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The Effect of Contextual Teaching And Learning (CTL) Learning Model on The Ability Of Concept Understanding Class VII Students of SMP 16, Kota Bengkulu

Sufianto
Guru SMP N Bengkuku Tengah

Abstract
This study aims to determine the effect of the Contextual Teaching and Learning (CTL) learning model on the ability to understand the concepts of class VII students of SMP 16 Kota Bengkulu. The research carried out was quasi-experimental with a population of all students in class VII of SMP 16 Kota Bengkulu totaling 218 students. Samples were taken by random sampling technique and a sample of 60 students was obtained, 30 students in the VIIA class as the experimental class, 30 students in the VIIE class as the control class. Data collection using Instrument concept understanding ability test. Data analysis techniques using Ancova. The results showed that there was the influence of the Contextual Teaching and Learning (CTL) learning model on the conceptual comprehension ability of seventh grade students in Bengkulu City 16 Junior High School at 80.50% with an average of 82.75 and there was an effect of an initial ability of 60.50% with an average average of 82.80. It can be concluded that the ability to understand students' concepts is better by using the Contextual Teaching and Learning (CTL) learning model.
Keywords: Contextual Teaching and Learning (CTL); Concept Understanding Ability.

1. INTRODUCTION

The ability to understand concepts in mathematics learning is the competence shown by students in understanding concepts and in conducting procedures in a flexible, accurate, efficient and precise manner. So that understanding the concept with regard to understanding mathematical ideas that are comprehensive and functional. According to Haji, S. (2014), understanding of concepts is very important. Because it can affect the understanding of other mathematical objects, namely principles and skills. To be able to improve students' ability to understand mathematical concepts, learning is needed which provides opportunities for students to practice a theory in mathematics as well as outside mathematics (daily life).

According to Haji, S. (2011). it is necessary to develop an approach in mathematics learning that allows students to be more free to convey their ideas about mathematics (communication). The ability to understand mathematical concepts can provide benefits for students themselves, including improving memory, increasing the ability to solve problems, build their own understanding, and improve the attitude and confidence of these students.

According to Widada, W. (2015), the use of contextual learning media that is appropriate and in accordance with needs, can improve students' abilities in the process of achieving mathematical concepts and principles as well as improving student mastery learning. Contextual learning media can effectively produce patterns (patterns) that students can easily compile initial statements (conjecture) and with vertical mathematical activity, students with the help of more capable friends or teachers can achieve the concepts and principles they are learning.

According to Haji, S. (2012). Mathematical communication skills of students taught through contextual learning are better than students taught through conventional learning. Learning with the CTL learning model will be able to develop students' ability to solve problems and make decisions objectively and rationally. Besides that, it will also be able to develop critical, logical and analytical thinking skills. Therefore students must be truly trained and accustomed to thinking critically and independently. By using the CTL learning model, students are expected to be able to solve math problems well, especially to improve students' ability to understand concepts.

In the opinion of Amri, S. (2010: 193). That the CTL (Contextual Teaching and Learning) approach is a concept that emphasizes the interrelationship between learning material and the real world, so that

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students are able to connect and use the competencies of learning outcomes in everyday life. Mathematical learning with a contextual model is closely related to: 1) the phenomenon of social life, language, environment, hopes and dreams that grow, 2) the phenomenon of world experiences and knowledge of students, and 3) class as a social phenomenon. So that through this approach learning becomes more effective and meaningful, where learning will measure the ability to understand concepts. Based on the description above, the researchers concluded that the contextual learning model would be effective against the ability to understand concepts. The role of the teacher in implementing CTL is to help students achieve goals. This means that the teacher is more focused on strategies than giving information. One of the teacher's efforts is managing the class as a team that works together to find knowledge for students. Based on the research results of Prahastiwi, R. (2012). The application of the CTL (Contextual Teaching and Learning) Approach can improve students' mathematics learning activities and achievements.

One of the ways to improve students' understanding skills is to use the CTL learning model. CTL is a comprehensive system. CTL consists of interconnected parts. If these parts are intertwined with each other, there will be an effect that exceeds the results given by the parts separately. Johnson, E. (2008: 65) reveals contextual is an educational process that aims to help students see the meaning in the material they learn by connecting with the context of everyday life. The meaning of the statement is that the CTL system is an educational process that aims to help students see the meaning in the academic material they learn by connecting academic subjects with the context in their daily lives, namely with the context of their personal, social, and cultural conditions .

