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THE EFFECT OF *GAME SUITS* ON STUDENT MOTIVATION AND LEARNING OUTCOMES ON SUMMATION MATERIAL

Mira Amelia[1*], Isrok'atun[2], Dety Amelia Karlina[3]
[1,2,3]Universitas Pendidikan Indonesia
[1]ameliamira@upi.edu

Abstract
This research was motivated by the paradigm of grade II students who consider counting difficult. The fact found in the field is that the learning pattern is not fun so that students do not like and are not motivated to learn mathematics. The purpose of this study was to find out how game suits affect student motivation and their learning outcomes about addition in grade II. In addition, this study also determined whether game suits help students in improving students' numeracy skills related to summation operations. This study used quasi-experimental research with a non-equivalent control group design. The sample in this study was grade II students totaling 60 students. The motivation data collection technique is questionnaire, while learning outcome data is pretest and posttest. Data analysis techniques are performed using SPSS 23 for windows with t-test. The results of this study show that game suits in mathematics learning activities on addition material have a significant effect on increasing student learning motivation and have a significant effect on improving student learning outcomes.
Keywords: *game suit; motivation; learning outcomes*

Abstrak
Penelitian ini dilatarbelakangi oleh paradigma siswa kelas II yang mengganggap berhitung itu sulit. Fakta yang ditemukan di lapangan yakni pola pembelajaran tidak menyenangkan sehingga siswa tidak menyukai dan tidak termotivasi untuk belajar matematika. Tujuan dari penelitian ini adalah untuk mengetahui bagaimana game suit berpengaruh pada motivasi siswa dan hasil belajar siswa tentang penjumlahan di kelas II. Selain itu, penelitian ini juga menentukan apakah game suit membantu siswa dalam meningkatkan kemampuan berhitung siswa terkait penjumlahan operasi. Penelitian ini menggunakan penelitian quasi eksperimen dengan design non-equivalent control group. Sampel dalam penelitian ini yakni siswa kelas II yang berjumlah 60 siswa. Teknik pengumpulan data motivasi adalah angket, sedangkan data hasil belajar adalah pretest dan posttest. Teknik analisis data dilakukan dengan menggunakan SPSS 23 for windows dengan uji-t. Hasil penelitian ini menunjukan bahwa *game suit* dalam kegiatan pembelajaran matematika pada materi penjumlahan berpengaruh signifikan terhadap peningkatan motivasi belajar siswa kelas 2 pada materi penjumlahan dan berpengaruh signifikan terhadap peningkatan hasil belajar siswa kelas 2 pada materi penjumlahan.
Kata Kunci: game suit; motivasi; hasil belajar

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Introduction

Education is man's attempt to understand himself consciously and in a planned way with his environment, and to change himself (Ulhusna et al., 2020). In education, a student experiences a learning process that can be reaped as a result. Learning is an ongoing process, so everyone will learn throughout his life (Cleopatra, 2015). Usually to make their own interpretations and understandings, the child applies his environment and previous experiences into the current learning context (Lloyd et al., 2022). As educators, teachers are responsible for

imparting knowledge to students so that they can understand the knowledge and life skills needed in everyday life (Dahlia, 2022). To achieve the desired learning objectives, teachers and students must work together to build and design learning (Genty, 2013; Ulhusna et al., 2020). It is important for teachers to create innovative education as a practice-oriented teaching model (Karolčík &; Marková, 2023). Teachers must design learning processes that can make it easier for students to understand their learning.

Elementary schools are a great place to start efforts to improve education, especially mathematics (Isrok'atun, 2012). Maths in school is essential to build students' mindsets (Dyah Anungrat Herzamzam, 2018). However, in general, students are afraid and lazy to learn mathematics because of the large number of calculations (Elis Warti, 2016). This is relevant to the facts found in the field, namely based on observations in one of the elementary schools in Sumedang Regency, the difficult assumption of mathematics lessons is still attached to elementary school students, especially low grades. They find counting difficult and unpleasant. This makes mathematics a subject that many students dislike. From this, teacher skills in packaging learning are very necessary. Learning mathematics is similar to learning other subjects (Younes et al., 2023). Students enjoy learning maths because they have a strong interest in the subject, or because they feel satisfied with their abilities (Amien et al., 2023). Teachers must be able to create interesting things so that students are not easily bored with counting. Fun and creative teachers are the reason why children usually love maths (Fatonah &; Naemah, 2022). Students who are interested in learning tend to be more focused while in class (Karcher et al., 2022). It is different if students who are not interested often disengage from a given task because they do not have the necessary ability to complete it, the task is too difficult, they cannot manage time well, or they do not find the task interesting enough (Yang &; Ogata, 2023). Students have learning motivation which is very important for their learning success (Dahlia, 2022). Motivation to learn is tied to perseverance (Lakanen & Isomöttönen, 2023). Learning motivation is a process that can encourage, direct, and follow one's actions to achieve certain goals (Bishara, 2018; Novianti et al., 2022). Learning motivation can support learning performance (Michael & Kyriakides, 2023). An important factor in student success is learning motivation, because learning outcomes will be better if there is motivation (Walidah et al., 2022).

