IJESS
International Journal of Education and Social Science
ISSN : 2686-2239 (online) _____ VOL 5 NO 2 OCTOBER 2024

Integration of Calculator.oi Application in Improving Mathematics Learning Outcomes of Students in Elementary Schools

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Abstract

This study aims to evaluate the effectiveness of the Calculator.oi application integration in improving students' mathematics learning outcomes in Elementary Schools. This study focused on fourth-grade students at SDN 22 Ketapang and used a quantitative approach with an experimental method. In this study, the experimental method was applied to compare the differences in students' learning outcomes before and after using the Calculator.oi application. Learning outcome data were collected and analyzed using the Wilcoxon test, after the normality test showed that the data were not normally distributed. The results showed a significant increase in students' mathematics learning outcomes after using the Calculator.oi application. Analysis of the differences between pre-test and post-test scores revealed that all students experienced significant progress in their understanding and achievement in mathematics. The significance value obtained from the statistical test was below 0.05, indicating that this application had a significant positive impact and was effective in improving students' learning outcomes. Based on these findings, it is recommended that the Calculator.oi application be integrated more widely into the mathematics learning process in Elementary Schools. The use of this application is considered an innovative and effective learning medium in supporting the understanding of mathematical concepts. Further research is recommended to involve a larger sample size and different class variations in order to obtain more comprehensive and representative results. In addition, exploration of students' perceptions regarding the use of this application as a learning tool is also important. This will provide a deeper understanding of how the Calculator.oi application can be accepted and utilized in a broader learning context.

Keywords: Calculator.oi; Learning Outcomes; Mathematics

INTRODUCTION

Education is one of the main pillars in the development of a country, according toDendodi et al., (2023)Education has an important function for the development of a person's knowledge and skills. Education can also be interpreted as a conscious and systematic effort to achieve a standard of living or progress. Education can realize character through various activities, such as learning and training moral values, developing character, and instilling religious values.

Education is important for human life, because education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength, personality formation, intelligence, noble morals and skills needed by themselves and society. Education includes teaching special skills and also something that cannot be seen.(Siregar et al., 2019). Upper and lower middle class people often hear and talk about education. This shows that education is currently important for all people, not just the upper middle class.

According to the Big Indonesian Dictionary (KBBI), "education" comes from the root word "educate", which means "to care for and provide training (teachings, guidance) regarding children's morals, thoughts and intelligence so that they can achieve the perfection of life, namely living and giving life to children who are in harmony with nature and their society."(Nurkholis, 2013).Education can also be defined as a learning process that aims to develop talents in children, whether in terms of intelligence, personality, spirituality, or religion.(Suriadi et al., 2021).

However, Law Number 20 of 2003 concerning Chapter I, Article 1 of the National Education System states that education is a planned and planned process, to create a learning atmosphere and learning procedures that enable students to develop their potential to have spiritual religious strength, personality, intelligence, and self-control, noble morals and the abilities needed for themselves, society, nation and state.(Budiarti et al., 2017).Based on the above definitions, it can be concluded that education is an effort carried out consciously to guide children from birth to achieve physical and mental maturity through interaction with nature and the surrounding environment.(Biassari et al., 2021).Education can also improve the quality of learning for both teachers and students.

The quality of teachers and learning is highly dependent on the quality of education.(Nugroho, 2022), gTeachers, who are an important part of the education system, must receive special attention inlearning improvement which is an important component for improving the quality of education rationally. Therefore, progress in the field of science and technology is expected to encourage progress and positive changes in education. This progress can influence the way educators think to help them meet the learning needs of their students, one of which is in the use of learning resources. With interesting learning resources, student learning will be easy to remember and take the knowledge information provided by the teacher(Nurrita, 2018).

Learning media is anything that can be used to stimulate the thoughts, feelings, attention, and abilities or skills of students so as to encourage the learning process.(Rohima, 2023). This limitation is very broad and deep and includes our understanding of the sources, environment, people, and methods used for learning and training. The use of learning media not only makes it easier for teachers to deliver lessons to their students, but also increases the desire of students to participate in more interactive and active learning activities in the classroom, which results in feedback between teachers and students.

Learning media also really helps the learning process to run smoothly.(Nurrita, 2018).Learning media is increasingly important for learning in today's digital era. Learning media includes various types of technology and audiovisual resources that help students learn in school. This includes electronic devices such as computers, tablets, projectors, and also

media resources such as images, audio, and video. The influence of media in learning in elementary school, which is an important early educational stage in the formation and development of children.