The purpose of the study was to find out whether there was an influence of the Contextual Teaching and Learning (CTL) learning model on the ability to understand the concepts of class VII students of SMP 16 Kota Bengkulu

Contextual Teaching and Learning (CTL) is a learning strategy that emphasizes the process of full student involvement to be able to find the material learned and connect it to real life situations so as to encourage students to be able to apply it in their lives. CTL as a learning approach has 7 principles or components, namely: 1) constructivism, 2) inquiry, 3) asking questions, 4) learning society, 5) modeling, 6) reflection, and 7) actual assessment (Sanjaya, W. Hal: 255 -268). To achieve this goal, the CTL system will guide students through the seven main components of CTL: making meaningful relationships, doing meaningful work, collaborating, thinking critically and creatively, maintaining students' personalities, achieving high standards, and using authentic assessment.

According to T. T. LAM (2007), a contextual approach can strengthen students' prior mathematical knowledge and improve student learning about new concepts in the process of solving some 'real' problems. Ruhimat, et al. (2009: 188) argue that in essence, the development of each component of CTL in learning can be carried out the following steps: (1) developing students' thinking to carry out learning activities more meaningfully, by working alone, finding themselves, and constructing their own knowledge with new skills they have, (2) implementing as far as possible inquiry, for all topics taught, (3) developing attitudes of curious students through raising questions, (4) creating learning communities, such as through group activities, discussions, etc. , (5) presenting models as examples of learning, usually through illustrative models, even actual media, (6) familiarizing children to reflect on each learning, (7) conducting objective assessments, namely assessing the actual abilities of students.The CTL learning model has five syntax or learning steps (Trianto, 2008), namely relating, experiencing, applying, cooperating, and transfering. Thus it can be concluded that contextual learning prioritizes knowledge and experience or the real world, high-level thinking, student-centered, students become active, critical, creative, solve problems, learn fun, fun, not boring, and use various learning resources.

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Understanding is a process, a way of understanding how to learn so that you understand and knowledge a lot. Someone is said to understand the mathematical concept if he has been able to do several things, including: finding, defining, identifying, and giving examples. Schunk (2012: 408) states that a concept is a representation of a category that makes people able to recognize examples and not examples. Concepts can include concrete objects or abstract ideas.

According to Haji, S. (2014), understanding of concepts is very important. Because it can affect the understanding of other mathematical objects, namely principles and skills. To be able to improve students' ability to understand mathematical concepts, learning is needed which provides opportunities for students to practice a theory in mathematics as well as outside mathematics (daily life). The indicators of understanding the concept are restating a concept, classifying certain objects according to the concept, giving examples and not examples of concepts, presenting concepts in various forms of mathematical representation, developing necessary requirements and sufficient requirements from a concept, using and utilizing and selecting procedures or certain operations, applying concepts or algorithms in solving problems.

Sanjaya, (2009), states that understanding concepts is the ability of students in the form of mastery of subject matter, where students do not merely know or remember a number of concepts learned, but are able to express them in other forms that are easy to understand, provide interpretation of data and are able to apply concepts that according to the cognitive structure it has. Then it can be said that the ability to understand concepts in mathematics learning is the competence shown by students in understanding concepts and in conducting procedures in a flexible, accurate, efficient and precise manner. So that understanding the concept with regard to understanding mathematical ideas that are comprehensive and functional. And the ability to understand the concept is the ability of students to understand the basics of material including definitions, facts, basic concepts and rules in mathematics in sequence and can apply it. Students who have an understanding of concepts are more aware of important mathematical ideas and relationships between mathematical ideas. students can be said to understand a mathematical concept, or understand the concepts given in mathematics learning, if students are able to memorize things separately on a concept without relation to others, can apply formulas in routine calculations, and do calculations algorithmically, if students can associate things with others correctly or with other concepts that have been given first.

2. METHOD

This research is a quasi-experimental study. The data used in this study is a test of students' conceptual comprehension abilities. The data used to test homogeneity is data from the pretest mathematics scores of students of class VII A and VII E and the posttest score data is used to test the normality of the data and also test the hypothesis of the study using the ANCOVA test. Experimental research design model, Campbell and Stanley (Ary, 2011: 374-404).