In the process of learning a person will cause learning outcomes, which are associated with changes in themselves. Learning Outcomes are the result of teaching and learning activities (Shafi'i et al., 2018). Learning success is influenced by two factors, namely internal and external. Internal factors are the consistent nature of individuals in organizing and functioning learning, especially with regard to the way students receive and process new data, process, systematize, and store data, and solve certain problems (Angelkoska et al., 2016). Internal factors include initial ability, intelligence level, study motivation, study habits, study anxiety, and study motivation. Factors that exist outside the individual are called external factors (Shafi'i et al., 2018). External factors include family environment, school environment, community, socioeconomic circumstances, and others. According to Bloom's Taxonomy theory, three categories of domains produce learning outcomes: psychomotor, affective, and cognitive domains. Cognitive complexity consists of six domains: the memory domain (C1) for example mentions, the comprehension domain (C2) for example deciphering, the application domain (C3) for example sorting, the analysis domain (C4) for example solving, the evaluation domain (C5) for example assessing, and the creating domain (C6) for example producing. So, learning outcomes are the abilities that students have after the learning process, which includes their cognitive, affective and psychomotor skills (Nurrita, 2018). In addition, by considering the needs

of each student and being able to attract students' attention during the learning process, teachers must be able to arrange optimal learning facilities (Nida et al., 2023). Teachers must create good teaching and learning situations to avoid adverse situations of students and solve problems to create an optimal learning atmosphere (Jumrawarsi &; Suhaili, 2021). Satisfactory learning outcomes will be produced if teachers master teaching materials, namely the material to be taught, educational and learning strategies, able to encourage students to achieve achievements, and try their best to improve the quality of education (Isrokatun et al., 2021). That way the role of the teacher is also very important in determining student learning outcomes.

Educational games is a game that is not done just to entertain, but get contains information conveyed to the child(Putri, Suyanto, & Fatta, 2015;; Fatonah &; Naemah, 2022). Game-based learning has long been considered the best method of education (Figuccio & Johnston, 2022). Games are visual tools that have the ability to help students learn (Attard &; Busuttil, 2020). Educational games can be a contributing factor to student motivation and learning success. During childhood, a child still enjoys fun things, such as play that is usually used by game tools to express their ideas (Kh et al., 2018). Games used in learning not only have the ability to give students the opportunity to learn from their own experiences, but also have the ability to give them the opportunity to learn the cultural richness that is around them (Ulya, 2017). One game that can be applied as an educational game is a traditional game. Traditional games can encourage students in school to learn the learning process.

Game suit is a simple traditional game that is very easy to apply to grade II math learning on the basic material of addition. *Suit* is a simple way that can be done by gathering two or more people to determine the winner (Salsabillah et al., 2023). This game is done in pairs, both students do suits using 10 fingers to be counted by adding up then students answer the results of the suit. *Game suit* This can train students' speed in answering so that motivated students want to answer faster and more precisely. This can be seen from the results of learning summation in class when using *Game Suit* with which learning addition does not use *Game Suit* Students answer summation questions faster and more precisely. This suit game can be categorized into simple traditional educational games because it only uses fingers to do the game.

Previous research has shown that educational games affect motivation and learning outcomes in mathematics. (Nisa &; Susanto, 2022) conduct research on Use of Wordwall-based educational games that It was found that it had an influence on motivation and learning outcomes in mathematics learning. Research (Prasetyo &; Hardjono, 2019) In learning traditional games congklak shows that the use of traditional game learning media congklak has increased interest in learning. Other research results are by: (Arifah et al., 2019) in Bilomatika Educational Game shows improved results on learning outcomes.

Unlike the previous study, the novelty of this study is to increase the motivation and learning outcomes of grade 2 students on addition material using educational games, namely *suit games*. That way the purpose of this study is to see the influence of game suits in increasing the motivation of grade 2 students to learn addition material and see the influence of game suits in improving the learning outcomes of grade 2 students on addition material.

