



# THE INFLUENCE OF CONTEXTUAL MODELS ON PROCESSING SKILLS AND SCIENCE CONCEPT MASTERY IN SD 207 JAMBI CITY

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## ABSTRACT

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This study aims to see how science process skills and student learning outcomes apply a contextual learning approach in science learning. The method used is a quasi-experimental using a control class and an experimental class for fifth grade students at SD Negeri 207 Jambi City. Collecting data by giving 25 multiple choice questions. The data analysis technique used normality test, SPSS 25 homogeneity test and T-test. The results showed that there was a positive effect in the "high" category of the CTL model on the ability of processes and concepts, namely 45.15% and 46.15%.

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## 1. Introduction

Education in Elementary School (SD) is basic education which has the main goal of preparing the nation's next generation who are expected to have both knowledge and skills. In practice, there are many problems in the field, namely the goals that have been set in the outlines of the education program cannot always be fully achieved as expected. This is in accordance with the description submitted by Rembang & Rembang (2021), that in the learning process there is still a tendency to minimize the involvement of students. The dominance of classroom teachers in the learning process causes the tendency of students to be more passive, so that they wait more for the teacher's presentation than to seek and find the knowledge, skills or attitudes they need.

Regarding the learning process in the classroom, in general, SD Negeri 207 Jambi City has several problems in learning. This can be seen, based on the results of observations and reflections that have been carried out during teaching in class V it is known that in the learning process. Among these problems, for example, in Natural Sciences (IPA), students' enthusiasm or motivation is still relatively low in the teaching and learning process, learning outcomes, especially in science subjects, are not yet optimal (52% of students are still below the KKM) and the completeness of class learning is determined. has not reached 85%. The various problems that exist are feared that the achievement of the curriculum at SD Negeri 207 will be difficult to achieve. This is as conveyed by Irda (2021), that mastery of concepts is a general indicator of the achievement of educational or curriculum goals

In addition to mastery of concepts that are still not optimal, the results of temporary observations and reflections show that science process skills during science learning are also still low. It can be seen that, in general, students are not proficient in observing a certain object, students have not been able to take measurements correctly, and so on. In fact, these skills (scientific process skills) are very necessary and important, not only to support science learning but also in everyday life. It is as said by Sukarno S., Permanasari & Hamidah, (2013) process skills are indispensable in all areas of life. For this reason, the science process skills of students in grade 5 of SD Negeri 207 Jambi city need to be improved.



The results of reflection and discussion with colleagues show that learning at SD Negeri 207 Jambi City tends and in general is carried out with an ordinary pattern or lecture model, namely the learning process that begins with an explanation of the subject matter by the teacher related to concepts, sample questions, and practice questions. done by students. Students are given the opportunity to ask questions after the presentation of the material by the teacher or before the teacher continues to explain the next material. The dominance of the teacher in learning the lecture model where the teacher acts as the sole transmitter of information with students as listeners. Several teachers and colleagues also informed that students still and often do not pay attention to the teacher,

According to the theory, many factors can cause the above conditions to occur, for example factors that come from within the students themselves and factors that come from outside. Factors that come from within students, for example: low interest in lessons, unpreparedness of students in following lessons, students' motivation to learn is still low, lack of attention or concentration in learning. While factors that come from outside, for example: the learning method used by the teacher is less attractive, the relationship between the teacher and students is not good, the level of discipline in the school, inadequate teaching tools or media, less effective study time and others.[4].

To produce a quality learning process, there are several factors that need to be considered, including learning methods and learning motivation. Learning motivation is one of the internal factors that is quite important in the teaching and learning process. Motivation is needed to foster interest in the lessons taught by the teacher. The learning method is also one of the factors that determine the success or failure of the teaching and learning process, with the right method automatically supporting the achievement of learning objectives. Teacher innovation in implementing learning strategies is important, because with teachers applying innovations and variations of learning strategies at each meeting in learning,[5].

