukan dengan menggunakan statistik deskriptif dan inferensial, termasuk uji normalitas, homogenitas, serta uji hipotesis untuk menguji signifikansi hasil penelitian. Penelitian ini dilakukan dengan memberikan pre-test sebelum melaksanakan kegiatan *Suit Game Perkalian* dan post-test setelah melaksanakan kegiatan *Suit Game Perkalian*. Analisis data pretest dan posttest menunjukkan adanya peningkatan yang cukup besar pada nilai rata-rata siswa. Nilai awal sebesar 37,00 meningkat menjadi 58,00 pada akhir penelitian, menunjukkan kenaikan sebesar 21 poin. Selain itu, perhitungan menggunakan SPSS menunjukkan peningkatan yang cukup besar dengan nilai signifikansi (2-tailed) yaitu 0,008 < 0,05 menunjukkan adanya perubahan signifikan pada skor pretest dan posttest sebelum dan sesudah tes. Bisa dijabarkan bahwa pemanfaatan permainan suit perkalian terbukti memberikan peningkatan hasil kemampuan numerasi siswa kelas V SD Negeri Sokoharjo.

Kata Kunci: Kemampuan numerasi, matematika, perkalian, permainan edukasi, sekolah dasar.

1. Introduction

Numeracy literacy is a key requirement to be able to compete in the modern era. This skill is not only taught at school, but should also be cultivated in the family and community environment. Numeracy literacy enables individuals to understand and use mathematical concepts to overcome various challenges in everyday life (Manurung et al., 2023). The ability to think logically becomes a strong foundation for mastering numeracy skills and solving complex problems.

Mathematics is a crucial foundation of knowledge for the whole world, as shown by the PISA survey. Unfortunately, the 2018 PISA Survey revealed that the mathematics learning achievements of Indonesian students are not optimal. Indonesian students' math skills show significant fluctuations between years. The lowest score was recorded in 2003 at 360, and the highest score in 2006 reached 391. However, the latest score in 2018 dropped to 379, far below the OECD average standard of 487 (Benu et al., 2024). This indicates that the numerical literacy of Indonesian students needs to be improved. One of the causes is the tendency of students to rely on online sources rather than textbooks when doing assignments. For the nation to progress, Indonesia needs to produce a generation that not only masters mathematics but also has complex cognitive abilities.

Students' skills in using their mathematical knowledge to solve various real-world problems are called numeracy skills (Jannah & Hayati, 2024). The ability to explain various information presented in visual form as a basis for making decisions is one of the many markers of numeracy skills. Another marker is the use of representations in the form of numbers and different symbols. Numeracy skills have become an important foundation in navigating life in the digital age. From making financial decisions and understanding market trends to solving complex problems in various fields, numeracy serves as a powerful tool. In a global context, individuals with strong numeracy skills are more alert to the challenges of an increasingly complex and competitive world of work (Mantau & Talango, 2023). They are able to adapt to new technologies, analyze big data, and contribute to global problem-solving. Numeracy is not just a numeracy skill; it is the key to unlocking opportunities and achieving success in the digital age.

Research findings at SDN Sokoharjo show that the numeracy skills of grade V students still need to be improved, especially in terms of solving multiplication problems. Based on the education report card platform, 40-70% of students have reached the minimum competency by applying mathematical concepts to solve everyday problems. This indicates that the majority of students have not been able to understand the concept of multiplication or memorize multiplication tables in-depth and lack practice problems. As a result, many students tend to avoid multiplication problems and feel less confident. The lack of variety in math learning methods is also a factor that causes students to lose interest in learning and tend to be passive. Teachers need to create a learning atmosphere that is fun and engages students. An effective learning process requires a harmonious relationship between teachers, students, learning content and the learning environment. Making learning fun with stories, songs, challenges, and humor helps students understand the material more easily and quickly (Anjarini & Pangestika, 2022). If learning previously felt monotonous, now, with games, the classroom atmosphere becomes more dynamic. Students not only listen passively but also play an active role in the learning process. While socializing with their peers (Ngazizah & Fadhillah, 2023). Therefore, there is nothing wrong with teachers using educational games, one of which is the multiplication suit game. Suit

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Game Multiplication is a learning environment that further develops students' multiplication skills, which are optimal and creative.

The purpose of this study was to determine the effect of numeracy skills of grade V students of SD Negeri Sokoharjo through the use of Suit Game Multiplication. This research was conducted by giving a pretest before implementing the Multiplication Game Suit activity and a posttest after implementing the Multiplication Game Suit activity.