Research Methods

In this study using a quantitative approach with experimental research methods. Experimental research is a quantitative way to find out how the independent variable (treatment) affects the dependent variable (outcome) under controlled conditions (Nisa &; Susanto, 2022). The design of this study is: *Quasi Experimental Design Non-Equivalent Control Group*. Researchers divide into experimental groups given *Pre-test* first then given treatment in

the form of *Game Suit* and ends with *post-test* and the control group given *Pre-test* first then given treatment using unequal treatment and ended with *post-test*. The population in this study was SDN Jatiputri with a total of 159 students and SDN Malaka with a total of 185 students. The samples taken were 30 grade II students of SDN Jatiputri as an experimental class and 30 students of grade II SDN Malaka as a control class. The sample is obtained through the technique *Nonprobability Sampling* Because the sample in this study was chosen randomly. This data collection technique uses observation, interviews and tests. The instruments used are questionnaires to measure learning motivation, interviews to find out teacher responses about learning using *Game Suit*, and test questions to measure learning outcomes.

Data analysis consists of data analysis of learning motivation questionnaires, descriptive statistical analysis, and inferential statistical analysis consisting of: (1) prerequisite tests, namely normality tests and homogeneity tests, (2) hypothesis tests, namely t-tests (*Independent sample t-test*) (3) N-gain test. Data testing was conducted utilizing SPSS version 23. Before conducting research, researchers conduct a valid test of the instrument to see whether or not each item produced is valid. For the validity test, there were 10 tests and 10 questionnaires were given to 30 students. Test Validity using SPSS 23 for windows and the results show all valid. In addition, a reliability test was carried out with a result of 0.78 which showed that the instrument tested was reliable because Cronbach's Alpha was more significant than 0.60. The purpose of this research reliability test is to assess the relevance and accuracy of the data collected through the test. Based on the findings can be formulated hypotheses as follows:

H_{01}: There is no significant effect on increasing the motivation to learn mathematics of grade II students on addition material that uses *game suits* better than using conventional learning

H_{a1}: There is a significant influence on increasing the motivation to learn mathematics of grade II students on addition material that uses *game suits* better than using conventional learning

H_{02}: There is no significant effect on improving the mathematics learning outcomes of grade II students on addition material that uses *game suits* better than using conventional learning

H_{a2}: There is a significant influence on improving the mathematics learning outcomes of grade II students on addition material that uses *game suits* better than using conventional learning

These criteria are known based on:

1) Ha is rejected if the value of *sig. (2-tailed)*> 0.05 and the learning motivation score and the average score of the experimental class were lower than the average score of the control class, this shows that the use of game suits in mathematics learning has no effect on increasing learning motivation and learning outcomes of grade II students of SDN Jatiputri.
2) Ha is accepted if the value of *sig. (2-tailed)*< 0.05 and the learning motivation score and the average score of the experimental class were higher than the average score of the control class, this shows that the use *of game suits* in mathematics learning has an effect on increasing learning motivation and learning outcomes of grade II students of SDN Jatiputri.

Results and Discussion

The data analyzed in this study included the results of student learning outcomes tests and the results of the distribution of motivational questionnaires. The questionnaire data used in this study aimed to identify students' motivation to learn to use *Game Suit*. The description of the

initial questionnaire scores of learning motivation of experimental and control class students is shown in Table 1 as follows.

Table 1. Comparison of Average Percentage of Initial Motivation Results

Indicators	Experimental Class	Control Class
Student interest and attention to the lesson	56%	63%
Students' enthusiasm to perform their learning tasks	60%	62%
Responsibility in doing his learning tasks	68%	65%
The reaction that students show to the stimulus given by the teacher	58%	57%
A sense of pleasure and satisfaction in doing the tasks given	52%	63%

Table 1 shows that of the five indicators of experimental and control class learning motivation, four had low levels of motivation, and one had high levels of motivation. Learning motivation in experimental and control classes mostly falls into the category of low motivation level indicators (first, second, fourth, and fifth) and one high motivation level indicator (third). With this, the motivation to learn experimental classes and control classes is much in the low category. Furthermore, the average final motivation results can be seen in Table 2 as follows.

