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Influence of Problem Posing Learning Model with Support Software Camtasia on The Ability of Understanding Student's Mathematical

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ABSTRACT

This study aims to find out how students 'activities in using the problem posing learning model with the help of Camtasia software affect to the ability of Mathematical Understanding, find out how the influence of the problem posing learning model with the help of Camtasia software on the Students' Mathematical Understanding Ability, to determine student responses in learning using problem posing learning models with the help of Camtasia software. The research is experimental method with the population all students of grade X in 7th State Senior High School Cirebon City. The respondent selected used purposive sampling technique. By comparing pretest (before being given treatment) with posttest (already given treatment). Data collection techniques using tests, observations and questionnaires. Data analysis used observation analysis, normality test, regression test and t test. The results of this study indicate that the learning outcomes of students whose learning using Camtasia-based video media is better than students with conventional learning models.

INTRODUCTION

The development of mathematics education has some basic competencies that students must possess to improve their mastery of the material being taught. According to The National Council of Teachers of Mathematics (NCTM) 2000 (Cahyani & Setyawati, 2017) there are five standard competencies central to learning is problem solving skills, communication skills, the ability of the connection, reasoning, and the ability of representation. Mathematical understanding is the basic for learning in mathematics (Masnia & Amir, 2019; Pamungkas et al., 2018). Mathematical proof is very closely related to mathematical understanding so that students who have difficulty in mathematical proof are mostly caused by their lack of understanding of mathematical concepts and definitions, write mathematical notation or use mathematical language correctly (Sahara et al., 2017). Before students have five basic competencies as mentioned, basically students must have understanding abilities. The ability of mathematical understanding is the key to solving mathematical problems as well as problems in real life (Setiyani, 2019). In line with the opinion of (Afriyani et al., 2018) the effectiveness of learning needs to be measured from the quality of understanding mathematical concepts. The basic mathematical understanding ability is when someone is able to parse or explain a number (Colegrove & Krause, 2016).

Mathematical understanding is about a concept, how students understand a concept, what they do not understand about a concept, or how they can develop a concept (Gülkılık et al., 2015). If a person understands mathematics, he can recognize the relationship between new concepts and previous concepts (Minarni et al., 2016). From the description above it can be concluded that the ability of mathematical understanding

is the ability of a person to find mathematical concepts from mathematical objects, then can be understood and can explain them again to solve problems in everyday life.

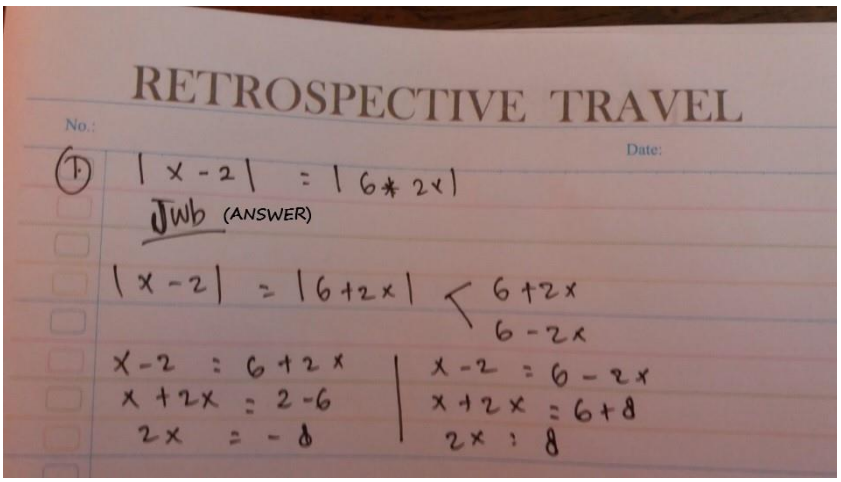

Figure 1. Example student answers of determine completion of $|x-2| = |6+2x|$.

Based on observations at one of the senior high school in Cirebon, the absolute value material, whereout of the 35 students only a few students can work on material about absolute value correctly. This means that only a few students can solve problems regarding mathematical understanding. It is seen that students are less able to understand the concept of absolute value. From the Figure 1, it proves that the students' mathematical understanding ability is still lacking, the need for a learning model that can grow and develop students' mathematical understanding abilities, namely the Problem Posing learning model. One innovative learning model that can be applied in mathematics learning to develop students' mathematical understanding abilities is to use the Problem Posing learning model.

According to Suarsana et al. (2019) in the learning model problem posing the teacher only gives the situation and not the teacher who gives but the students who raise their own problems based on the situation given by the teacher. According to Ticha and Hospesova (Kilic, 2013) defines problem posing as finding new problems or rearranging the given problem. Problem posing is a problem solving activity that can be defined as the creation of new problems from certain events and situations (Arikan & Ünal, 2015). The problem posing is a way to develop students' creative thinking abilities and encourage them to take responsibility for their own learning (Solórzano, 2015). The problem that needs to be raised is also a problem that is waiting to be resolved and they emphasize that problem posing is a special way to solve the problem (Ozdemir & Sahal, 2018; Pratiwi et al., 2022). It can be concluded that problem posing learning is learning that is designed to lure students into making or submitting questions from sources that have been obtained.