Through the use of media such as simulations, animations, and intellectual graphics, media can help make the educational process more in-depth and realistic, as well as increase student motivation and participation.(Wibowo, 2023). Technology skills are essential in today's technological era for future success. If learners learn to use technological devices from an early age, they can build strong digital literacy and prepare themselves to face technological challenges later in life. However, it is important to remember that the use of media in learning must be planned and supported by the right strategy. Teachers must be good facilitators and ensure that media is used appropriately for clear learning objectives. They must choose the right media, select relevant content, and integrate media into various learning activities to ensure that the influence of media on learning is truly beneficial for learners.

Mathematics in elementary school aims to improve critical, logical, systematic, and honest thinking skills, skilled in solving mathematical problems and other fields as well as in everyday life but the situation in the field is not as expected. Many students are still not aware of the purpose of mathematics lessons. This can be seen from the low ability of students to solve everyday mathematical problems.(Albania, 2014).Mathematics is not just a collection of calculations and formulas, it also requires conceptual understanding, logical thinking, and problem-solving skills which are very important for the intellectual development of students.

However, there are many problems that hinder the learning of mathematics in elementary schools, which have an impact on students' understanding and interest in the subject. Ineffective teaching methods are one of the main problems that often occur. SDN 22 Delta Pawan,is an elementary school level where most of the students get low average learning outcomes, this is shown from the mid-semester evaluation scores in October for grade 4 in mathematics, the scores obtained on average are below the KKM, and this is due to the use of conventional media, so that students' interest in the mathematics learning process decreases.

Some researchers say that the limited use of learning methods and tools that are less inspiring, less challenging, and do not provide enjoyment to students, as a result, the average level of learning achievement is below the minimum standard set (KKM).(Aisyah et al., 2021). According toPrincess & Widodo (2018) Interest is the acceptance of a relationship between oneself and something outside oneself.

Based on the explanation above, a study was conducted on the influence of calculator.oi media in learning, in order to find out how much influence the media has on improving student learning outcomes, especially in mathematics, so that it has satisfactory results. Calculator.oi is an application used to support mathematics learning in elementary schools, especially to improve student learning outcomes.

Researchers believe that the use of calculator.oi. media can have a positive impact on improving student learning outcomes. This belief is based on several theoretical and empirical reasons. First, digital-based media such as calculator.oi. offers access to interactive calculation and problem-solving tools, so that students can more easily understand abstract concepts, especially in mathematics lessons. Second, this media allows students to learn independently at their own pace, strengthen understanding through repeated practice, and get direct feedback. These features are in line with the principles of active and constructivist learning, where students play an active role in building their own knowledge. In addition, the accessibility and ease of use of this platform are believed to increase student motivation and interest in learning, which in turn contributes to improving learning outcomes. So the hypothesis of this study is as follows:

H0: Calculator.oi. learning media does not have a significant effect on student learning outcomes in Mathematics subjects in Elementary Schools.

Ha: Calculator.oi. learning media has a significant influence on students' learning outcomes in Mathematics subjects at school.

RESEARCH METHODS

To find out the effectiveness of calculator.oi. media in learning mathematics, especially this material, the author conducted quantitative research. According toTrio (2019) what is meant by quantitative research is one type of research whose specifications are systematic, planned, and clearly structured from the beginning to the creation of the research design. The methods included in the quantitative research approach are the correlation method, the experimental method, and the influential method. In this study the author used the experimental method. The experimental method is a type of pre-experimental design used in this study, where the results of the treatment can be known more accurately because it makes a comparison between the conditions before and after the treatment(Amalia, 2015).

This research involvesall fourth grade students at SDN 22 Ketapang, totaling 30 people, with details of 15 males and 15 females. This study uses saturated samples, if students <60 people, so taking the existing sample becomes a total of 30 students. The pre-test was conducted 2 times with a sample of 30, in the same class, then conducting a post-test at the end of the meeting. In giving the pre-test and post-test, the author used a sample test with a total of 10 questions. The maximum value of the pretest is 100 if all are correct and 0 if all are wrong. The range of values is from 0 - 100. To collect data in this study, the test was given to students before the process of using the calculator.oi media (pretest) and after the process of using the calculator.oi media. (posttest).

RESULT AND DISCUSSION

Steps takenin the statistical analysis of this study are as follows. First, the author converted the pre-test and post-test values from Excel to SPSS version 25. Then, a normality test was carried out. The normality test is a statistical process used to determine whether the collected data is normally distributed, which means that most of the data distribution is concentrated around the middle value and is spread uniformly (Handayani et al., 2019). According toThe Last Supper (2010)Calculation of normality test using SPSS with Shapiro-Wilk test if the amount of data is less than 50 (N<50).