Table 2. Comparison of the Average Percentage of Final Motivation Results

Indicators	Experimental Class	Control Class
Student interest and attention to the lesson	75%	66%
Students' enthusiasm to perform their learning tasks	75%	64%
Responsibility in doing his learning tasks	90%	72%
The reaction that students show to the stimulus given by the teacher	83%	77%
A sense of pleasure and satisfaction in doing the tasks given	83%	60%

As shown in Table 2, the experimental class had three levels of very high motivation and two levels of high motivation, while the control class had four levels of high motivation and one level of low motivation. Thus, it can be concluded that students taught with game suits have higher and higher motivation compared to control classes. This shows that there is a difference in the number of criteria between the experimental class and the control class

The following table shows a description of the pretest and posttest scores of students in experimental and control classes, for more details can be seen in the following Table 3.

Table.3 *Pretest* and *Posttest Values*

Description	Experimental Class		Control Class	
	Prestest	Posttest	Prestest	Posttest
Number of Students	30	30	30	30
Lowest Value	10	70	20	50
Top Rated	100	100	100	100
Standard Deviation	19,711	8,683	17,827	12,847
Average	73,33	89,33	68,33	82,67

The average pretest score for the experimental class was 73.33 and the pretest average score for the control class was 68.33. The average posttest score for the experimental class was 89.33 and the posttest average score for the control class was 82.67. This suggests that using a game suit medium to learn summation improves the posttest results of the experimental class.

The following table shows the analysis of value data *Pretest* and *posttest* experimental classes and control classes based on cognitive levels, for more details can be seen in Table 4 below.

Table.4 *Pretest* and *Posttest* Scores of Cognitive Level

Description	Experimental Class		Control Class	
	Pretest	Posttest	Pretest	Posttest
C3	75%	92%	73%	89%
C4	72%	87%	63%	75%
Average	73%	89%	68%	82%

According to Table 4, students in the cognitive domain experiment class applying (C3) and analyzing (C4) had better pretest and posttest percentages compared to students in the control class. Students in the experimental class had the highest percentage, at 92%, and the smallest percentage at 63% in the cognitive analyzing domain control class (C4).

After data analysis of questionnaire results and descriptive statistics, then a prerequisite test and n-gain test were carried out. Normality and homogeneity tests were used to start testing motivation and learning outcomes questionnaires. The t-test and n-gain test are used if the data are normally distributed and homogeneous. Results of learning motivation questionnaires and *pretest-posttest* Experimental and control classes tested for normality with tests *Kolmogorov-Smirnov* at the level of significance $\alpha = 0.05$ which can be seen in Table 6 as follows.

Table.6 Normality of Early-End Questionnaires

Class	*Kolmogorov-Smirnov Sig (2-tailed)*
Experimental Initial Questionnaire (Game Suit)	0,503
Experimental Final Questionnaire (Game Suit)	0,542
Initial Questionnaire Control (Conventional)	0,493
Final Questionnaire Control (Conventional)	0,608

The learning motivation questionnaire of both classes is normally distributed, according to the results of the *Kolmogorov Smirnov* test which achieved a significance value of more than 0.05 which can be seen in Table 7 below.

Table.7 Normality of Pretest-Posttest Results

Class	*Kolmogorov-Smirnov Sig (2-tailed)*
Experimental Pretest (Game Suit)	0,340
Experimental Posttest (Game Suit)	0,169
Pretest Control (Conventional)	0,271
Posttest Control (Conventional)	0,229

Kolmogorov Smirnov's test on the Pretest-Posttest results of both classes produced a significance value of more than 0.05, which indicates that the learning outcomes of both classes have a normal distribution. Furthermore, the learning outcomes of both experimental and

control classes were tested for homogeneity *with statistical Levene* tests with significance levels α = 0.05 which can be seen in Table 8 below.

Table.8 Test of Homogeneity of Student Learning Motivation Questionnaire

Student Learning Motivation Questionnaire			
Levene statistic	***df1***	***df2***	***Sig.***
0,693	1	58	0,409

The results of the *Levene statistical* test obtained a significance value of more than 0.05 so that the data is homogeneous, for more details can be seen in Table 9 below.