The absence of media in classroom learning or the selection of inappropriate media makes it difficult for students to build mathematical understanding skills. According to Herawaty et al. (2019), the use of learning media helps students in learning abstract mathematics. The need for the use of technology is increasing in the 21st century (La Aca et al., 2020; Liu et al., 2021; Wijaya, 2020), especially during a pandemic situation. Technology is an effective tool and efficient which can be used for the development of learning media (Wijaya et al., 2020). One of the right technology can help overcome problems in learning mathematics, namely with camtasia media. The media that will be

used in learning with the problem posing model is camtasia. Utilization of technology using must be designed by the teacher (Wijaya, et al., 2021) so it is in making videos using Camtasia. However, teachers sometimes have many reasons not to use technology when teaching (Harisman et al., 2019; Tondeur et al., 2020)with the reasons they do not have enough time, are comfortable with the habit of using the blackboard when teaching and have the assumption that using technology is a waste of time.

Camtasia videos have been shown in the literature to help students with learning disabilities with their writing skills, study habits, and test performance (Miller, 2014). Every visual step made, captured using the Camtasia Studio computer software program (Beach & Willows, 2014). Screenshots made with the software application camtasia (TechSmith, Inc.), which is installed on a desktop computer (Stinson & Stevenson, 2013). According to Setiyani et al. (2019), by using Learning CD, the content of subject matter can be modified using various applications such as Camtasia Studio and Microsoft Powerpoint which can be combined into a more interesting integrated learning media. From the above statement it can be concluded that camtasia is software that can record something that takes place on activities on a computer, capturing video from a computer screen, and can record our music or sound (Setiawan et al., 2021) so that learning becomes more effective

RESEARCH METHOD

The research method used in this study is an experimental method because it is in accorandce with the research objectives, namely looking at the relationship between research variables. The design used in this study uses the *Nonequivalentt Control Group Design,* according to Sugiyono (2016) in Figure 2.

E	:	O_1	X_E	O_2
K	:	O_3	X_K	O_4

Figure 2. Nonequivvalent control group design.

Information:
E : Experimental group
K : Control group
O_1 : Pretest (initial test before treatment)
O_2 : Posttest (Final test after treatment)
X_E : Treatment of the experimental class (learning with the Problem Posing model)

In this study the sampling technique uses purposive sampling where the technique used has certain considerations in the sampling (Sukestiyarno, 2020). Consideration in sampling is in the selection of samples assisted by mathematics subject teachers. Which of the two classes is chosen which class uses the problem posing model (experimental class) and which class uses scientific learning (control class). Data collection techniques that will be carried out in this study are as Table 1.

Table 1. Data collection techniques.

No.	Data collection technique	Instrument
1	Pretest and posttest tests	Tests for comprehension skills
2	Observation	Student Activity Observation Sheet
3	Questionnaire	Student Response Questionnaire Sheet

Before being implemented in learning, test questions are tested first so they can find out the quality of the data collection tools or instruments used. The validation of the mathematical communication description test instrument consists of validity and reliability. The questionnaire indicators in this study were students' attitudes towards learning mathematics; students' attitudes towards learning using the problem posing model ; and student attitudes towards camtasia videos. To find out the success or failure of the action taken, an observation analysis was carried out in the form of student activity sheets. Data analyzed to determine student activity. Percentage calculation:

$$\text{Value Conversion} = \frac{\sum \text{student total score}}{\sum \text{maximum score}} \times 100\%$$

The classification to determine the percentage and interpretation of student activities can be seen in Table 2.

Table 2. Classification of percentage of student activities.

Percentage (%)	Interpretation
$90 < x \leq 100$	Very good
$70 < x \leq 90$	Well
$50 < x \leq 70$	Enough
$30 < x \leq 50$	Less
$0 < x \leq 30$	Very less

According to analysis prerequisite testing is done when using parametric analysis then testing of analysis requirements must be carried out on assumptions such as homogeneity for the difference test, normality and linearity for the correlation and regression test (Sukestiyarno, 2020). The relationship between the percentage interpretation of questionnaire responses are presented in Table 3.

Table 3. Interpretation criteria questionnaire responses.

No	Percentage	Criteria
1	$81\% \leq P \leq 100\%$	Very good
2	$61\% \leq P < 81\%$	Well
3	$41\% \leq P < 61\%$	Enough
4	$21\% \leq P < 41\%$	Not good
5	$0\% \leq P < 21\%$	Ugly

RESULTS AND DISCUSSION

Description of Data Observation Results Student Activities

This student observation sheet covers student activities during the learning process with the learning model using the problem posing model. The results of observations of student activities during learning during the four meetings are in the Figure 3.

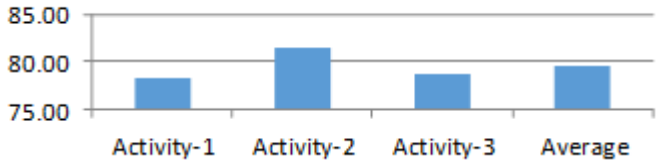

Figure 3. Data description observations student activities.