Selection and use of appropriate methods in accordance with the objectives of competence is very necessary. There are many methods that can be used by educators in delivering teaching materials to students. Learning methods will also make the method of educating more varied, not merely verbal communication through the utterance of words by educators so that students do not get bored and educators do not run out of energy. Therefore, innovation is needed in implementing science learning at SD Negeri 207 Jambi City to solve some of the problems above. This is also in line with the opinion Hamruni (2015) that contextual learning is learning that emphasizes the process of student involvement to be able to find the material being studied and connect it to real life situations, thus encouraging students to be able to apply it in their lives. Models are used in all aspects of life. Models are useful in describing choices and in analyzing the appearance of these options[7]. According to Suharlii (2015), the learning model is one of the keys to the success of the learning process carried out by educators

The results of previous research have empirically proven that the contextual learning model has a positive impact on the development of student potential. For example, research conducted by Yuniari, Putra, & Manuaba (2014), that the contextual learning approach can improve learning outcomes or mastery of concepts (PKn). Furthermore, research conducted by Aprilia, Sunardi, & Djono, (2017) found that the use of contextual learning media can improve science learning outcomes. Maknun (2014) also found that the contextual approach can also improve students' scientific literacy skills and argumentation quality. The various research results above prove that the contextual approach can be used as an alternative in science learning to improve other learning outcomes, such as science process skills and mastery of science concepts while at the same time solving several personal issues related to the learning process at SD Negeri 207 Jambi City.

Referring to the description above, the focus of this research is to answer the question of how to improve the ability of science process skills and student learning outcomes by applying a contextual learning approach in science learning. This is believed to be an alternative in solving various implementation problems and learning outcomes in class V SD Negeri 207 Jambi City.

## 2. Research Methods

This research is a quasi-experimental research using a positivistic paradigm. According to Hastjarjo (2019) and Creswell (2014) states that quasi-experimental research can be interpreted as a research method used to find the effect of certain treatments on others under controlled conditions. This research was



conducted at SD 207 Jambi City which is located at Jl. South Circle Rt 02, Paal Merah, Kec. Paal Merah, Jambi City Prov. Jambi. This research was conducted from October 2021 to March 2022. In this study the variables used were the independent variable (independent variable) and the dependent variable (dependent variable). The independent variable in this study is the contextual learning model. The dependent variable in this study is science process skills and student learning outcomes. In this study, the researcher used a research instrument in the form of a test with the aim of knowing student learning outcomes after following the learning process using a contextual learning model. The instrument for measuring the ability of science process skills and learning outcomes consists of 25 multiple choice questions. The technique of data analysis using the normality test of the data is carried out using the formula

$$x^2 = \sum \left[ \frac{(fo - fe)^2}{fe} \right] \quad (1)$$

The homogeneity test in this study used the help of the SPSS 25 program.

To determine the effect of the contextual learning model on science process skills and mastery of science concepts, the N-gain analysis technique was used.

$$N - gain = \frac{N_{post} - N_{Pre}}{N_{maks} - N_{Pre}} \times 100\% \quad (2)$$

Furthermore, to see the level of belief in the truth about the effect of the contextual learning model on science process skills and mastery of science concepts, it is necessary to do a T test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \left[ \frac{1}{n_1} + \frac{1}{n_2} \right]}} \quad (3)$$

### 3. Results and Discussion

#### 3.1 Result

##### 3.1.1 Description of Students' Initial Conditions

Based on the results of observations, the data on student learning outcomes in the cognitive domain of science subjects for fifth grade students of SD Negeri 207 Jambi City is still low. This can be seen from the students' pretest scores. The average score of students, both the control class and the experimental class is still below the KKM (75), each of which is 66.69 for the experimental class and 67.02 for the control class. Students whose scores have reached the new KKM are 10 students or 38.46%. While students whose scores have not reached the KKM are 16 students or 61.56%. The lowest score obtained by students is 47 while the highest score obtained by students is 93. For more details, the table below can be presented.

TABLE 1  
PRETEST RESULTS FOR THE CONTROL CLASS AND THE EXPERIMENT CLASS FOR THE SCIENCE PROCESS SKILLS VARIABLES

Class	Score	Criteria	Amount	Percentage
Experiment	86 – 100	Very good	4	15.38
	76 – 85	Well	5	19.23
	66 – 75	Enough	5	19.23
	51 – 65	Not enough	9	34.61
	50	Fail	3	11.53
	Average	Enough	66.69	
	Total		26	100
Control	86 – 100	Very good	5	18.52
	76 – 85	Well	5	18.52
	66 – 75	Enough	6	22.22
	51 – 65	Not enough	6	22.22
	50	Fail	5	18.52
	Average	Enough	67.02	
	Total		27	100