Table.9 Test of Homogeneity of Student Learning Test Results

Student Learning Test Results			
Levene statistic	***df1***	***df2***	***Sig.***
3,854	1	58	0,054

According to the terms of the hypothesis test, there is a significant effect if the significance level of the t-test is less than 0.05, but there is no effect if the significance level is more than 0.05. The results of the t-test calculation show that there is an effect of using game suits on increasing motivation and mathematics learning outcomes of grade II students on addition material. This can be seen from the average score of the learning outcomes of the experimental class is higher than the average score of the learning outcomes of the control class. In addition, the average score of the experimental class's learning motivation was also higher than the control class's average learning motivation score. In addition, this is proven in the results of hypothesis tests that have value *Sig. (2-tailed)* which is less than 0.05. By from the results of the t-test (*Independent sample t-test*) obtained the following data:

Table.10 Independent Test Results Final Questionnaire of Experimental Class and Control Class

	Independent-sample test
	Sig. (2-tailed)
Final Questionnaire	0,000

It can be seen that the results of the hypothesis test have a *value of Sig. (2 tailed)* which is less than 0.05. Furthermore, it is seen from the results of the t-test (*Independent sample t-test*) as follows:

Table.11 Independent Posttest Test Results Experimental Class and Control Class

	Independent-sample test
	Sig. (2-tailed)
Posttest	0,022

Post-test results show *a Sig.(2-tailed)* value of less than 0.05. This indicates that the value of Sig.(2-tailed) is less than the significance level value. Thus, it can be concluded that H0 is rejected, so Ha is accepted, which means:

1) The use of *game suits* has an effect on increasing the motivation to learn mathematics of grade II students on addition material
2) The use of *game suits* affects the improvement of mathematics learning outcomes of grade II students in addition material

Based on the results of value acquisition *N-gain* The increase in student motivation questionnaires obtained an average score of 40.68% (Less effective) for the experimental class and 10.54% (Ineffective) for the control class. In terms of calculation, the percentage of criteria for the level of motivation to learn the experimental class is obtained to: students' interest and attention to the lesson 75% (High), for indicators of student enthusiasm to do their learning tasks 75% (High), for indicators of responsibility in doing their learning tasks 90% (Very High), for indicators of students' reactions to the stimulus given by the teacher 83% (Very High), and for indicators of pleasure and satisfaction in doing tasks given 83% (Very High). While Percentage calculation of the control class learning motivation level criterion obtained for students' interest and attention to the lesson 66% (High), for indicators of student enthusiasm to do their learning tasks 64% (High), for indicators of responsibility in doing their learning tasks 72% (High), for indicators of students' reactions to stimuli given by teachers 77% (High), and for indicators of pleasure and satisfaction in doing tasks given 60% (Low).

Based on this exposure, the five indicators of learning motivation were higher in the experimental class than in the control class. This states that learning using game suits in experimental classes has an effect on increasing student learning motivation. In addition, this was reinforced from the results of interviews with grade II teachers who stated *Game Suit* It is very effective to use in addition learning because it trains students' speed in answering and encourages students to be enthusiastic in learning to count, especially addition.

According to the cognitive realm, the result of the calculation of values *N-gain* showed that the improvement in student learning outcomes was obtained on average 61.31% (moderately effective) for experimental classes and an average of 44.66% (less effective) for control classes. This showed that the experimental class performed better in all cognitive domains of both applying (C3) and analyzing (C4) compared to the control class. This is due to several factors, including game suits designed as attractive as possible, tailored to the material and needs of students, resulting in increased student learning motivation and ultimately will have a good impact on student learning outcomes. In addition, in this suit game, if students answer incorrectly, they are given the opportunity to answer correctly until the score obtained reaches the specified score so that there is a chance to win in the game suit. This encourages students to be thorough and fast in answering questions in the game suit. Thus supporting the pretest and posttest results of the experimental class is superior to the control class.

The results of this study are also supported by previous findings on educational game-based learning conducted by (Nisa &; Susanto, 2022) at Use of Wordwall-based educational games that It was found that it had an influence on motivation and learning outcomes in mathematics learning. The acquisition of t-test (Independent sample t-test) on posttest data is known to be the result of Sig value.(*2-tailed*) of 0.000<0.05 means that the hypothesis is accepted, namely that the use of wordwall-based educational games has a significant effect on motivation and learning outcomes in mathematics learning. Therefore, it can be concluded that motivation and learning outcomes in mathematics have an influence from educational games.

Conclusion

Based on the results of research that researchers have carried out at SDN Jatiputri and SDN Malacca, it can be concluded that *Game Suit* In grade 2 mathematics learning activities on addition material has a significant effect on increasing student motivation and learning outcomes Class 2 on Summation Material. Researchers suggest that teachers can use *Game Suit* in mathematics learning because students are very enthusiastic during the learning process using *Game Suit*. Then, other researchers can apply *Game Suit* on different concepts and materials to

be a comparison material. In addition, this study can be used as a reference for other related research.

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