2. Literature Review

Mathematical numeracy is the ability to use numbers and symbols to find solutions to everyday problems, such as reading graphs or tables (Pratiwi et al., 2023). The ability to analyze by using numbers is called counting (Bopo et al., 2023). According to a different perspective, counting is a cognitive skill that involves applying mathematical principles to solve everyday problems and applying numerical skills (Boangmanalu & Nasution, 2023). In primary schools, mathematics-focused teaching needs to be planned to maximize students' mathematical proficiency. Effective mathematics teaching requires that students create their own knowledge, teachers set the necessary conditions, and there is relevant mathematics content (Sutama et al., 2020).

Research conducted by (Indrawati, 2021) Piaget argues that play is a fun way for children to practice the abilities they already have. By playing, children naturally develop their thinking skills. Therefore, games are a very suitable learning approach for elementary schools. The game method is an effective approach to facilitating Mathematics learning, especially geometry and measurement materials, so as to achieve maximum learning achievement (Ramlah, 2024). A study conducted by (Ningtias et al., 2024) revealed that the application of the 'jellyfish hunting' game in mathematics learning can improve students' numeracy skills. The interactive and fun approach in this game proved to be effective. In addition, research by (Sesrita and Yarmi, 2023) found that learning math with the game congklak can significantly improve students' numeracy skills. By playing while learning, children can develop their potential optimally in a fun and inclusive environment.

"Suit Game Multiplication" is an interactive method that combines the concept of a finger suit game with multiplication operations. Students will play suit by showing the number of fingers and then multiplying the number of their fingers. Whoever answers the multiplication result the fastest is the winner. This game not only makes learning multiplication fun but also helps students master the multiplication tables faster. The purpose of this game is to make it easier for students to explore and memorize multiplication in a fun and interactive way. The relevant research is from (Lisa et al., 2024). The results of the study show a very striking change between the scores before and after the action of educational games. In line with previous research learning outcomes showed a striking increase in students. The suit multiplication game is useful in improving the multiplication skills of SD/MI students in the context of learning mathematics.

3. Research Methods

This study adopted a quantitative experimental approach with a pre-experimental design of one group pretest-postest type. This design allows researchers to compare students' initial ability with their final ability after being given specific actions. After the treatment, students' abilities are

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measured again to see the improvement. The following is a research design with a One-Group Pretest-Posttest design:

Table.1. One-Group Pretest-Posttest Design

O_1	X	O_2

Description:

O_1= Pretest score before treatment

X = Treatment

O_2 = Posttest score after treatment

This study is helpful for measuring changes caused by the treatment given to the subject. Data analysis is carried out through normality, homogeneity, and hypothesis testing to test the significance of the research results. This research was conducted through collecting data and processing data in a numerical format, relevant to the description by (Ardiansyah, 2023). Sugiyono (2023) states that this design involves one group of subjects who are tested before and after treatment is given. This study's only Level of student competence in subject matter involves one group, so it is simpler in organization and implementation; there is no need to divide participants into experimental and control groups. The one-group pretest-posttest design has a fundamental weakness, namely the absence of a comparison group, making it challenging to ensure that the changes that occur in the experimental group are entirely due to the treatment given, without being influenced by other factors. One strategy that can be applied is to use data analysis with appropriate statistical tests to analyze data and test hypotheses.

The types of questions used include multiple-choice, complex multiple-choice, true-false statements, and matching questions. The primary purpose of using various question formats in the pretest and posttest is to get an accurate picture of the student's Level of competence in the subject matter. Through the combination of question formats, the evaluation can be carried out in a more varied and objective manner. The instruments used are learning outcome evaluation questions that have been prepared by the Ministry of Education and Culture. Although researchers do not have the authority to modify these questions, efforts have been made to ensure the quality of the data obtained. Through consultation with experts and descriptive statistical analysis, researchers have tried to maximize the validity and reliability of the data. The data collection technique utilized was a test. The main objective of this study is to understand the effect of numerical competence on grade V students of SD Negeri Sokoharjo through the use of the Multiplication Game Suit.

4. Results and Discussion

4.1. Research Results

Suit Game Multiplication has been proven to be effective in improving student learning outcomes. Besides making the learning process more interesting, the game also stimulates critical thinking skills and encourages students to interact more actively with each other. The combination of these factors led to an increase in the average student score. The improvement in the numeracy skills of grade V students of SDN Sokoharjo who participated in the multiplication suit game can be seen from the comparison of test scores before and after the game was implemented.