Table 1: Research Design

Group	*Pre Tes*	Free variable	*Post Tes*
Experiment	Y1	X	Y2
Control	Y1	-	Y2

Information:
Y1 = *Pre-Tes*
Y2 = *Post Tes*
X = Learning using the Contextual Teaching and Learning (CTL) model

3. RESULTS AND DISCUSSION

This research was conducted to determine the effect of the Contextual Teaching and Learning (CTL) learning model on the conceptual comprehension ability of students learning mathematics at the junior high school class VII at the 16th School of Bengkulu City. In this study, researchers gave pretest and post-test in the form of a concept comprehension ability test with 7 question descriptions. The pretest and posttest in the form of a concept comprehension ability test were given to find out the

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student learning outcomes from the control class that were used as a comparison with the experimental class.

Table 2: Description of Data on the Ability of Understanding of Experimental Class Concepts

No	**No Subject**	**Skor *Pretest***	**Skor *Posttest***	**Gain**	**No**	**No Subject**	**Skor *Pretest***	**Skor *Posttest***	**Gain**
1	R-1	53	84	0,70	16	R-16	53	84	0,70
2	R-2	53	84	0,70	17	R-17	41	75	0,61
3	R-3	56	84	0,68	18	R-18	44	72	0,53
4	R-4	53	84	0,70	19	R-19	44	72	0,53
5	R-5	56	88	0,76	20	R-20	34	78	0,69
6	R-6	56	84	0,68	21	R-21	38	78	0,68
7	R-7	59	91	0,84	22	R-22	38	75	0,63
8	R-8	59	88	0,75	23	R-23	47	81	0,69
9	R-9	53	91	0,86	24	R-24	41	81	0,72
10	R-10	59	88	0,75	25	R-25	47	78	0,61
11	R-11	59	88	0,75	26	R-26	47	78	0,61
12	R-12	56	97	1,00	27	R-27	50	81	0,67
13	R-13	50	81	0,67	28	R-28	50	78	0,59
14	R-14	47	84	0,74	29	R-29	59	88	0,75
15	R-15	50	81	0,67	30	R-30	56	88	0,76
total (Σx)							1510,36	2482,50	20,99
Average (X)							50,35	82,75	0,70
Standard deviation (S)							7,16	5,77	
Varians (S^2)							51,24	33,25	
Minimum score							33,93	72,14	
Maximum score							59,29	97,143	

From the table above it can be seen that the lowest pretest value is 33.93 with the highest value of 59.29. For an average value of 50.35 with a standard deviation of 7.16. While for the posttest value it can be seen that the lowest value is 72.14 and the highest value is 97.14. For the average value of 82.75 with a standard deviation of 5.77. Then the pretest and posttest data were classified based on the interval class to find the frequency. The highest frequency at pretest is 10 students or 33.33%. The lowest frequency is 3 students or 10%. The following is presented in the form of a histogram diagram as shown below.

Table 3: Pretest Frequency Distribution Concept Understanding Ability

No	**Interval**	**Concept Understanding Ability**	
		Frequency (*Pretest*)	**% (*Pretest*)**
1	34 – 39	3	10,00 %
2	40 – 45	4	13,33 %
3	46 – 51	8	26,66 %
4	52 – 57	10	33,33 %
5	58 – 63	5	16,66 %
TOTAL		30	100 %

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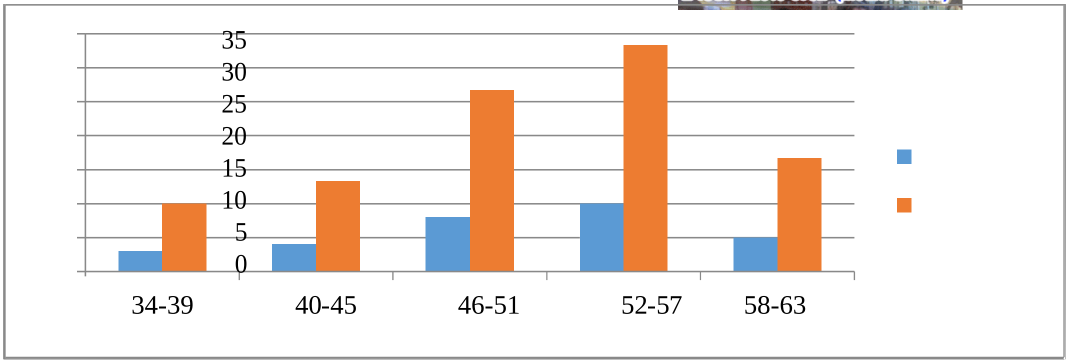

Figure 1: Histogram Diagram Frequency Pretest Distribution Concept Understanding Ability Experiment Class.

