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CAN SCANNING TECHNIQUE AFFECTING ELEMENTARY STUDENTS' UNDERSTANDING IN SOLVING MATH NARRATIVE TEXT?

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ABSTRACT

This research was dedicated to finding out the effect of scanning techniques on cognitive aspects, with a focus on mathematics narrative text for fourth grade students in a rural environment. In carrying out this research, the method used was quasi-experimental. The sample for carrying out this research included an experimental class consisting of 22 students, while the control class consisted of 22 students. After carrying out this research, it was found that the experimental class, which used the scanning technique when carrying out learning activities, obtained an average score of 84.6, which was higher than the control class, which did not use the scanning technique only 72.8. Apart from that, the value of the effect size (d) was also obtained, the amount of which was 0.74, where this was adjusted based on the results obtained from calculating the effect size using the calculation form in the form of Cohen's d. Then, from the effect size value obtained, interpret the influence of using scanning techniques, which falls into the medium category. So, this statement provides an indication of where a good effect was found after using the scanning technique regarding cognitive aspects of ability with a focus on math story questions intended for fourth grade students in a rural environment.

Keywords: Elementary School, Math Narrative Text, Scanning Techniques

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PRELIMINARY

Learning mathematics material intended for elementary schools is one of the important lessons that is carried out for students who are studying at elementary school (Musfiqon, 2012). Some children think mathematics is difficult to learn, one of the factors that influences this is students' lack of interest in studying mathematics because many students don't like it (Sari et al., 2023). Even though learning can be fun if the learning is packaged in an interesting way (Amran et al., 2021). The content of mathematics lessons in elementary school, especially in high grades, with material that is suitable for concept development, is a quite difficult stage in teaching it to children (Manguni, 2022).

Therefore, numeracy literacy skills are needed, which influence children's mastery of mathematics (Manguni, 2022). The definition of The ability to use numbers and symbols is referred to as numeracy literacy, which are directly related to basic mathematics, when solving a problem. The development of numeracy literacy in elementary schools began to focus after the low results of measuring numeracy literacy skills from the Progress in International Reading Literacy Study (PIRLS) (Manguni, 2022). He showed the results of the 2011 PIRLS measurement, where in these results, Indonesia itself only ranked 45th, with 48 countries participating, while the points obtained were 428 points, with the average of the measurement being 500 points. These data show that Indonesia is in a low position compared to other participating countries (Manguni, 2022). To improve this position, Indonesian students need three basic skills, which include the ability to read, write, and count (Manguni, 2022). The skills of reading, writing, and arithmetic during the learning process can be measured based on the students' level of success when they understand and master the material through several questions (Supini, 2021).

Some of the questions given to students, especially in mathematics subjects, one of which is narrative text. Understanding these types of questions is an important skill for all students because these questions provide a test of how well students understand the mathematical concepts that have been given and create connections between mathematics and the real world; they provide a more real context, and their application can be done in daily life (Sulianto, 2008). By understanding math word problems, students can see how mathematics is used to solve real-world problems, developing valuable problem-solving skills. In addition, many mathematics exams and tests, including standard tests, contain story questions (Ana, 2019). If students do not understand math word problems, they may have difficulty dealing with more complex questions and applying their mathematical knowledge appropriately. Understanding math word problems prepares students well for facing various types of exams and tests (Ana, 2019).

Narrative text have higher complexity compared to other types of questions because Students must be able to comprehend information and identify relevant mathematical concepts (Sari & Lestyarini, 2023). Narrative text are often considered difficult by most students because they have to analyze the information provided in depth so they can find the right solution (Ana, 2019). According to data from TIMSS (Trends in International Mathematics and Science Study), the results obtained after carrying out mathematics ability tests on students in Indonesia, which were carried out in 2019, were ranked 38th out of 58 participating countries, and the main cause was the students

themselves less able to understand the presentation of story questions (Hadi & Novaliyosi, 2019). When working on math narrative text, you need more time if you compare them with other types of math problems. This is because narrative text require an understanding of the context of the problem and a deeper analysis of the information (Utari et al., 2019).