Table.2. Pretest and Posttest Results

No.	Soal	N	Value		
			Minimum	Maximum	Average
1.	Pretest	10	15	75	37,00
2.	Posttest	10	30	80	58,00

The average student score obtained before the application of the multiplication suit game was 37.00. Students' numeracy skills after being given treatment have a mean value of 58.00.

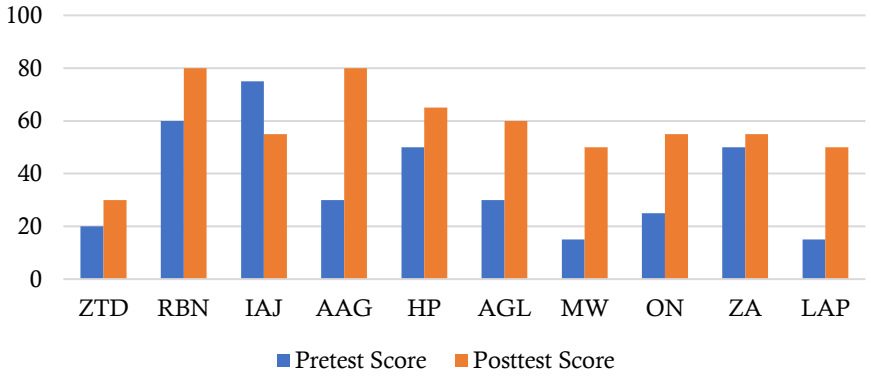

Figure.1. Comparison of Pretest and Posttest Scores

The results of the pretest and posttest data analysis in the bar chart, there is a significant increase in students' ability to multiply after participating in learning integrated with the Suit game. This finding is similar to the results of research (Lisa et al., 2024), namely a significant increase in learning outcomes. Normality test is used to conduct prerequisite testing.

Table.3. Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	0.233	10	0.132	0.905	10	0.250
Posttest	0.194	10	0.200	0.917	10	0.329

The normality test using the Shapiro-Wilk Test shows that the pretest Sig value is 0.250>0.05 which has a normal data distribution. Then the posttest Significance value of 0.329>0.05 shows that the data is normally distributed. It can be explained that the data is normally distributed and can be continued with the next test.

Table.4. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Exam Scores	Based on Mean	2.571	1	18	.126
	Based on Median	1.161	1	18	.295
	Based on the Median and with adjusted df	1.161	1	16.963	.296
	Based on trimmed mean	2.309	1	18	.146

The significance value of the homogeneity test is more than 0.05 so that the variance between data groups is homogeneous. This makes it possible to use the paired t-test in assessing differences in pretest and posttest scores.

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Table.5. Hypothesis Test

					95% Confidence Internal of The Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pretest - Postest	- 21.000 00	19.68207	6.22718	-35.08686	-6.91314	-3.372	9	0.008

A null hypothesis in a two-way test is rejected if the probability value obtained is lower than the predetermined significance level (α = 0.05). Referring to the findings of the hypothesis test, it is explained that the significant value is 0.008. 0.008 <0.05 means that H1 (there is a significant improvement in the numeracy skills of grade V students of SDN Sokoharjo through the Multiplication Game Suit) is accepted and H0 (there is no significant improvement in the numeracy skills of grade V students of SDN Sokoharjo through the Multiplication Game Suit) is rejected. This means that there is a significant difference in the pretest and posttest scores due to the utilization of the multiplication suit game.

Based on the t-test, the $t_{calculated}$ value (-3.372) is greater than the t_{table} value (2.26216). This means rejecting the null hypothesis and accepting the alternative hypothesis. This means that the multiplication suit game has a positive effect on the counting ability of fifth-grade students of SD Negeri Sokoharjo.

4.2. Discussion

Mathematics has a very crucial role in life because of its significant influence on the progress of science and technology (Rahayu et al., 2023). Mathematics enables children to think, reason, and analyze systematically, critically, and creatively. However, currently, mathematics is often considered a significant academic challenge for many students. Relevant to the description of (Rizqi et al., 2023), many students still face obstacles in understanding the concept of multiplication, which has an impact on their overall understanding of mathematics. Fast arithmetic is an essential basic skill for overcoming this problem and opening up opportunities for students to achieve better. Lack of quick calculation skills will hinder students' progress in learning math (Robainah et al., 2022). If students have difficulty multiplicating, it can affect the challenge of understanding the following material (Friantini et al., 2020). Based on this, researchers apply educational games, namely the multiplication suit game. *The Multiplication Suit Game* can be a learning environment that further develops students' multiplication skills and makes them more effective and innovative. Relevant research from (Lisa et al., 2024) with the results of his research showed that student scores increased rapidly from the initial test to the final test. The multiplication game suit is helpful in improving the multiplication skills of elementary/MI students in learning mathematics.