Based on Table 1 above, it can be seen that the student scores are in the failure criteria ( $\leq 50$ ) for the experimental class of 3 students or about 11.53%, while for the control class there are 5 people or about 18.52%. There were 9 students who achieved the poor criteria (51-65) for the experimental class or about 34.61%, while for the control class there were 6 students or about 22.22%. There were 5 students who achieved sufficient criteria (66-75) in the experimental class or 19.23%, while in the control class there were 5 students. 6 people or about 22.22%. Good criteria (76-85) for the experimental class amounted to 5 students or 19.23%, while in the control class as many as 5 people or about 18.52%. The students who achieved scores with very good criteria (86-100) for the experimental class were 4 students or 15.38% and for the control class as many as 5 people or about 18.52%.

TABLE 2  
PRETEST RESULTS FOR THE CONTROL CLASS AND THE EXPERIMENTAL CLASS FOR THE VARIABLE MASTERY OF SCIENCE CONCEPTS

Class	Score	Criteria	Amount	Percentage
Experiment	86 – 100	Very good	5	9.23
	76 – 85	Well	5	19.23
	66 – 75	Enough	6	23.07
	51 – 65	Not enough	8	30.77
	50	Fail	2	7.69
	Average	Enough	67.09	
Control	Total		26	100
	86 – 100	Very good	6	22.22
	76 – 85	Well	5	18.52
	66 – 75	Enough	7	25.92
	51 – 65	Not enough	5	18.52
	50	Fail	4	14.82
Average	Enough	68.50		
Total			27	100

Based on Table. 2 above, it can be seen that the students' ability in terms of mastery of concepts is in the failure criteria ( $\leq 50$ ) for the experimental class of 2 students or about 7.69%, while for the control class as many as 4 people or about 14.82%. There were 8 students who achieved less criteria (51-65) for the experimental class or about 30.77%, while for the control class there were 5 students or about 18.52%. Students who achieved sufficient criteria (66-75) in the experimental class were 6 students or 23.07%, while in the control class there were 7 people or about 25.92%. Good criteria (76-85) for the experimental class amounted to 5 students or 19.23%, while in the control class as many as 5 people or about 18.52%. The students who achieved scores with very good criteria (86-100) for the experimental class were 5 students or 19.23% and for the control class as many as 6 people or about 22.22%.

Based on the data above, it can be seen that science learning outcomes in the context of science process skills and concept mastery are still relatively low, both for the experimental class and the control class. Therefore, it is necessary to have a pilot action by applying the CTL learning model for its effect on science learning outcomes in fifth grade students of SD Negeri 207 Jambi City and science process skills.

### 3.2.1 Learning Outcomes

#### 1. Learning Outcomes on Variable Science Process Skills

In learning activities with the implementation of CTL shows that student activities are very good. This has an influence on student learning outcomes. The results obtained from CTL learning can be presented in table 3 below.

TABLE 3  
POSTTEST RESULTS ON VARIABLE SCIENCE PROCESS SKILLS

Class	Score	Criteria	Amount	Percentage
Experiment	86 – 100	Very good	12	46.15
	76 – 85	Well	10	38.46
	66 - 75	Enough	4	15.38



Class	Score	Criteria	Amount	Percentage
Control	51 – 65	Not enough	0	0
	50	Fail	0	0
	Average	Very good	86.27	
	Total		26	100
	86 – 100	Very good	7	25.92
	76 – 85	Well	8	29.63
	66 - 75	Enough	7	25.92
	51 – 65	Not enough	3	11.11
	50	Fail	2	7.40
	Average	Well	77.26	
Total		27	100	

Based on Table 3, it can be seen that there are 12 students who have reached the "Very Good" category, or about 46.15%, while in the control class there are 7 people or about 25.92%. There were 10 students in the "Good" category in the experimental class or about 38.46%, while in the control class there were 8 students or about 29.63%. There were 4 students in the "Enough" category in the experimental class or about 15.28%, while in the control class there were 7 people or about 25.92%. The ability in the "Less" and "Fail" categories in the experimental class no longer exists, while in the control class there are 3 people (11.11%) and 2 people (7.40%).