Several studies have been conducted to measure the time required for students to work on math narrative text. It was found that the average time for working on narrative text for sixth-grade students was around 10–15 minutes per problem (Ilham, 2021). Thus, it is very important for teachers and parents to be able to provide support to students by providing appropriate exercises so that students can improve their ability to read and understand information (Ilham, 2021). Teachers are figures who have an important position in education (Yuliyanti & Abduh, 2020). The emergence of changes in learning outcomes can take the form of affective, cognitive, and psychomotor aspects (Prasetyo & Abduh, 2021). According to (Khusaini & Muvera, 2020), environmental differences between urban and rural areas can influence students' cognitive characteristics.

The cognitive characteristics of students in urban and rural areas are different because there are differences in the environment and access to educational resources (Mahdalena & Siswa, 2020). City schools tend to have more resources, better-trained teachers, more complete libraries, and better access to facilities. This can support the cognitive development of students in the city. In contrast to students in rural areas, educational resources are limited and libraries are inadequate, accompanied by simpler facilities and infrastructure (Handayani et al., 2020). In cities, access to better education and social diversity tend to influence how students understand the world. However, busy lives and higher stress levels can also affect their study focus. In rural areas, although access to educational resources may be limited, a quieter environment and lack of distractions can support student concentration. Limited access to technology, less multicultural experience, and differences in lifestyle and outdoor experiences also play a role in shaping how students learn and process information.

In previous research, it was shown that the scanning technique was effective in providing an improvement in the ability to comprehend math narrative text for students in sixth-grade for six weeks with significant results (Bachtiar, 2019). Another study conducted by (Yudharina, 2015) on fifth grade students also showed that the scanning technique was successful in improving the ability to understand math narrative text when applied to the experimental group for four weeks, where the results were significant. Apart from that, there are differences in research carried out by (Sofah, 2013) in fourth-grade,

which shows that the scanning technique is less effective in improving understanding of mathematics narrative text, which was carried out for five weeks with insignificant results. However, this research tends to be more often conducted in urban areas due to easier access to resources, including educational institutions, research facilities, and diverse samples of research participants. Different daily contexts, higher academic pressure, and the tendency for more advanced technological development in urban areas are also the main reasons. With the previous explanation, it is necessary to carry out research that specifically examines whether scanning techniques are also effective in rural environments, where certain factors, such as the availability of technology, may be an obstacle.

In carrying out this research, the aim is to determine the effect of using scanning techniques related to cognitive aspects, with a focus on mathematics narrative text intended for students who are in fourth-grade in a rural environment. It is hoped that the results of this research will provide new insights for efforts to improve education, especially in the field of mathematics in rural environments.

METHODS

Carrying out this research is included in the type of research that utilizes experimental methods, where this method tests relationships in the form of cause and effect between two or more variables. In this method, researchers manipulate more than one independent variable to see how changes in these variables affect the dependent variable. By using the population of two public elementary school locations in Dawuhan village, Wanayasa subdistrict, and Banjarnegara district, which face unique challenges in access and quality of mathematics education, The reason for choosing the sample was because it was relevant to the research objectives. With a stratified sampling technique, the sample consisted of students who were in fourth-grade and were taken at two public elementary school locations in Dawuhan village, Wanayasa subdistrict, and Banjarnegara district, totaling 44 students chosen because they were a group. relevant to the objectives of carrying out this research. In collecting data, the techniques used are cognitive tests. Carrying out cognitive tests is the most common instrument used when measuring students' cognitive abilities when solving mathematics narrative text (Nurwasilah, 2023). This test includes one type of mathematics narrative text that is relevant to the research objectives. Before the test is given, testing will be carried out to find out whether the questions have validity and reliability. The validity test also has the purpose of finding out whether there

are instruments that are declared invalid or valid (Oktaviana, 2019). So, the analysis uses a quasi-experimental approach technique in order to test the effect of scanning techniques on children's cognitive aspects of math narrative text. The hypothesis of this research, H_0, is that the scanning technique in learning mathematics questions does not have an effective effect on students' understanding, and H_1 is that the scanning technique in learning mathematics questions has an effective effect on students' understanding.

Testing the validity of the instrument was carried out using a comparison method from the results of the calculations above which were based on r_{table} with a significance level of 5% ($\alpha = 0.05$).

Provision:

If $r_{count} > r_{table}$ = the question items are valid

If $r_{count} < r_{table}$ = the question items are invalid

In accordance with the results obtained after carrying out validity testing calculations with a value of $\alpha = 0.05$ as well r_{table} = 0,444 of the 10 questions given, 5 questions were declared valid. Then the results of calculating the validity of the question items are presented in table 1, while reliability is presented in table 2.

