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The Influence of the Contextual Teaching and Learning Model on Learning Outcomes of Class IV Style Material

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Abstract

To get successful learning outcomes in science subjects in fourth grade elementary school material, teachers must use the right learning model. The aim of this research is to find out how much influence the contextual teaching and learning (CTL) model has on student learning outcomes in class IV style material at SDN 131 Pekanbaru. This research uses a quantitative approach with quasi-experimental research methods (quasi-experiments). The population in this study was 40 students with a sample of 20 students from class IV A as the experimental class and 20 students from class IV B as control class students. Sample selection is based on a partial population. The instrument used in this research was a test sheet to measure the abilities of class IV students at SDN 131 Pekanbaru. The analysis techniques used are descriptive analysis and inferential analysis. This test is used to see the influence or not of the contextual teaching learning (CTL) learning model. The results of the research show that there is an influence on the use of the CTL learning model on the learning outcomes of style material in class IV SDN 131 Pekanbaru. This is proven by the results of hypothesis testing using the t-test, obtained $ttabel$ = 2.02 and $thitung$ = 5 with a real level of α = 0.05 and degrees of freedom (db) = 38. The novelty of this research is that it examines the application of the CTL model in science and technology subjects in elementary schools. This research can provide insight into how CTL models can optimize understanding of force material.

Keywords: Contextual Teaching and Learning, learning outcomes, material style.

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INTRODUCTION

Education is basically one of the efforts to provide knowledge, insight, skills, and specific skills to individuals to explore and develop talents as well as personality (Wiyono & Budhi, 2018). In an effort to improve the quality of education, especially in improving educational outcomes, one of the things that must be developed is the teaching and learning process. This is the most basic activity in the education process. Thus, the success or failure of achieving educational goals is influenced by the success of the teaching and learning process, one effort to improve the quality of the learning process can be done by improving the model used (Budiman, 2021). Thus, it is clear that education is a very important thing in the life of every human being. Through education, humans can gain various abilities and can develop the abilities they have to be applied in one's life (Syahfitri et al., 2022).

Education that is able to support future development is education that is able to develop students, so that they are able to face and solve various kinds of problems in life that they face. In the context of basic education, Natural Sciences (IPA) subjects play a vital role in building students' understanding of basic scientific concepts which will become the foundation for learning at a higher level. (Mayudin & Rahmi, 2024). One important form of education is science learning, where science learning is often related to everyday life. According to Widyaiswara et al., (2019) explains that "science or science is a human effort to understand the universe through precise observations on targets, and using procedures, and explaining with reasoning so as to reach a conclusion". So, the science learning process is very important to apply to increase students' knowledge in elementary schools and must be implemented according to the right strategy so that students can easily understand it. Natural Sciences (IPA) is a translation of the English words, namely natural science, which means natural science (Rizanti et al., 2021).

When looking at a science lesson, it has been successful, it can be seen from the student learning outcomes. Learning outcomes are certain competencies or abilities achieved by students after following the teaching and learning process and include cognitive, affective and psychomotor skills. According to Febriana (2021), Student learning outcomes are achievements achieved by students academically through exams and assignments, activeness in asking and answering questions that support the achievement of these learning outcomes. With learning outcomes, teachers and schools can find out whether students have achieved the specified competencies (Murdani et al., 2024). In academic circles, the idea often arises that educational success is not determined by a student's grades listed on a report card or diploma, but the measure of success in the cognitive field can be determined through a student's learning outcomes.

To get successful learning outcomes in science subjects in fourth grade elementary school material, teachers must use the right learning model. Professional teachers must strive to carry out the learning process by applying various learning models and strategies (Erni et al., 2020). According to Amnah et al., (2022), A learning model is a plan or pattern that is used as a guide in planning learning in class or learning in tutorials. The learning model refers to the learning approach that will be used, including teaching objectives, stages in learning activities, learning environment, and classroom management when delivering material to students. One learning model based on constructivism theory is the contextual teaching learning model. In this case, many learning models are used to solve educational problems and one of them is the CTL learning model which certainly influences the development of children, where each child has different characteristics from each other (Manurung, 2020).