While the results of the calculation of the experimental class posttest data, the highest frequency in the posttest was 13 students or 43.33%, the lowest frequency was 1 student or 3.33%. The following is presented in the form of a histogram diagram as shown below.

Table 4: Posttest Frequency Distribution of Conceptual Understanding Ability

No	Interval	Concept Understanding Ability	
		Frequency (*Posttest*)	% (*Posttest*)
1	71 – 76	4	13,33 %
2	77 – 82	10	33,33%
3	83 – 88	13	43,33%
4	89 – 94	2	6,66%
5	95 – 100	1	3,33%
TOTAL		30	100

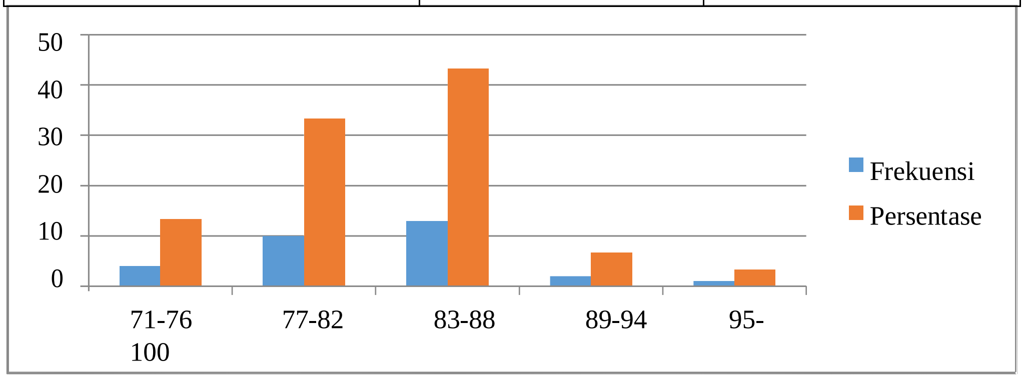

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Figure 2: Histogram Diagram of Posttest Frequency Distribution Ability to Understand
Experimental Class Concepts.

Table 5: Data Description of Control Class Concept Understanding Ability Test Results.

No	**No Subject**	**Skor *Pretest***	**Skor *Posttest***	**Gain**	**No**	**No Subject**	**Skor *Pretest***	**Skor *Posttest***	**Gain**
1	R-1	47	59	0,34	16	R-16	44	66	0,59
2	R-2	47	69	0,63	17	R-17	47	66	0,55
3	R-3	50	63	0,40	18	R-18	31	47	0,31
4	R-4	50	69	0,59	19	R-19	38	50	0,28
5	R-5	50	63	0,40	20	R-20	41	53	0,29
6	R-6	53	63	0,34	21	R-21	38	56	0,43
7	R-7	50	66	0,51	22	R-22	41	53	0,29
8	R-8	56	63	0,25	23	R-23	38	50	0,28
9	R-9	59	81	1,00	24	R-24	41	59	0,44
10	R-10	53	69	0,55	25	R-25	44	50	0,17
11	R-11	54	59	0,19	26	R-26	44	50	0,17
12	R-12	44	53	0,25	27	R-27	41	53	0,29
13	R-13	44	59	0,41	28	R-28	56	63	0,24
14	R-14	47	63	0,45	29	R-29	59	81	1,00
15	R-15	44	63	0,50	30	R-30	53	69	0,55
total (Σx)							1400,71	1823,57	12,71
Average (X)							46,69	60,79	0,42
Standard deviation (S)							6,85	8,58	
Varians (S^2)							46,88	73,61	
Minimum score							31,43	47,14	
Maximum score							58,93	81,43	

From the table above it can be seen that the lowest pretest value is 31.43 with the highest value of 58.93. For the average value of 46.69 with a standard deviation of 6.85. Whereas for the posttest value it can be seen that the lowest value is 47.14 and the highest value is 81.43. For an average value of 60.79 with a standard deviation of 8.58. Then the pretest and posttest data were classified based on the interval class to find the frequency. The highest frequency at pretest is 10 students or 33.33%, the lowest frequency is 1 student or 3.33%. The following is presented in the form of a histogram diagram as shown below.