Table 1. Validity Test Results

Question Number	r_{xy}	Information
1	0.62	Valid
2	0.79	Valid
3	0.68	Valid
4	0.81	Valid
5	0.53	Valid

Table 2. Reliability Test Results

Cronbach's Alpha	N of Items
.712	22

In accordance with the interpretation table, the level of instrument reliability in table 2 is between 0.70 and 0.90, which means the instrument has high reliability. In table 3, the test results of the independent sample effect are presented.

RESULT AND DISCUSSION

In table 3, the test results of the independent sample effect are presented.

Table 3. Independent Sample Effect Size-t Test Results

Student Scores	
Cohen's d	0.74
Hedges' correction	0.194
Glass's delta	0.230

Based on calculations using the Choen's d formula, the value obtained from the effect size (d) is 0.74. Then this value is interpreted as a medium level. So, a conclusion can then be drawn that the use of this scanning technique can have a moderate influence on the ability of fourth-grade students when faced with math narrative text in a rural environment. The results of the normality calculation are then presented in table 4 below.

Table 4. Normality Test Results

Class	Kolmogorov-Smirnov[a]		
	Statistic	Df	Sig.
Experimental Class	.163	22	.135
Control Class	.143	22	.200

The level of significance of the posttest results from the experimental class is 0.135, and the level of significance of the posttest results from the control class is 0.200, as shown in Table 4. Obtaining normality test results with a significance rate of = 0.05 indicates where H_0 is accepted based on sample data taken from a normally distributed population. This statement is founded on the outcomes of calculations in which has been determined. The significance level for posttest results in the experimental class was 0.135 > 0.05, and the significance level for posttest results in the control class was 0.200 > 0.005. Table 5 displays the results of the homogeneity calculations.

Table 5. Homogenity Test Results

Levene Statistic	df1	df2	Sig.
2.209	1	42	.145

In the presentation of Table 5, it shows that the significance level of the post-test results between the experimental class and the control class is 0.145. The results of the homogeneity test with a significance rate of $\alpha = 0.05$ show that H_0 can be accepted, which means that the variance of the values for all classes is the same or homogeneous. From this statement, the calculation results have been determined for α. In the posttest, the variance of the two classes used was homogeneous because the significance was 0.145 > 0.05. The calculation results from the t test are presented in Table 6.

Tabel 6. T-Test Results

Class	Mean	Std. Deviation	DF	t_{hitung}	t_{tabel}	Sig. (2 tailed)
Eksperimen	84.64	13.081	42	2.457	1.682	0.018
Control	72.82	18.384				

The criteria for testing a hypothesis are that if it falls into the accepted category, $t_{count} < t_{table}$. Then the results of the ttable price are obtained based on the t distribution list followed by the probability (1- α), besides that in the condition where H_0 is rejected if $t_{count} > t_{table}$. In the presentation of the table above, it can be seen that the value of $t_{count} > t_{table}$ is 2,457 > 1,682. If viewed based on the results obtained from tcount, hypothesis 0 (H_0) can be rejected and hypothesis 1 (H_1) can be accepted. Thus, a conclusion can be drawn that students' ability to solve math narrative text using the scanning technique is higher if a comparison is made with the students' ability to solve narrative text without using the scanning technique.

Discussion

The subject matter studied was math narrative text on thinking about how to count. In the experimental class, the scanning technique was used as a treatment for learning mathematics narrative text. In the experimental class, the steps begin with introducing the concept of scanning techniques to students, including the goals to be achieved. Researchers show examples of using this technique in math narrative text, provide practical guidance, and give students the opportunity to try it themselves. A discussion of their experiences in applying the technique was conducted, followed by feedback that helped improve their understanding. Afterwards, the results of the exercise using the scanning technique were evaluated to see changes in students' understanding of mathematics narrative text. Analysis

of these data is used as a basis for improving the use of techniques and considering further development. The final step is the integration of scanning techniques into continuous mathematics learning. Fourth grade was chosen as the experimental class, and the number of students was 22.

