The effect of contextual teaching and learning approach and motivation of learning on the ability of understanding the mathematics concepts of grade V student

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Abstract. The purpose of this study was to obtain information about the effect of the *CTL* approach and learning motivation on the ability to understand mathematical concepts in class V students. This research is a quasy type experimental research. The population is all students in class V SDN Gugus I Kecamatan Tanjung Harapan Solok City and the sample is 57 students in grade V SDN 01 Tanjung Paku. This sampling technique uses randomized sampling. Research data is obtained from the ability to understand mathematical concepts and questionnaires. The results of the study showed that: (1) The ability to understand mathematical concepts of students participating in learning with the *Contextual Teaching and Learning* approach was better than using conventional learning; (2) the ability to understand the mathematical concepts of students who have high learning motivation who follow learning with the *Contextual Teaching and Learning* approach is better than using conventional learning; (3) The ability to understand mathematical concepts of students who have low learning motivation who follow learning with the *Contextual Teaching and Learning* approach is better than using conventional learning; (4) There is no significant interaction between the *Contextual Teaching and Learning* approach *and* students 'learning motivation on the ability to understand students' mathematical concepts.

1. Introduction

Given the importance of understanding students' mathematical concepts in learning, it is necessary to have good learning motivation so that students are diligent in facing the task, resilient in the face of difficulties, happy in finding and solving mathematical problems and can achieve the desired learning goals.

While extrinsic motivation is a factor that comes from outside the individual but influences the willingness to learn. Based on this, it can be said that motivation and the ability to understand mathematical concepts is one of the important abilities in mathematics learning [1]

From the statement above, the lack of understanding of mathematical concepts has an impact on students' low motivation to learn mathematics. Which is an indicator of learning motivation are: 1) The existence of encouragement and learning needs; 2) Demonstrate attention and interest in the assignment given; 3) Persevering with the task; 4) Ductile faces difficulties; 5) Successful desires and desires [2].

From these indicators it has not been seen from within the students so that there are still many students who have not issued ideas or ideas because they are still doubtful of their own abilities in the lack of understanding of the concept of matter, and students still experience difficulties in working on questions from the material, so students feel mathematics as a difficult, unpleasant subject, even a frightening specter, and low student learning outcomes are influenced by the lack of learning motivation of students. This can be seen by the presence of some students who are sleepy, daydreaming, looking out of class, lazy to do assignments, and not happy to solve math learning problems. Other factors that influence mathematics learning outcomes are caused by the teacher when learning takes place still using conventional learning models. So, the need to use various models, approaches, and methods in the teaching and learning process that suits the needs of students in the classroom, so that the learning process is not monotonous and boring. In learning, especially mathematics learning the role of the teacher is very large and really challenged to choose a learning approach that can support the achievement of mathematics learning goals. And, the learning process can be said to be quality and effective if the learning process can encourage students to be more active and motivated in learning so as to solve various problems. Therefore, the teacher must strive to present learning that allows students to solve problems in their daily lives, especially those related to mathematics learning. Motivation to learn has an important role in improving learning outcomes for each student, because if the motivation is low then there is no interest in the subject in this subject of mathematics. Learning motivation can be grown from within the students themselves or through encouragement by the teacher. One of the efforts that can be done by the teacher to improve student learning motivation is by choosing the right learning model or approach. The choice of learning model or approach must be adjusted to the material that will be delivered, if the model or approach that is applied is not in accordance with the level of difficulty of the teaching material, it will cause dissonance in the learning process.

One approach to learning that can be done to improve student motivation and ability to understand students' concepts is to use the *Contextual Teaching and Learning (CTL)* approach . Based on several studies found that: 1) the *CTL* approach is appropriate to be used as a learning guide and can develop character and improve learning outcomes (Setyorini; 2014); 2) the use of integer addition and subtraction learning modules with the *CTL* approach can improve concept understanding of fourth grade students [3];

So from the results of the research described above, it can be concluded that the learning process using the *CTL* approach can improve student learning outcomes, this indicates that the *CTL* approach can increase student motivation so that the understanding of students' mathematical concepts also increases.