TABLE 4  
IMPROVING THE ABILITY OF SCIENCE PROCESS SKILLS

No	Score range	Category	Experiment Class		Control Class	
			Frequency	Percentage	Frequency	Percentage
1	N-Gain 0.70	Tall	12	46.15	5	18.51
2	0.30 ≤ N-gain 0.70	Currently	10	38.45	8	29.63
3	N-gain < 0.30	Low	4	15.38	14	51.86
Total			26	100	27	100
Average			Currently		Low	

Based on Table 4. it can be seen that the increase in the ability of students' science process skills in the "High" category for the experimental class was 12 people or about 45.15%, while in the control class there were 5 people or about 18.51%. The increase in the "moderate" category, in the experimental class as many as 10 people or about 38.45%, while in the control class as many as 8 people or about 29.63%. The increase in the ability of science process skills with the "Low" category, in the experimental class as many as 4 people or about 15.38%, while in the control class as much as 51.86%. Thus, in general, it can be said that the improvement of science process skills in the experimental class is relatively better than the control class.

## 2. Learning Outcomes on Variables of Mastery of Science Concepts

As previously mentioned, in addition to learning outcomes in the form of science process skills, the research also aims to see the extent of the influence of the CTL learning model on students' mastery of science. Therefore, based on the test data that has been carried out, the data is described in the following table form:

TABLE 5  
POSTTEST RESULTS ON VARIABLES OF MASTERY OF SCIENCE CONCEPTS

Class	Score	Criteria	Amount	Percentage
Experiment	86 – 100	Very good	12	46.15
	76 – 85	Well	9	36.62
	66 - 75	Enough	5	19.23
	51 – 65	Not enough	0	0
	50	Fail	0	0
	Average	Very good	87.50	
Total			26	100
Control	86 – 100	Very good	8	29.63

Class	Score	Criteria	Amount	Percentage
	76 – 85	Well	8	29.63
	66 - 75	Enough	7	27.92
	51 – 65	Not enough	3	11.11
	50	Fail	1	3.70
	Average	Well	79.59	
	Total		27	100

Based on Table 5, it can be seen that the students who have reached the "Very Good" category are 12 students or about 46.15%, while in the control class there are 8 people or about 29.63%. There were 9 students in the "Good" category in the experimental class or around 36.62%, while in the control class there were 8 students or about 29.63%. There were 5 students in the "Enough" category in the experimental class or around 19.23%, while in the control class there were 7 people or about 25.92%. The ability of the "Less and Fail" category in the experimental class no longer exists, while in the control class there are 3 people (11.11%) and 1 person (3.70%) respectively. Based on the data above (Table 4.7) it can be concluded that it can be seen that the implementation of the CTL learning model has an effect on the experimental class.

TABLE 6.  
IMPROVING THE ABILITY TO MASTER SCIENCE CONCEPTS BASED ON N-GAIN . ANALYSIS

No	Score range	Category	Experiment Class		Control Class	
			Frequency	Percentage	Frequency	Percentage
1	N-Gain 0.70	Tall	12	46.15	9	33.33
2	0.30 ≤ N-gain 0.70	Currently	9	36.62	8	29.63
3	N-gain < 0.30	Low	5	19.23	10	37.04
	Total		26	100	27	100
	Average	Tall			Currently	

Based on Table 6, it can be seen that the increase in students' ability to master science concepts in the "High" category for the experimental class was 12 people or about 46.15%, while in the control class there were 9 people or about 33.33%. The increase in the "moderate" category, in the experimental class as many as 9 people or about 36.62%, while in the control class as many as 8 people or about 29.63%. The increase in the ability to master science concepts with the "Low" category, in the experimental class as many as 5 people or about 19.23%, while in the control class as many as 10 people or about 37.04%. Thus in general it can be said that the increase in mastery of science concepts in the experimental class is in the "good" category while the control class is in the "medium" category.

### 3.2 Discussion

Based on the average value at the end of each cycle of learning activities using the Contextual Teaching and Learning (CTL) learning model, it shows an increase in student learning outcomes, both in the science process skills variable and in the variable mastery of science concepts. For science process skills (based on Table 4.4) it can be seen that the increase in the ability of students' science process skills in the "High" category for the experimental class was 12 people or about 45.15%, while in the control class there were 5 people or about 18.51%. The increase in the "moderate" category, in the experimental class as many as 10 people or about 38.45%, while in the control class as many as 8 people or about 29.63%. Improving the ability of science process skills with the "Low" category, in the experimental class as many as 4 people or about 15.38%, while in the control class as many as 51.86%. Thus, in general, it can be said that the improvement of science process skills in the experimental class is relatively better than the control class.