In the control class itself, where learning is done without using scanning techniques. In the control class, the approach to using scanning techniques in learning mathematics narrative text was to maintain the existing learning approach without significant changes. Researchers provide an introduction to the concept of scanning techniques to students, but without in-depth focus or structured exercises. This technique is applied while students are completing math narrative text, but the evaluation of the results is more limited and not carried out in depth as in the experimental class. Reflections regarding experience using scanning techniques also tend to be more limited, so that further development in the use of this technique does not occur significantly. Fourth-grade was chosen as the control class, where the number of students was 22.

The posttest was carried out after both classes were given treatment in different mathematics learning, namely teaching and learning activities in the experimental class, which used techniques in the form of scanning, while in the control class, the learning activities did not use any treatment or were the same as daily learning activities, which did not use scanning technique. The results of the posttest analysis itself can be reviewed based on Table 7.

Tabel 7. Description of Experimental Class and Control Class Data

	Experimental Class	**Control Class**
N	22	22
Mean	84.6	72.7
Median	86.6	74.4
Modus	86.6	86.6
Minimum	55.5	35.5
Maximum	100	100
Sum	1861	1599

The posttest results for each class are presented in Table 7. The aggregate value of the data collected from an experimental class consisting of 22 students is 1,861, where the

mode is 86.6 and the mean is 84.6. Consequently, the experimental class has a minimum score of 55.5 and a maximum score of 100.

In contrast, the posttest outcomes for the control group, comprising the responses of 22 students, totaled 1599 points, with an average of 72.8, a median of 74.4, and a mode of 86.6. The control class is assigned a minimum score of 35.5 and a maximum score of 100.

Aside from that, instances of score differences between the two classes are detailed in Table 7. The analysis of the mean scores indicates that the experimental group achieved an average score of 84.6, while the control group achieved a score of 72.7.

In addition to the data presented in Table 7, the report also includes the outcomes of the posttest, which consist of a histogram depicting the students' performance in both courses. To facilitate clarity, Figure 1 presents posttest data pertaining to the experimental and control groups.

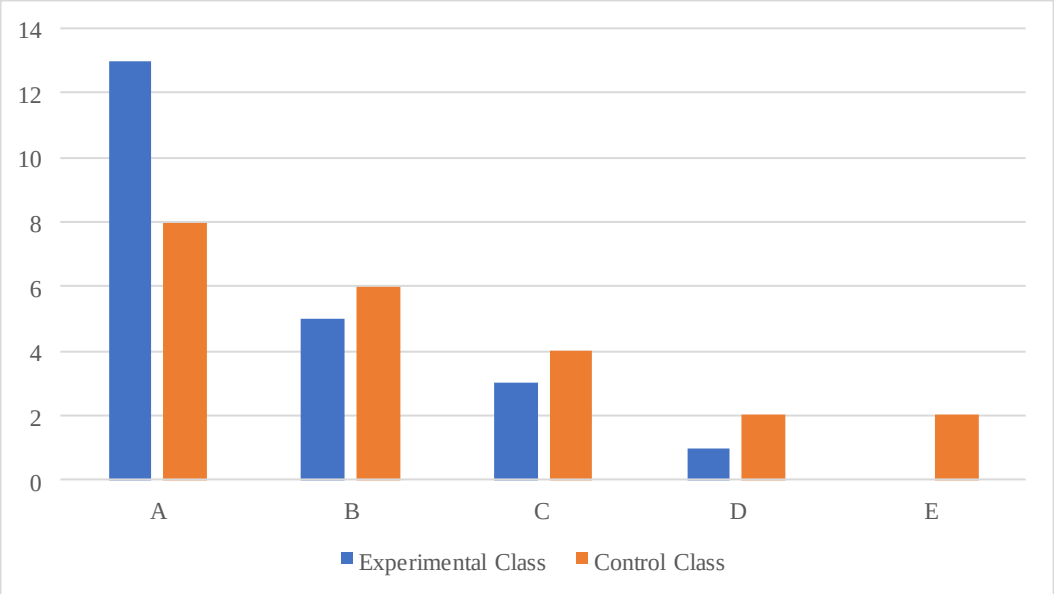


Figure 1. Posttest Score Results Data

From Figure 1, the assessment of students' posttest results is grouped into letters A, B, C, D and E. Then the presentation of the information is presented in table 9.

Table 9. Description of Posttest Values in Figure

Mark	Score
A	86 – 100
B	71 – 85

Mark	Score
C	56 – 70
D	41 – 55
E	0 – 40

For further clarity, data on posttest results for the experimental and control classes are presented in table 10.