The suit is a crucial first step in many games. Without understanding the mechanics of suits, it can be not easy to follow the game. Suit is often used to determine the turn order or role of each player. A suit generally involves three fingers: the thumb, index finger, and pinky, each with a specific symbol. The rules of suits are unique, with the thumb winning over the index, the index winning over the pinky, and the pinky winning over the thumb (Fad, 2014). The popular hand game, often called suit or suten, is a commonly used tradition to determine turn or order among several people (Lisa et al., 2024). Each culture has its own way of playing this game, often linked to philosophies and symbols that reflect local values. Through suits, children learn to accept results gracefully and respect ancestral traditions (Witasari & Wiyani, 2020). Suit is included in the category of folk games that have been passed down from generation to

generation, which, according to (Kurniawan, 2019), are group or individual activities that are fun and part of cultural heritage.

Traditional games are games whose rules, equipment, field size, and length can be adjusted to the situation and conditions (Kurniawan, 2019). According to Returns in Salsabillah et al. (2023), the rules of the game for finger placement are; thumb meets forefinger, then the thumb wins; thumb and pinky are won by the thumb, index and pinky compete then the index is the winner; index and thumb then the thumb is superior, if the pinky and thumb are pitted then the pinky wins, the pinky and index are always won by the index. Although its exact origins are still a puzzle, many experts argue that thousands of years ago, this game already existed in the Eastern Mediterranean region. Ancient paintings in Egypt seem to be silent witnesses of a game that has tested human luck (Sumarsono, 2022). This means players have the freedom to modify the rules according to their region. At SDN Sokoharjo, the suit game is applied to grade V students by changing the rules and elements that use fingers. The game involves at least two students facing each other and performing suits using one or two hands according to the multiplication level learned, where each finger represents one number.

The multiplication suit game is done by pairing up and then giving a signal (1, 2, 3) and immediately opening their fingers simultaneously. Then, the number of fingers of the first student is multiplied by the number of fingers of the second student. For example, the first student opens two fingers, and then the second student opens four fingers, and then the question becomes 2 x 4. Students who can mention the answer to the multiplication result quickly and precisely will get a score/reward, but if the answer is wrong, do not get a score and march backward, and so on. The following is a display of the Multiplication Game Suit using fingers:

Figure.2. Multiplication of Number Symbols Using Fingers

The rules in this game are: the number of players is two people facing each other, the game uses the number symbols 1 to 10 using fingers, the game is connected to the multiplication calculation operation, the victory of this game is determined by the number of scores obtained from the speed and accuracy of the answer, if the player mentions the answer faster than the opposing player, but the answer is wrong then the player loses and retreats followed by the next player. The following presents the implementation of the Multiplication Suit Game:


Figure.3. Implementation of the Multiplication Suit Game

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The increase in students' average scores after the implementation of the *Multiplication Game Suit* can be explained through several factors. First, the game creates a fun learning environment and reduces students' anxiety towards math. Second, the game mechanism is challenging, fostering students' ability to find innovative solutions. Third, the social interaction that occurs during the game helps students learn from each other and understand multiplication concepts better. The combination of these factors significantly contributed to the improvement of students' learning achievement.

5. Conclusion

The test results showed that the Suit game succeeded in significantly increasing the students' average score after participating in the Suit game. The average score of students reached 58 after an increase from 37, showing an increase of 21 points. Calculations using SPSS26 showed an increase with a significance value (2-tailed) of 0.008<0.05, which indicates a significant difference in the pretest and posttest scores before and after the test. The data obtained shows that the multiplication suit game is necessary in practice so that learning can be effective, efficient, and enjoyable. The fifth-grade students of SDN Sokoharjo benefited from the use of multiplication games to improve their math counting skills. The test results illustrate that the use of multiplication suit games has been proven to increase the numeracy skills of grade V students of SDN Sokoharjo.

The research findings in class V of SD Negeri Sokoharjo prove that the application of the multiplication suit game is efficacious in improving students' numeracy skills. It is expected that teachers apply educational games to increase students' active participation and, at the same time, improve their learning achievement. The findings in this study can be used as a basis for creating a more effective mathematics learning approach that is relevant to the characteristics of elementary school students. Researchers who want to conduct research on the utilization of educational games should focus more on the criteria and needs of students so that the learning stages run optimally.

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