This is because the *Contextual Teaching and Learning* approach is a conception that helps teachers associate subject content with real-world situations, and motivates students to make connections between knowledge and its application in life [4]

The above definition illustrates that the *CTL* approach is the concept of learning in where the teacher brings the real world into the classroom and encourages students to make connections between the knowledge they have with their application in their daily lives. In the *CTL* approach the task of the teacher is to provide ease of learning to students by providing various means and adequate learning resources. Teachers not only convey learning material in the form of memorization but set the environment and learning strategies. A conducive learning environment is very important and supports the *CTL* approach .

Of the seven components of *CTL* approach *learning* also has several advantages to the ability to understand students 'mathematical concepts and students' learning motivation that is more meaningful learning, meaning students do their own activities related to the material so that students can understand it themselves. Learning is more productive and able to foster understanding of concepts to students because the *CTL* approach requires students to find themselves instead of memorizing subject matter. Increase student motivation to express opinions about the material being studied. Growing curiosity about the material learned by asking the teacher. Develop the ability to work with other

friends to solve existing problems. Students can make their own conclusions from learning activities. [5].

The above explanation shows that the *CTL* approach can provide opportunities for students to actively learn in understanding and deepening the learning material as a whole. So the researcher will carry out this research with the title: "The Effect of *Contextual Teaching and Learning* Approaches *and Learning* Motivation on the Understanding Ability of Class V Students' Mathematical Concepts at SDN 01 Tanjung Paku, Tanjung Harapan Subdistrict, Solok City".

This research can be a consideration of the use of approaches *CTL* for other material or subjects and it is necessary to review the initial knowledge of students so that they are not considered the same for all conditions. This research is also expected to be used as a variety of learning strategies for teachers to empower the students' ability in understanding concepts in learning.

2. Experimental

The research used in this study is quasi-experiment which aims to investigate the influence of the approach *CTL*. This research was carried out at SDN 01 Tanjung Paku, Solok City in the even semester of 2017/2018 school year which took place on April 2 to 30, 2018 . The population of this study were all students in the school of SDN 01 Tanjung Paku while the sample of this study was the fifth grade students taking two classes as many as 57 people consisting of 29 students in the VA class as the experimental class and 28 students in the VB class as the class control. Sampling by total sampling because it has a homogeneous member or element. The independent variable in this study is *contextual teaching and learning* and conventional learning , and the bound variable is the ability to understand mathematical concepts , while the moderator variable is learning motivation . The research design used in this research is design *Post-Test Only factorial control group 2 x 2* . The instrument used to obtain data in this study is a test of the ability to understand mathematical concepts and learning motivation of students in learning mathematics . The instrument was assessed by a competent validator which included lecturers and teachers at the school and was tested against respondents outside the sample class.

3. Results and Discussion

This study focused on obtaining the average score of the ability to understand students' mathematical concepts . The following is presented the results of the formalities and homogeneity testing data after the research :

Table 1. Tests for Homogeneity Test for Experimental and Control Classes

Class	N	S^2	Count	Ft(α=0,05)	Information
Experiment	29	80,073	2,46	2,54	Homogeneous
Control	28	197,315			

Table 2. Testing for Experiment and Control Class Normality Tests

Class	N	α	L_0	L_t	Information
Exsperiment	29	0,05	0,137	0,1634	Normal
Control	28	0,05	0,146	0,1658	Normal

From tables 1 and 2, both data are homogeneous and normal, said to be homogeneous because $F_{count} < F_{table}$ (2.46 < 2,54 and data dikata ka n normal in the experimental class for $_{observation}$ $L < L_{table}$ (0, 137 < 0.1634) while in the control class there is data $L_{observation} < L_{table}$ (0.146 < 0.1658). As for the acyl h dinalisis posttest learners based on their respective capabilities, an outline of a picture obtained as in the following table:

Table 3. Data on Average Score of Ability to Understand Students' Mathematical Concepts in Experimental and Control Classes

Results	Class	N	Motivation to Learn	$\bar{x}$	X min	X mak	S
Postest	Exsperiment	7	Low	74,917	60,3	85,3	8,93
		22	High	79,035	65,7	95,1	8,93
		29	Total	78,04	60,3	95,1	8,95
	Control	10	Low	67,235	40,7	87,9	16,89
		18	High	71,535	45,7	85,7	12,47
		28	Total	69,9	40,7	87,9	14,05

From Table 3 shows the average results of the ability to understand mathematical concepts in the experimental class students is higher (78.04) than the control class (69.9) after being given treatment. This happens because students in the experimental class are able to associate the old knowledge with the newly acquired after being given treatment. Whereas in the control class students are still less able to associate the old knowledge with the new ones obtained after being given treatment. Calculation of variance and standard deviation aims to determine the diversity of a data group. Per standard deviation count from the above bell also reveals that the variance or diversity of the experimental group is different from the control class at the posttest. In experiments a little variant and control class have more variants.