Table 10. Frequency Distribution of Posttest Scores for the Experimental Class and Control Class

Letter	Score	Frequences		Percentage	
		Experimental	Control	Experimental	Control
A	86 – 100	13	8	59%	36%
B	71 – 85	5	6	23%	28%
C	56 – 70	3	4	14%	18%
D	41 – 55	1	2	4%	9%
E	0 – 40	0	2	0%	9%

There were thirteen students in the experimental group who earned an A; specifically, four students achieved a perfect score of 100, one student achieved 95.5, four students achieved 93.3, and four students achieved 86.6, for a cumulative percentage of 59%. In contrast, within the control group, eight students achieved A grades: one earned a perfect score of 100, another earned a 95.5, two earned a 91.1, and four earned an 86.6, representing a percentage of 36%.

Thereafter, five students in the experimental class earned a B grade: two students earned an 82.2, one student earned an 80, one student earned a 77.7, and one student earned a 73.3, representing a percentage of 23%. Six students in the control group earned a B grade; specifically, one student achieved an 80, two students attained a 77.7, and three students attained a 71.7, representing a percentage of 28%.

Additionally, it is worth noting that three students in the experimental group received a grade of C: one earned 68.8, another earned 64.4, and the third earned 62.2, representing a percentage of 14%. In contrast, the control group comprised four students

who earned a C grade: one earned 68.8 points, another earned 66.6 points, a fourth earned 64.4 points, and the last earned 60 points, representing 18 percent of the total.

Moreover, within the experimental group, a solitary student obtained a D grade of 55.5, representing a percentage of 4%. In contrast, the control group comprised of two individuals: one who achieved a score of 48.8 and the other who obtained a score of 42.2, representing a 9% percentage.

E is the final grade; there is no E grade in the experimental class. In contrast, the control group comprises two individuals: one who achieves a perfect score of 40 and the other who attains a score of 35.5, representing a 9% improvement in percentage.

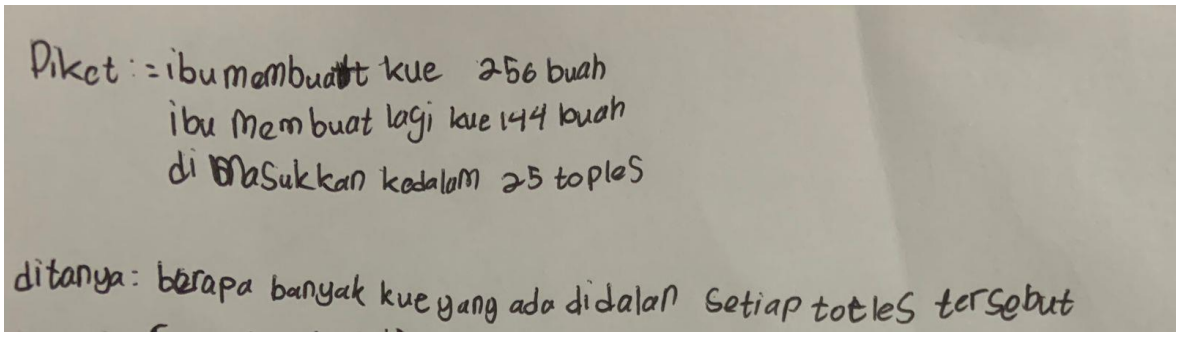
The evaluation is predicated on accurate responses on the examination. Five questions are presented in the format of descriptions. In order to evaluate students' proficiency in solving math narrative text, the scores assigned to each answer on this posttest are calculated using an indicator of narrative text-solving ability. Four indicators of skill in resolving narrative text comprise the score, and the evaluation is conducted in accordance with the established scoring guidelines. Table 11 displays the results of the average indicator scores.