According to Kasmawati et al., (2017), The contextual teaching learning model is a learning concept that helps teachers relate the material they teach to students' real-world situations and encourages students to make connections between the knowledge they have and its application in their lives as family and community members. Before implementing learning using CTL, of course, teachers must create a learning design/scenario, as a general guideline and at the same time as a control tool. The development of each component of CTL in learning can be done through the following steps according to Trianto (Maretiana et al., 2022): 1) Developing students' thinking to carry out more meaningful learning activities, whether by working independently, finding independently and constructing new knowledge and skills that will be possessed. 2) Carrying out as far as possible inquiry activities for all topics taught. 3) Developing students' curiosity by raising questions. 4) Creating a learning community, such as through group discussion activities, questions and answers, and so on. 5) Presenting models as examples of learning can be through model illustrations, even real media. 6) Accustoming children to reflect on each learning activity carried out. 7) Conducting objective assessments, namely

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assessing the actual abilities of each student.

Researchers conducted interviews with class IV teachers at SD Negeri 131 Pekanbaru. From the data obtained from the fourth-grade teacher named Mrs. E at SDN 131 Pekanbaru, the scores achieved by the students had not yet reached the minimum graduation standard (KKM) which had been set at 79. Of the total, only 25 students succeeded in achieving completion, while 15 students did not achieve completeness. This situation shows that the achievement of student learning outcomes in natural science subjects using contextual teaching learning models is still not optimal. This can be seen from 40 students in class IV State Elementary School 131 Pekanbaru.

Like research conducted by research that has been conducted by Ismoyo & Istianah (2018), shows that the tcount result of 2.235 is more than the ttable of 2.003. Because tcount > ttable, Ho is rejected and Ha is accepted, which shows that the CTL (Contextual Teaching and Learning) learning model influences the science learning outcomes of class V students at SDN Geluran 1 Taman Sidoarjo. Apart from that, this is also in line with research conducted by Lawe & Marselina (2019), which shows that there is a significant difference in science learning outcomes between students who study using the contextual model and students who study using the conventional model. From the arithmetic average, it is known that the arithmetic average of the experimental group is higher than the control group (87.90>67.95). Thus, it is concluded that the contextual model has a significant effect on science learning outcomes.

Based on previous research, researchers are interested in conducting this research in order to expand understanding and knowledge regarding educational subjects, especially those directly related to critical thinking skills and academic achievement in the field of science, especially in the context of implementing teaching models that influence student achievement. Therefore, it is hoped that this learning can be used as a useful reference for educational aspects. This research can show the extent to which the application of CTL in learning helps students see the connection between what they learn and everyday life, increasing student motivation and involvement in the learning process.

METHODS

This research uses a quantitative approach with quasi-experimental research methods (quasi-experiments). By using the Nonequivalent Control Group Design. This design involves two classes, namely the experimental class and the control class (Sugiyono, 2018). In the experimental class, the learning process is treated using the Contextual Teaching and Learning (CTL) learning model. Meanwhile, in the control class the learning process only uses conventional models. Before being given treatment, the two classes were given a pretest. And then carry out an ability test by giving a posttest which aims to identify the two groups. The population of this study was all class IV students at State Elementary School 131 Pekanbaru, totaling 40 students. Meanwhile, the sample in this study was 20 students from class IV A and 20 students from class IV B. This research selected samples from a partial population. The sample used is a portion or representation of the population that is the focus of the research. All certain classes were used as research samples.

In collecting data, researchers used an objective test in the form of multiple choices with four answer choices, namely: a, b, c and d which consisted of 20 questions. Each correct answer is given a score (1) and a score (0) for incorrect answers. These questions will be distributed to the experimental class (the class that received the treatment) using the CTL model and the control class using the conventional learning model. Instrument testing was carried out to determine the quality of the research instruments that will be used in the research. In this study, test sheets were used as the main instrument to measure the abilities of class IV students at SDN 131 Pekanbaru. This instrument was chosen because it allows researchers to record and evaluate student performance directly in real situations. Meanwhile, the analysis techniques used are descriptive analysis and inferential analysis. This test is used to see the influence or not of the contextual teaching learning (CTL) learning model.