Table 6: Pretest Frequency Distribution Concept Understanding Ability

No	**Interval**	**Concept Understanding Ability**	
		Frequency (*Pretest*)	**% (*Pretest*)**
1	31 – 36	1	3,33 %
2	37 – 42	7	23,33 %
3	43 – 48	10	33,33 %
4	49 – 56	10	33,33 %
5	57 – 62	2	6,66 %

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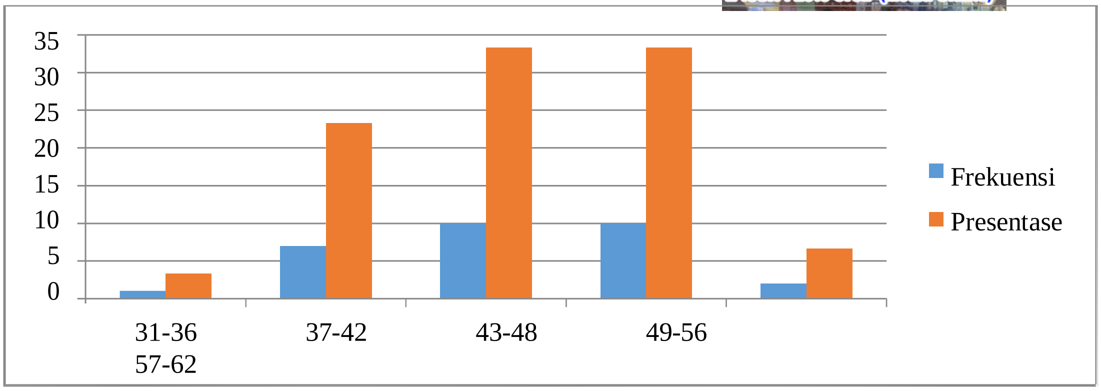

Figure 3: Histogram Diagram of Pretest Frequency Distribution Ability to Understand Control Class Concepts.

While the results of the calculation of posttest data on the highest frequency control class at the posttest were 14 students or 46.66%, the lowest frequency was 2 students or 6.66%. The following is presented in the form of a histogram diagram as shown below.

Table 7: Posttest Frequency Distribution of Conceptual Understanding Ability

No	Interval	Concept Understanding Ability	
		Frequency (*Posttest*)	% (*Posttest*)
1	42 – 50	5	16,66 %
2	51 – 58	5	16,66 %
3	59 – 66	14	46,66 %
4	67 – 74	4	13,33 %
5	75 – 82	2	6,66 %
TOTAL		30	100 %

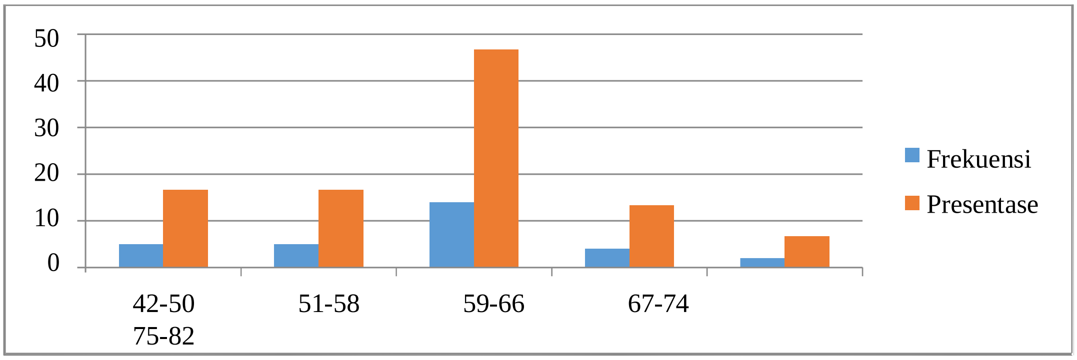

Figure 4: Histogram Diagram of Posttest Frequency Distribution Ability to Understand Control Class Concepts

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Data analysis

Table 8: Normality Test (*Test of Normally*)

One-Sample Kolmogorov-Smirnov Test

		Pretest Experiment Concept Understanding Ability	postest experiment Concept Understanding Ability	pretest control of Concept Understanding Ability	postest control Concept Understanding Ability
N		30	30	30	30
Normal Parameters[a,b]	Mean	50,37	82,80	46,80	60,93
	Std. Deviation	7,156	5,857	6,795	8,582
Most Extreme Differences	Absolute	,144	,119	,127	,128
	Positive	,114	,119	,127	,122
	Negative	-,144	-,115	-,086	-,128
Test Statistic		,144	,119	,127	,128
Asymp. Sig. (2-tailed)		0,117[c]	0,200[c,d]	0,200[c,d]	0,200[c,d]

a. Test distribution is Normal.