Table 11. Average Score of Indicators for Completing Narrative Text

Group of Class	I 1	I 2	I 3	I 4	Total	Class Rating Average
Experimental Class	14.81	7.59	7.27	7.27	38.07	84.6
Control Class	13.86	5.59	7	6.31	32.71	72.8

The average score derived from the posttest indicators assessing the capacity to solve narrative text is presented in Table 11. The initial determinant of aptitude is the capacity to comprehend the dilemma presented in the narrative. Fundamental to establishing a solid foundation in mathematics is the capacity to comprehend elementary school-level problems (Fadillah et al., 2022). Narrative text in mathematics demand a comprehensive comprehension of the given information, analytic abilities, problem identification, and the selection of an appropriate solution strategy (Oktasya et al., 2022). The average gain for the experimental group in this particular metric was 14.81, whereas the average gain for the control group was 13.86. This discrepancy suggests that the experimental group achieved a higher average gain when engaging in learning activities that utilized scanning techniques. In an educational setting, the scanning technique is not

employed during learning activities. The form of solution at the stage of completing the narrative text is as in figure 2.

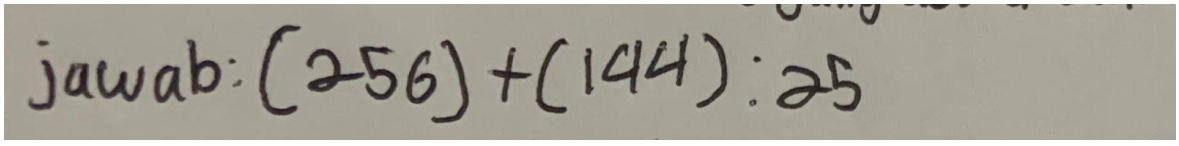


English Version

Known = mother made 256 cakes mom made another 144 cake put into 25 jars Asked = how many cakes are in each jar

Figure 2. Form of Solution to Understand the Problem In The Narrative Text

The second metric of proficiency pertains to the capacity for computation. It is necessary for pupils to conduct an analysis of the data presented in the word problem, discern pertinent mathematical operations, and perform accurate calculations (Alkhasanah et al., 2023). Students can apply relevant contexts to various mathematical concepts, including multiplication, subtraction, addition, and division, through the counting process (Mahmudah, 2015). The experimental group achieved an average score of 7.59 on this metric, whereas the control group achieved an average score of 5.59. This discrepancy suggests that the experimental group outperformed the control group in terms of average score when learning activities incorporated scanning techniques. control, which refrains from employing scanning techniques during learning activities. The form of solution at the stage of solving narrative text is as in figure 3.