As for the variable mastery of science concepts (Table 4.8) it can be seen that the increase in students' ability to master science concepts in the "High" category for the experimental class as many as 12 people or about 46.15%, while in the control class as many as 9 people or about 33.33% . The increase in the "moderate" category, in the experimental class as many as 9 people or about 36.62%, while in the control class as many as 8 people or about 29.63%. The increase in the ability to master science concepts with the



"Low" category, in the experimental class as many as 5 people or about 19.23%, while in the control class as many as 10 people or about 37.04%. Thus in general it can be said that the increase in mastery of science concepts in the experimental class is in the "good" category while the control class is in the "medium" category.

The results of the study, namely that there was a significant effect on the implementation of the Contextual Teaching and Learning (CTL) learning model on science process skills and mastery of science concepts, theoretically supported the results of previous research. Several studies that are in line with the results of this study include research conducted by Mirawati & Nugraha (2017) with the title *Improving Early Childhood Science Process Skills Through Gardening Activities*. The results in this study indicate that gardening activities are able to make a positive contribution to the improvement of science process skills in TK Lab. UPI. In theory, gardening activities are part of CTL learning.

Refer to opinion Sulastri & et al (2014), that there are several factors that influence learning from the school side which include: (1) Teaching method, teaching method is a way or path that must be passed in teaching, (2) Curriculum, curriculum is defined as a number of activities given to students. Most of these activities are presenting lesson materials so that students receive, master and develop the subject matter, (3) Teacher-student relations, the teaching and learning process occurs between teachers and students. the process is also influenced by the relationships that exist in the process itself, (4) student relations with students, students who have traits or behavior that are less pleasing to other friends, have low self-esteem or are experiencing inner pressures, will be exiled. of the group, (5) School discipline, School discipline is closely related to student craftsmanship in school as well as in learning. This includes all aspects of both teacher discipline in teaching because educator discipline can also set an example for students or students. Therefore, the implementation of learning with the CTL model has been proven to be able to optimize positive factors in influencing learning outcomes.

Through the results of this study, it is hoped that this research can provide benefits, including being able to contribute to the development of science, especially for education regarding the use of contextual learning models. For teachers, this research is an input in expanding knowledge and insight about learning methods, especially in order to improve science process skills and mastery of science concepts. Therefore, teachers need to implement the CTL learning model systematically in order to create optimal learning outcomes.

#### **4. Conclusion**

Based on the research and the results of the data that have been presented, it can be concluded as follows: There is a positive influence on the application of the Contextual Teaching and Learning (CTL) learning model on science process skills. The increase in the ability of students' science process skills in the "High" category for the experimental class was 12 people or about 45.15%, while in the control class there were 5 people or about 18.51%. The increase in the "moderate" category, in the experimental class as many as 10 people or about 38.45%, while in the control class as many as 8 people or about 29.63%. The increase in the ability of science process skills with the "Low" category, in the experimental class as many as 4 people or about 15.38%, while in the control class as much as 51.86%. The data is strengthened by the T test (Table 4.6) it can be seen that the value of Sig. (2-tailed) obtained a value of 0.013 which means  $<0.05$ . According to the provision that if the value of Sig. (2-tailed), 0.05. Thus it can also be said that there is a significant effect of the implementation of the CTL model on students' science process skills.

There is a positive influence on the application of the Contextual Teaching and Learning (CTL) model to the mastery of science concepts. The increase in students' ability to master science concepts in the "High" category for the experimental class as many as 12 people or about 46.15%, while in the control class as many as 9 people or about 33.33%. The increase in the "moderate" category, in the experimental class as many as 9 people or about 36.62%, while in the control class as many as 8 people or about 29.63%. The increase in the ability to master science concepts with the "Low" category, in the experimental class as many as 5 people or about 19.23%, while in the control class as many as 10 people or about 37.04%. Thus in general it can be said that the increase in mastery of science concepts in the experimental class is in the "good" category while the control class is in the "medium" category. Therefore, it can be said that the experimental class is relatively better than the control class. This data is strengthened by the T test that the value of Sig. (2-tailed)



obtained a value of 0.000 which means  $<0.05$ . Thus, it can also be said that there is a significant effect of the implementation of the CTL model on the mastery of science concepts.

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