The normality test shows that the data are not normally distributed (see Table 2). Therefore, since the data are not normally distributed, the author uses the Wilcoxon Test to evaluate whether there is a significant difference between the two corresponding data sets. This test, also known as the Wilcoxon Signed-Rank Test, is a non-parametric statistical method used to compare the differences in medians of two related data sets. This method is a non-parametric alternative to the paired t-test if the data population does not have a normal distribution. The data analyzed with this test must be interval or ratio type data, and is not expected to follow a normal distribution.

According toRudianto et al., (2020)The Wilcoxon test is used to test conditions (variables) in paired samples or can also be used for before and after research. In this test, we want to know which is greater between the pairs. This method is now called the Wilcoxon test or Wilcoxon Signed Rank Test.Due to data abnormality, the Wilcoxon Test was conducted to evaluate the comparison of learning outcome improvements in the use of calculator media in Mathematics learning in Elementary Schools.

After conducting experimental research in class 4 of SDN 22 Ketapang, the researcher presented descriptive statistical data, namely the results of the pretest scores before using learning media and the posttest at the end of learning after using learning media as in Figure 1.

Table 1. Pretest & posttest results

Jumlah Peserta Didik	Nilai Rata-rata Pretest	SD Pretest	Nilai Rata-rata Post Test	SD Post Test
n = 30	56,83	11,271	76,83	10,215

The prerequisite test for analysis, namely the normality test using Shapiro – Wilk, is as follows in Figure 2.

Table 2. Data Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Sebelum Menggunakan Media	,150	30	,084	,924	30	,035
Posttest Menggunakan Media	,154	30	,068	,928	30	,044

a. Lilliefors Significance Correction

Based on table 2 above, the significance value of student learning outcomes without using calculator.oi learning media is 0.035, while learning outcomes using learning media are 0.044. From this statement, it can be concluded that all significance values of learning using calculator.oi media are smaller than 0.05 (p <0.05). Therefore, based on hypothesis testing, if the sig value <α, then Ho is rejected, which means that the data is not normally distributed.

After displaying the results of the prerequisite analysis test, namely the normality test, the following author displays the results of the W-Test (Wilcoxon) test to determine whether there is a significant difference between the average pre-test and post-test scores in experimental research using calculator.oi media in mathematics learning as in Figure 3.

Table 3. Statistical test result data with Wilcoxon test

Z	-4,809[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

		N	Mean Rank	Sum of Ranks
Posttest Menggunakan Media - Pretest Sebelum Menggunakan Media	Negative Ranks	0[a]	,00	,00
	Positive Ranks	30[b]	15,50	465,00
	Ties	0[c]		
	Total	30		

a. Posttest Menggunakan Media < Pretest Sebelum Menggunakan Media

b. Posttest Menggunakan Media > Pretest Sebelum Menggunakan Media

c. Posttest Menggunakan Media = Pretest Sebelum Menggunakan Media

Based on the picture above, the average positive rank value is 15.50 and the average negative rank value is 0.00. This indicates an increase in learning in students who use Calculator.oi media. The Wilcoxon statistical test (see Table 3) also shows that the post-test value (mean = 76.83) is significantly (p = 0.05) higher than the average pre-test value (mean = 56.83).

This means H0 is rejected and Ha is accepted, namely the calculator.oi learning media has a significant effect on student learning outcomes in Mathematics subjects in Elementary Schools. So, this study is in accordance with previous studies that show that mathematics learning media using calculators is feasible to use based on the assessment results by each validation that provides a value with a percentage of 86%, 80%, and 90% with an overall average of 88.4% which is included in the criteria "Very Valid"(Fajarwati & Irianto, 2021). Regarding the benefits of calculator.oi. in learning mathematics,In the learning process for elementary school students to understand integer operations, this has had a significant impact on their level of understanding of the material.."7.45%.

CONCLUSIONS

The purpose of this study was to assess the impact of using calculator.oi. media on student learning outcomes in Mathematics. The results showed that the use of calculator.oi. was very effective in improving student learning outcomes at the Elementary School level. This study was conducted systematically, following procedures in accordance with quantitative research to evaluate the effectiveness of calculator.oi. in the context of mathematics learning. This study was limited to one class, so the author cannot generalize the results because the number of samples was very limited or only carried out on one population. Therefore, it is recommended to conduct further research involving a larger number of participants in order to obtain more valid and reliable results.

This study did not explore, or even explore, students' views regarding their perceptions of the use of calculator.oi. media in mathematics learning. Therefore, the researcher suggests that subsequent researchers conduct interviews to obtain more in-depth information. The questions that need to be answered are how students experience and what benefits they feel when using calculator.oi. media in mathematics learning. Thus, researchers can obtain comprehensive and in-depth information about the benefits of this media through direct interviews with the students involved. This will provide a clear picture of the impact of using calculator.oi media in the context of mathematics learning.

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