4. Hypothesis testing

4.1. The first hypothesis

Testing the first hypothesis is done by using the t test because the data is normally distributed and has a homogeneous variance. The combined variance of the two samples is 11.73 for the real level α = 0.05 and 55, so that the $_{calculated}$ t is 2.53. Being right t_{table} obtained was 1,673. Because t_{count} greater than t_{table} , then Ho is rejected and $H_{1\ is}$ accepted. So it can be concluded that the ability to understand mathematical concepts of students who use the *CTL* approach is higher than students who use conventional learning.

4.2. The second hypothesis

The second hypothesis testing is done using t test because the data is normally distributed and has a homogeneous variance. the combined variance of the two samples is 10.66 for the real level α = 0.05 and 38, so the resulting t_{count} is 2.199. While the t_{table} obtained is 1.69. Because t_{count} greater than t_{table} then Ho is rejected and $H_{1\ is}$ accepted. So it can be concluded that the ability to understand mathematical concepts of students who have high learning motivation using the *CTL* approach is higher than students who have high learning motivation who use conventional learning.

4.3. The third hypothesis

The third hypothesis testing is done using t test because the data is normally distributed and has a homogeneous variance. the combined variance of the two samples is 14.25 for the real level α = 0.05 and 15, so that the $_{calculated}$ t is 1.80. While the t_{table} obtained is 1.75. Because t_{count} greater than t_{table} , then Ho is rejected and $H_{1\ is}$ accepted. So it can be concluded that the ability to understand mathematical concepts of students who have low learning motivation using the *CTL* approach is higher than students who have low learning motivation who use conventional learning.

4.4. The fourth hypothesis

To find out how the interaction of students between experimental classes and the control class. Based on the summary of the results of the two path ANAVA calculations above can be stated that: 1) The alternative hypothesis (Ha) states that there are differences in the effect of the learning approach

between groups with CTL approaches and conventionally accepted, because the calculation results show that Fcount = 6.63> Ftable = 2.78. Complete calculation results can be seen in Appendix 11. 2) Alternative hypothesis (Hb) which states that there are differences in the influence of high and low motivation in the results of the ability to understand students' mathematical concepts, because the calculation results show that Fcount = 2.88> Ftable = 2.78 . The results of the complete calculation can be seen in Appendix 11. The research hypothesis proves that there is no influence of interaction between learning approaches and learning motivation on the results of students' ability to understand mathematical concepts in mathematics learning.

Based on the fourth hypothesis test results obtained there is no interaction between approaches *CTL* with *learning* motivation towards the ability to understand mathematical concepts . The absence of these interactions can be seen from the average test results of the ability to understand mathematical concepts through approaches *CTL* and conventional learning. If approach *CTL* and conventional learning are applied, then the average test results of the ability to understand the mathematical concepts of students taught by approach *CTL* have better learning motivation compared to students taught with conventional learning. When treated with an approach *CTL ,* the average obtained tends to be higher than conventional learning. This can be seen in Figure 1 below:

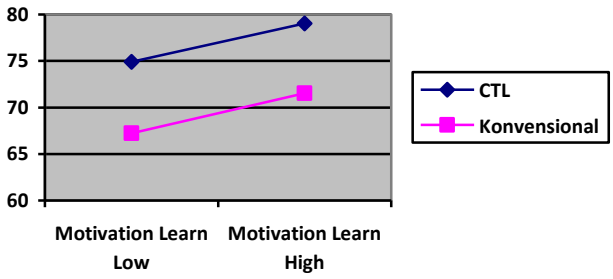

Figure 1. Interaction Graph between Contextual Teaching and Learning Approach and Motivation of Learning on the Ability of Understanding the Mathematics Concepts

Based on Figure 3 , it can be seen that point A is the students with low learning motivation found in the experimental class with an average of 7 4.92 , while point B is the students with high learning motivation who are in the experimental class with an average of 79.04 , Point C is students with low learning motivation in the control class with an average of 67.24 , while point D is students with high learning motivation in the control class with an average of 7 1.54 . So the AB line with the CD line does not intersect. Explains that the presence or absence of interaction can be predicted from the graph of the independent variable profile. If the profiles of the first and second independent variables do not intersect, there is likely to be no interaction between the two variables. Because lines are parallel AB and CD, factors have no interaction.