RESULTS AND DISCUSSION

Based on the research results, the average pretest score for students in the experimental class and the control class is the same, namely 41. Based on the evaluation results, it can be concluded that mastery of style material is still lacking because the average pretest score is low. Therefore, it is necessary to find a solution so that students can master the material well. So the researcher used a trial by conducting trials in an experimental class with 20 students who would be given yeti behavior using a contextual teaching and learning model and class IV b was a control class, there were 20 students, in the control class who were not given treatment or without a contextual model teaching and learning. The following are the results of the data analysis carried out in this research, namely descriptive statistical analysis and inferential analysis.

Descriptive Statistical Analysis

Based on observations of the implementation of teacher activities and student activities during the learning process in the experimental class using the CTL model and the control class not using the CTL model. The pretest and posttest results showed that the average score in the experimental class was higher than the control class. The average score obtained in the experimental class was 79.75, while the average score in the control class was 74.5. The results of this research show that the CTL model influences student learning outcomes in the teaching and learning process. The results of the pretest and posttest were carried out in both classes, so that the following data were analyzed descriptively:

Table 1. Average Value of Learning Outcomes for Experimental Class and Control Class Styles

Descriptive Analysis	Pretest		Posttest	
	Experiment	Control	Experiment	Control
Number of samples (n)	20	20	20	20
Number of values	832	832	1.595	1.490
The highest score	60	60	95	95
Lowest value	30	30	60	55
Average	41,6	41,6	79,75	74,5

Source: Research Data Processing

From the table above, the average pretest to posttest learning outcomes about style in the experimental class using the CTL model increased by 38.15 points. Likewise, the average pretest to posttest learning outcomes about style in the control class increased by 31.9 points. However, the posttest scores for the experimental class and the control class looked different, the posttest score in the experimental class was 6.25 points higher when compared to the posttest score in the control class. This shows that the increase in learning outcomes in the experimental class style is better when compared to the control class. In other words, there is an influence on the learning outcomes of class IV students at SD Negeri 131 Pekanbaru.

Table 2. Differences in Frequency Distribution of Posttest Scores in the Experimental and Control Classes

Posttest			
Experimental Class		Control Class	
Class Intervals	F	Class Intervals	F
60 – 65	2	55 – 61	2
66 – 71	1	62 – 68	3
72 – 77	5	69 – 75	8
78 – 83	3	76 – 82	2
84 – 89	6	83 – 89	2
90 -95	3	90 - 96	3
Amount	25	Amount	25

Source: Research Data Processing

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The table above is a significant table of the frequency distribution of the experimental class and control class from the lowest value to the highest value. In the results of the posttest the experimental class and control class increased, with the lowest score being 60 and the highest score being 95 in the experimental class, while in the control class the lowest score was 55 and the highest score was 95.

Inferential Statistical Analysis

The analysis techniques used in this research are the normality test, homogeneity test and average learning outcomes test. The following are the results of inferential statistical analysis. Pretest scores are obtained from students' test results before being given treatment in the control class and experimental class. The pretest was given to determine the initial situation, whether there were differences between the control class and the experimental class. Pretest analysis is divided into 3 stages, namely:

Pretest Data Normality Test Results

The normality test was carried out to see whether the pretest data for the control class and experimental class were normally distributed or not.

Table 3. Frequency Distribution to Help Test Data Normality with Chi Square

Class Intervals	F	Middle Value (Xi)	Xi^2	$f.$ Xi	$f.$ Xi^2
30 – 35	3	32,5	1.056,25	97,5	3.168,75
36 – 41	1	38,5	1.482,25	38,5	1.482,25
42 – 47	5	44,5	1.980,25	222,5	9.901,25
48 – 53	5	50,5	2.550,25	252,5	12.751,25
54 – 59	3	56,5	3.192,25	169,5	9.576,75
60 – 65	3	62,5	3.906,25	187,5	11.718,75
Amount	N=20	285		968	48.599

Source: Research Data Processing

The table above is a frequency distribution table, as well as a table that helps calculate chi square calculations. To find the f value, the amount of data in each experimental class interval. Find the middle value (Xi) = lower limit plus upper limit then divide by two, for example 30 + 35 = 65: 2 = 32.5. To find Xi2: the middle value (Xi) is squared, for example (32.5 x 32.5) = 1,056.25. Find (f. Xi): the value of f multiplied by Xi, for example (3 x 32.5) = 97.5. And to find f. Xi: f value multiplied by Xi2 value, for example (3 x 1,056.25) = 3,165.75.