For the pretest of the ability to understand the concept students have data that is normally distributed, this is indicated by the sig value for the experimental class is 0.117> 0.05 and for the control class is 0.200> 0.05. For posttest mathematical comprehension abilities students have data that are normally distributed, this is indicated by the sig value for the experimental class is 0.200> 0.05 and for the control class is 0.197> 0.200. The next step is to test the homogeneity of the data.

Homogeneity Test

Table 9: Posttest Variance Value (Test of Homogeneity of Variances)

Posttest Concept Understanding Ability

Levene Statistic	df1	df2	Sig.
0,620	1	58	0,863

The sig value (0.863)> than 0.05 Accept H0 and reject H1, the data on the ability to understand the concept of the experimental class and the control class is homogeneous.

Hypothesis testing

Hypothesis testing using Ancova with the help of SPSS 23 software is:

Table 10: Descriptions of Concept Understanding Ability Statistics.

Dependent Variable: Concept Understanding Ability

Class	Mean	Std. Deviation	N
Eksperimen	82,8000	5,85691	30
Control	60,9333	8,58199	30
Total	71,8667	13,21461	60

Equality Test of Covariance Matrix

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Table 11: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
0,062	1	58	0,803

From the Descriptive Statistics table above, it can be seen in the experimental and control classes that the mean score of the test comprehension ability of the experimental class is 82.8000 and the control class is 60.9333. Shows that the average score of the experimental class is higher than the control class. Box's M value shows the homogeneity of the Comprehension Ability score of the experimental and control class concepts. Based on the Box's Test of equality of Covariance Matrices table, the sig value is 0.803 (p> 0.05) which shows homogeneous data.

The results was supported to previous research: There were three main findings of this study. First, mathematical understanding of students taught using realistic mathematics learning was higher than those who taught using the conventional method (the learning materials in both groups was non-ethnomathematics oriented). Second, mathematical understanding of students learned the ethnomathematics oriented materials was higher than those learned non-ethnomathematics oriented materials (realistic mathematics learning applied in both groups). Third, mathematical understanding of students who learned the ethnomathematics oriented materials was lower compared to the students learned the non-ethnomathematics materials (the conventional learning method applied in both groups). (W. Widada, Herawaty, & Lubis, 2018). Mathematical problem solving abilities of students after being given ethnomathematics with outdoor learning models were higher than before being given the learning models (W. Widada et al., 2019).

Inter-Subject Effect Testing

Table 12: Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9066,756[a]	2	4533,378	209,034	,000	,880
Intercept	1171,227	1	1171,227	54,005	,000	,487
Pretest	1894,489	1	1894,489	87,355	,000	0,605
Class	5088,127	1	5088,127	234,613	,000	0,805
Error	1236,177	57	21,687			
Total	320192,000	60				
Corrected Total	10302,933	59				

a. R Squared = ,880 (Adjusted R Squared = ,876)

The sig value is <0.05 (0.00) with the assumption of H0 and accepts H1, which is the influence of the use of the Contextual Teaching and Learning (CTL) learning model on the conceptual comprehension ability of class VII students of State Middle School 16, City of Bengkulu. with a large influence of 80.5%.

4. CONCLUSION

Based on the results of research on the use of contextual learning models it was found that the results had an effect on the ability to understand the concept of students of SMP Negeri 16 Kota Bengkulu on quadrilateral material. This is evidenced from the results of data analysis sig value <0.05 (0.00) assuming rejecting H0 and accepting H1, which is the influence of the use of contextual learning on the ability to understand the concept of seventh grade students of SMP Negeri 16 Kota Bengkulu with an influence of 80.5% . And the results of the final test data analysis showed that the learning outcomes of class VII students of 16 Bengkulu City Junior High School in the experimental class with an average of 82.75 while for the control class was 60.79, this showed that in the experimental class students had better understood the material already presented on quadrilateral using a contextual model.

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Based on the findings of this study, the advice that can be given is that the teacher can use or use the Contextual Teaching and Learning (CTL) learning model. With the contextual learning model can embed the concept of learning in students that helps teachers associate the material taught with real-world situations of students and encourage students to make connections between the knowledge they have and their application in their daily lives. CTL learning is very suitable to improve the ability to understand concepts so that the CTL learning model is better than conventional learning in improving students' conceptual comprehension abilities.

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