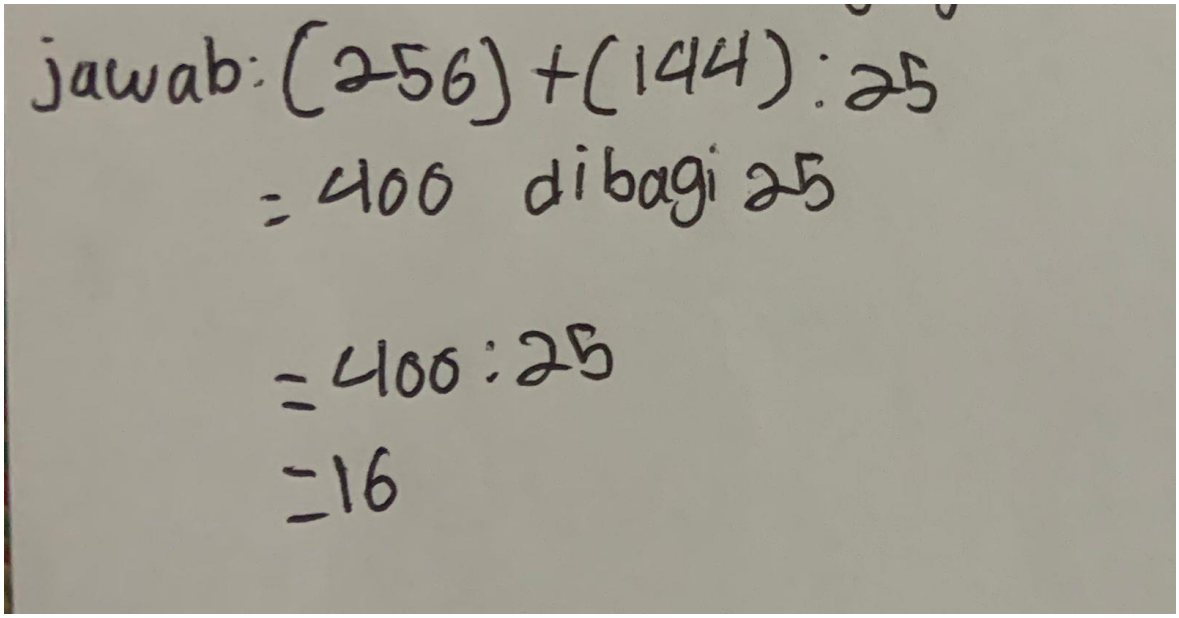


English Version

Answer = (256) + (144) : 25

Figure 3. Form of Solution to Create a Mathematical Model

The third metric of proficiency is the accurate completion of calculations. Systematic and logical reasoning are essential for achieving accuracy when performing calculations (Yudharina, 2015). By performing calculations accurately, pupils verify that the solution obtained corresponds to the inquiry presented in the word problem (Alkhasanah et al., 2023). The experimental group achieved an average score of 8.4 on this particular indicator, whereas the control group achieved an average score of 7. This finding suggests that the experimental group, which engaged in learning activities utilizing scanning techniques, achieved a higher average score compared to the control group, which did not implement such techniques. The solution form is in figure 4.



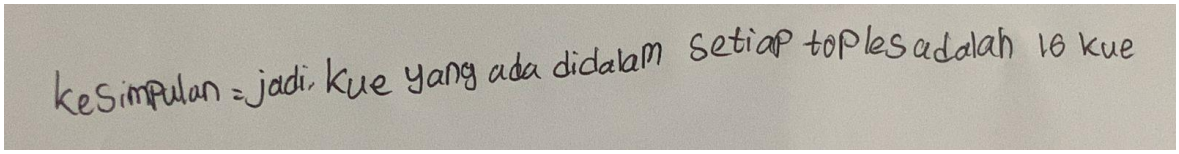
English Version

Answer = (256) + (144) : 25
= 400 division 25
= 400 : 25
= 16

Figure 4. Form of Solving Calculations from Mathematical Models

The fourth indicator of ability is drawing conclusions from answers to story questions that have been completed. Making conclusions allows students to re-examine the solutions they produce (Khasanah, 2015). The process of drawing conclusions involves re-evaluating the solutions provided, encouraging students to think critically about the approach they used and the suitability of the results (Khasanah, 2015). On this indicator, the experimental class scored an average of 7.27 while the control class scored an average

of 6.31. This indicates that the experimental class, which used scanning techniques during learning activities, received a higher average than the control class, which did not use scanning techniques during learning activities. The form of conclusion is in figure 5.



English Version

Conclusion = so, there are 16 cakes in each jar

Figure 5. Form a Conclusion from the Answer to the Narrative Text

Based on the average indicator of narrative text-solving ability, the experimental class has an average score of 38.07, which is greater than the control class's average score of 32.71. Furthermore, the average assessment of the experimental group on the posttest is 84.6, surpassing the average assessment of the control group (72.8). Additionally, we divide the total score by 0.45 in this evaluation. This evaluation is conducted as the cumulative score acquired from each assessment of students' posttest results in accordance with assessment guidelines is divided by 0.45. Consequently, the experimental group received an overall assessment grade of 1862 with a mean score of 84.6, whereas the control group received a lower grade of 1602 with a mean score of 72.8.

Based on the preceding discourse, it can be deduced that the experimental class achieved a higher mean score on the indicator assessing the capacity to resolve narrative text in comparison to the control class. Similarly, the experimental class exhibited a higher mean score on the posttest outcomes compared to the control class. Thus, the ability to solve narrative text was greater in the experimental class, which utilised scanning techniques throughout the learning process, than in the control class, which did not.

CONCLUSION

Based on the results of data analysis regarding the effect of scanning techniques on the ability to solve math narrative text in fourth-grade public elementary schools in rural areas, it can be seen that based on the average posttest results for the experimental class of 84.6 and the control class of 72.8, the experimental class has a class average score of 84.6, which is higher than the average value of the control class. Based on the results of hypothesis testing using the T-test, it shows that the condition for the results of $t_{count} > t_{table}$ is 2,457 > 1,682, with the results of hypothesis 0 (H_0) being rejected and hypothesis 1 (H_1)

being accepted. This shows that the use of scanning techniques in learning influences the ability to solve mathematics narrative text with an influence of 0.74, which is a medium criterion. Suggestions for further research are to develop guidelines or auxiliary materials that can help teachers integrate scanning techniques into the curriculum effectively.

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