Tabel 4. Normality Test and Pretest for Experimental Class and Control Class

Class	*X2count*	*X2 table*	Information	Conclusion
Experiment	6,16	11,07	$x^2 hitung \leq x^2 tabel$	$H_1 rejected$
Control	6,16			

Source: Research Data Processing

The hypothesis for testing data normality is:
H_0 : Data comes from samples that are normally distributed.
H_1 : Data comes from samples that are not normally distributed.

Based on the results of the data calculations, it can be seen that the calculated x2 for the experimental class and the control class is the same at 6.16 with degrees of freedom (dk) = 6 (number of interval classes) - 1 = 5 with a real level of a = 0.05, so we get the x2 table for both class of 11.07. For the experimental class and control class, it was obtained that x2 calculated = 6.16 ≤ x2 table = 11.07 so that H1 was rejected. It could be concluded that the pretest score data for the experimental class and control class were normally distributed with the aim of assessing the distribution of data in a group of data or variables.

Pretest Value Variance Homogeneity Test Results

The homogeneity test aims to find out whether the control class and experimental class have the same diversity/variance or not. To determine whether the two variants are the same or not, a comparison is carried out between f_count and ftabelf_tabel. The calculation results can be seen in the attachment which has been summarized in the following table:

Table 5. Homogeneity Test of Variance Pretest Scores for Experimental Class and Control Class.

Class	Varians	N	f_{count}	f_{table}	Information	Conclusion
Experiment	9,59	20	1	2,17	$f_{count} < f_{table}$	Homogeneous
Control	9,59	20				

Source: Research Data Processing

The hypothesis for testing data homogeneity is:
H_0 : the sample distributions of both groups have the same variance.
H_1:. The sample distribution of the two groups has unequal variance

Based on the table above, the calculation results and criteria above can be explained that f_count< f_table so that H0 is accepted and H1 is rejected. This means that the variances of the experimental class and control class are homogeneous.

Similarity Test Results of Two Average Pretest Scores for Control Class & Experimental Class

Based on the variance of the experimental class and the home gene control class, the statistical test for comparing the two average learning outcomes before different treatments are carried out is the t-test. The complete results of the t-test calculation of the control class and experimental class pretest scores can be summarized in the table below.

Table 6. T-test for the similarity of the pretest scores for the experimental class and the control class

Class	N	t_{count}	t_{table}	Information	conclusion
Experiment	20	0	2,02	$t_{hitung} < t_{tabel}$	H_1 ditolak
Control	20				

Source: Research Data Processing

Based on the average and variance of the experimental class and control class, tcount = 0 with probability (1-$\frac{1}{2}$ a) and the real level a = 0.05, so the probability is 0.097 and the degrees of freedom (db) = $n_1 + n_2$ -2 yaitu 20 + 20 - 2= 38, so f_{table} = 2,02. From the researchers' data processing in the table above, it was concluded that H1 was rejected, and Ho was accepted, meaning that there was no average influence between the learning outcomes of the experimental class style material and the average of the control class before being given different treatment.

Posttest Normality Test Results

The normality test was carried out to see whether the pretest data for the control class and experimental class were normally distributed or not.

Tabel 7. Frequency Distribution to Help Test Data Normality with Chi Square

Class Intervals	F	Middle Value (Xi)	Xi^2	f. Xi	f. Xi^2
30 – 35	3	32,5	1.056,25	97,5	3.168,75
36 – 41	1	38,5	1.482,25	38,5	1.482,25
42 – 47	5	44,5	1.980,25	222,5	9.901,25
48 – 53	5	50,5	2.550,25	252,5	12.751,25
54 – 59	3	56,5	3.192,25	169,5	9.576,75
60 – 65	3	62,5	3.906,25	187,5	11.718,75
Amount	N=20	285		968	48.599

Source: Research Data Processing

The table above is a frequency distribution table, as well as a table that helps calculate chi square calculations. To find the f value, the amount of data in each experimental class interval. Find the middle value (Xi) = lower limit plus upper limit then divide by two, for example 30 + 35 = 65 : 2 = 32.5. To find Xi2: the middle value (Xi) is squared, for example (32.5 x 32.5) = 1,056.25. Find (f. Xi): the value of f multiplied by Xi, for example (3 x 32.5) = 97.5. And to find f. Xi: f value multiplied by Xi2 value, for example (3 x 1,056.25) = 3,165.75. The results of the data normality test are summarized in the following table:

Tabel 8. Normality Test and Pretest for Experimental Class and Control Class

Class	$X^2 count$	$X^2 table$	Information	Conclusion
Experiment	3,96	11,07	$x^2 count \leq x^2 table$	$H_1 rejected$
Control	7,63			

Source: Research Data Processing

The hypothesis for testing data normality is:
H_0 : Data comes from samples that are normally distributed.
H_1 : Data comes from samples that are not normally distributed.