Social interaction that occurs in groups can improve concept comprehension skills because children who feel less intelligent will be helped and children who feel smart will try to explain to their less intelligent friends so that their understanding becomes more profound. One of the factors that most influence the ability to understand students' concepts is the *CTL* learning approach . approach *CTL is* carried out on 7 components . In the first component is constructivism, in which the teacher develops thinking students will learn more by working on their own, finding themselves, and constructing their own new knowledge and skills . Both found, where the learning process was built in the search process, the process of moving from observation became understanding for students . All three ask, which teacher develops students' curiosity through interactive dialogue through question and answer by all elements involved in the learning community. Fourth learning society, where k raft learning community is learning the findings resulting from the collaboration with others. Teachers in Contextual Learning (*CTL*) always carry out learning in groups whose members are heterogeneous students who are good at teaching the weak, who already know to tell the unknown, and so on. Fifth

modeling, in which d nature of vocational learning and specific knowledge, necessary to have a model that can be replicated by students. The model in this case can be various ways, how to throw or kick a ball in sports, how to recite in a foreign language, or the teacher gives an example of how to do something. Sixth reflection, which is an effort to see, organize, analyze, clarify, and things that have been learned. Practice in the classroom at the end of each lesson, namely the way the teacher leaves time to provide opportunities for students to reflect: students 'direct statements about what happens after learning, notes or journals in the student book, students' impressions and suggestions on day learning that, discussion, and work. The seven authentic assessments, namely the achievement of students is not enough just with the test, the learning outcomes are measured by authentic assessments that can provide true and accurate information about what students really know and can do or about the quality of educational programs. At the end of the lesson the teacher will give reinforcement so that the child does not misunderstand. This matter is inversely proportional to conventional learning where the teacher gives the material directly from the beginning of learning until the end of the lesson. Based on the above description of these two lessons there are differences in the process of knowledge formation by the teacher. This difference is considered to support the results of research that shows that the approach *CTL* effective for the ability to understand students' concepts rather than conventional learning. [6] The Impact of Motivation on Student's Academic Achievement and Learning Outcomes in Mathematics among Secondary School Students in Nigeria.

"Both classes are given a test in the form of a test of the ability to understand mathematical concepts" [7]. In this activity, students get the opportunity to empower their understanding of the concept . According to [8], "the intended understanding is students' understanding of the qualitative basis everywhere the facts are interrelated with their ability to use that knowledge in new situations" . Understanding is a process of thinking, and learning, said to be because the direction of understanding needs to be followed by learning and thinking. Understanding is a process, action, and way of understanding. Understanding according to [9] is encompassing the ability to capture meaningful meanings of material learned. Furthermore, Bloom's taxonomy states that understanding is the lowest level in the cognitive aspects related to mastery or understanding of something. [10].

5. Summary

The *CTL* approach can influence the ability to understand students' mathematical concepts. First, understanding the mathematical concepts of students who follow learning with the *Contextual Teaching and Learning* approach is better than using conventional learning. Second, understanding the mathematical concept of students who have learning motivation who follow learning with the *Contextual Teaching and Learning* approach is better than the learning motivation of students who use conventional learning. Third, there is no significant interaction between the *Contextual Teaching and Learning* approach *and* students 'learning motivation on the ability to understand students' mathematical concepts.

6. Suggestion

For guru expected to approach *Contextual Teaching and Learning* in the learning process. Because it is proven to improve the ability to understand the mathematical concepts of students in problem solving.

This research only examines initial knowledge and critical thinking skills. For that reason, it is suggested to further researchers to examine other aspects, such as creativity, intelligence and others.

For other researchers who are interested in conducting research on the influence of the *Contextual Teaching and Learning* approach*, in* order to be able to examine the influence of the learning approach on the ability to understand concepts and other subjects.

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