Based on the results of data calculations, it can be seen that the calculated x2 for the experimental class is 3.96 and the control class is 7.63 with degrees of freedom (dk) = 6 (number of interval classes) - 1 = 5 with a real level of a = 0.05, so we get x2 table for both classes is 11.07. For the experimental class, x2 calculated = 3.96 ≤ x2 table = 11.07 so that H1 is rejected, it can be concluded that the posttest score data for the experimental class is norm distributed. For the control class, x2 calculated = 7.63 ≤ x2 table = 11.07 so that H1 is rejected, it can be concluded that the posttest score data for the experimental class is normally distributed.

Posttest Value Variance Homogeneity Test Results

The homogeneity test aims to determine whether the control class and experimental class have the same variance or not. To determine whether the two variants are the same or not, a comparison is carried out between fcount and ftabel . The calculation results can be seen in the attachment which has been summarized in the following table:

Tabel 9. Test of Homogeneity of Variance in Posttest Scores for Experimental Class and Control Class.

Class	Varians	N	f_{count}	f_{table}	Information	Conclusion
Experiment	11,7	20	1	2,17	$f_{count} < f_{table}$	Homogeneous
Control	10,7	20				

Source: Research Data Processing
The hypothesis for testing data homogeneity is:
H_0 : the sample distributions of both groups have the same variance.
H_1: The sample distributions of the two groups have unequal variances.

Based on the table above, the calculation results and criteria above can be explained that fcount< ftable so that H0 is accepted and H1 is rejected. This means that the variances of the experimental class and control class are homogeneous. The conclusion from the calculation results and criteria above can be explained that fcount=1<ftabel=2.17, this means that the two groups, namely the experimental and control classes, are homogeneous..

Similarity Test Results of Two Mean Posttest Scores for Control Class and Experimental Class

Based on the variance of the experimental class and the homegene control class, the statistical test for comparing two average learning outcomes before different treatments are carried out is the t-test. The complete results of the t-test calculation of posttest scores for the control class and experimental class can be summarized in the table below.

Tabel 10. T-test for the similarity of posttest scores between the experimental class and the control class

Class	N	t_{count}	t_{table}	Information	conclusion
Experiment	20	5	2,02	$t_{count} > t_{table}$	H_1 rejected
Control	20				

Source: Research Data Processing

Based on the average and variance of the experimental class and control class, t_count = 5 with probability (1-$\frac{1}{2}$ a) and the real level a = 0.05, so the probability is 0.097 and the degrees of freedom (db) = n_1+n_2 -2, namely 20 + 20 - 2= 38, then t_table = 2.02. From the researchers' processing of data from the table above, it was concluded that the results of H0 were rejected and H1 was accepted, meaning that there was an average influence between the results of learning material in the experimental class style and the average of the control class before being given different treatment.

Based on the results of data processing, the pretest scores for the experimental class and control class were obtained $thitung$ = 0 ≤ $ttabel$ = 2.02, then H1 was rejected and H0 was accepted, meaning that there was no average influence between the learning outcomes of the experimental class style material and the average of the control class before being given the treatment. different. To see whether there are differences between the two classes, the posttest scores were tested statistically. From these calculations it is obtained that $thitung$ = 5 > $ttabel$= 2.02, then H1 is accepted and H0 is rejected, meaning that there is an average influence between the learning outcomes of the experimental class style material and the average of the control class after being given different treatments. The explanation above can be concluded that the results of the learning style used by the learning model are better than conventional learning. In other words, there is an influence of the material style learning model on class IV learning outcomes at SDN 131 Pekanbaru.

According to Haltiani et al., (2023), Learning outcomes are important indicators of the success of educational efforts, representing the skills and knowledge gained through training and experience (Degeng, 2021). Learning outcomes are not immediately visible but are demonstrated through actions that demonstrate the abilities obtained through learning. Interpretation of learning outcomes is highly dependent on specific disciplines and professions, reflecting diverse knowledge bases and structures. Learning outcomes include both qualitative and quantitative assessments, reflecting the overall learning experience. These outcomes are typically achieved through academic achievement, active participation, and engagement in learning activities (Marpaung, 2024). in line with what is said by (Parwasih & Warouw, 2020), learning outcomes are changes that cause humans to change in their attitudes and behavior.

Low learning outcomes are influenced by several factors, including (1) Internal factors, namely from within the individual that influence learning outcomes, including interest, readiness to learn and learning motivation. Learning motivation is the drive from within the student to achieve learning goals, (2) External factors, namely factors from outside the individual, such as learning methods that are not varied, teachers are less creative in using media and learning models, this causes the teaching and learning process to be less enjoyable and makes students feel bored and fed up, so that student learning outcomes are not optimal, especially in science learning (Pasaribu et al., 2024).

Natural Sciences and Social Sciences in the Independent Learning curriculum policy are combined into Natural and Social Sciences (IPAS) at the Elementary School level (Sukron et al., 2024). This science provides a lot of practice in developing scientific thinking and demands scientific attitudes such as curiosity, honesty, openness, and so on (Napitupulu et al., 2023). Therefore, science learning is not just a theory but teachers must be able to deliver teaching by correlating the usefulness of the science in everyday life through concrete evidence (Adim et al., 2020). According to (Dewi et al., 2023), achieving the objectives of science learning, it is expected that teachers are able to teach science learning well and correctly so that students can easily understand the contents of science learning.

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To help achieve student learning outcomes in style material in class IV, a suitable learning model is needed, such as the CTL (contextual teaching and learning) learning model. The philosophical basis of CTL is constructivism, namely a learning philosophy that emphasizes that learning is not just about memorizing material but constructing or building new knowledge and skills through the facts they experience in their lives (Nasri, 2021). Contextual learning is a learning concept that helps educators relate subject content to real situations in everyday life and motivates students to make connections between knowledge and its application in everyday life as members of society, Blanchard and Johnson (in Rahmi et al., 2023). According to Soleha et al., (2021), The aim of CTL learning is to help students understand the learning material they are studying by connecting the subject matter with its application in students' real, daily lives. Contextual learning is more important than results. In contextual classes, the teacher's task is to help students achieve their goals. This means that educators deal more with strategy than providing information. The task of educators is to manage as a team working together to discover something new for class members (students), something new comes from discovering it themselves, not from what the educator says.

According to Rustinah (2020), The CTL learning model has several advantages, namely: Providing opportunities for students to continue to progress according to the students' potential so that students are actively involved in PBM; Students can think critically and creatively in collecting data, understanding an issue and solving problems and teachers can be more creative; Make students aware of what they are learning; The selection of information based on student needs is not specified; Learning is more fun and not boring 6) Helps students work effectively in groups; and a good cooperative attitude is formed between individuals and groups. Characteristics of Contextual Teaching and Learning are new concepts built from real and contextual situations for students with what is already known, students are given the opportunity to collect and analyze their own data, students are guided to find important concepts from the data collected themselves (Sihombing et al., 2022).

That way, in the scenario of implementing learning using the CTL learning model, it is possible to create active learning. This is due to the implementation of learning that has been followed by all class IV students, so that students are more dominant in the learning process. Students can become more motivated in implementing learning because they use the CTL learning model.

CONCLUSION

Based on the problem formulation and research results based on data analysis and hypothesis testing as explained previously, it was concluded that the results of learning style material using the CTL learning model were better than learning results using conventional learning. This means that there is an influence on the use of the CTL learning model on the learning outcomes of style material in class IV SDN 131 Pekanbaru. This is proven by the results of hypothesis testing using the t-test, obtained $ttabel$ = 2.02 and $thitung$ = 5 with a real level of α = 0.05 and degrees of freedom (db) = 38. With the test criteria, namely if $thi\ tung < ttabel$ then H0 is accepted, and if $thitung > ttabel$ then H0 is rejected, and the calculation $thitung > ttabel$ is obtained, namely 5 > 2.02. In accordance with the test criteria, H0 is therefore rejected.

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