Based on Figure 3, it can be seen that the activities of students during learning using the problem posing model at each meeting there is an increase in student activity. At the first meeting the percentage of student activities showed a value of 78.34, the second meeting showed a value of 81.40, and at the third meeting showed a value of 78.80. While the average of meeting is 79.52 are categorized either. From the average of the three meetings the student activities were categorized as good (see Table 2), and at each meeting there were changes. This proved that the problem posing learning model with the help of camtasia software was able to increase student activity so that it would be better in learning. In accorandce with research Saumi & Sukmawati (2020), the achievement and improvement of students' mathematical problem-solving abilities in the experimental class with Camtasia software was better than the control class. Learning media including Camtasia provide motivation, attract students' interest and enthusiasm in learning mathematics (Latif et al., 2013; Setiyani et al., 2019). Camtasia application allows teachers to create unique and interesting presentation videos in order to achieve learning goals (Suniah et al., 2020).

Description of Data Test Students' Mathematical Understanding Ability

The average results of tests of mathematical comprehension ability of experimental class and control class students in the form of graphs can be seen in Figure 3.

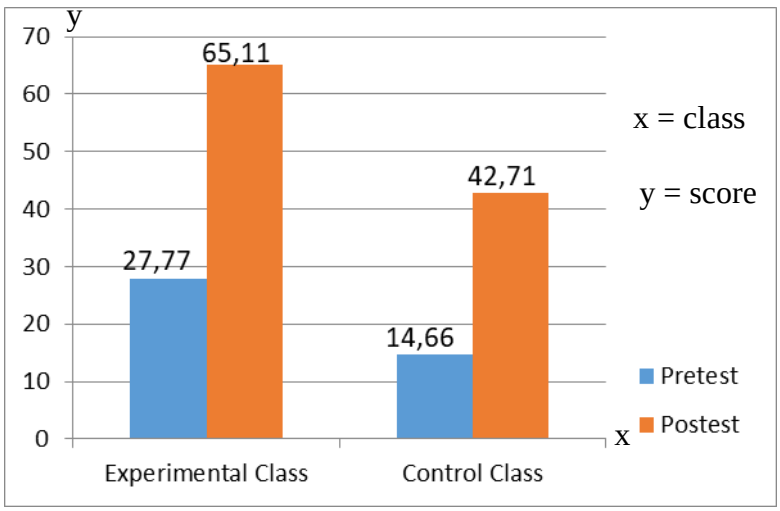

Figure 4. Average mathematical understanding ability test results.

Based on data from the calculation results can be seen the highest value, lowest value, average value, deviation standard and variance can be seen on Table 4.

Table 4. Statistical data results of mathematical understanding ability tests.

Statistics	Experimentation Class		Control class	
	Preliminary test	Final Test	Preliminary Test	Final Test
Total students	35.00	35.00	35.00	35.00
The biggest	49.00	95.00	34.00	70.00
The smallest	0.00	36.00	0.00	0.00
Average	27.77	65.11	14.66	42.71
Standard Intersection	12.14	12.69	9.60	16.23

Table 4 can be seen there are 35 students in the control class and experimental class, where control class scores highest pretest posttest score highest 34.00 and 70.00. In the experimental class the highest pretest score was 49.00 and the highest posttest score was 95.00. From the previous brief explanation it can be seen that the experimental class experienced a considerable increase compared to the control class, where the average value of the experimental pretest from 27.77 when the posttest was 65.11 and the standard deviation of the pretest 12.14 when the test becomes 12.69. Learning using the problem posing model with the help of camtasia software affects the students' mathematical understanding abilities. The results of this study are in line with Arianti et al. (2019), which states that the problem posing learning model is assisted by semi-concrete media affect the competence of mathematics knowledge of fifth grade elementary school students. Through the problem posing model, students are accustomed to asking problems for teachers, other students and even themselves (Silver, 2013). Problem posing models are seen as student activities that not only improve mathematical understanding skills but also nurture the development of more advanced problem-solving strategies (Cai et al., 2013). Camtasia can involve students in asking questions, so they are not dependent on the teacher.

Analysis of the Effect of Problem Posing Learning Models with the help of Camtasia Software on Students' Mathematical Understanding Capabilities

Table 5. Simple linear regression test.

Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	75.758	10.774		7.031	.000
Student Activity	- 132	.131	-.173	-1.008	.321

a. Dependent Variable : Problem Posing

Table 5 shows the using student activity data and problem posing obtained positive regression coefficients from the effect of learning with the problem posing model as follows:

1. Constant of 75.758 can be interpreted if the activity value is constant or 0, then the decision model of problem posing experiencing enhancement late at 75.758.
2. Coefficient regression activity amounted to – 0.132, stating that the student activity by one unit will shortly galmi lowering late models problem posing at 0.132.

From the description above proves that the influence of learning using the problem posing model with mathematical understanding ability. Also obtained a significance of

0.321>0 can conclude there is the influence of students 'activity in learning math using models problem posing on the ability of students' mathematical understanding. This is in line with the study of Yahya & Sanapiah (2018), the effect of problem posing learning models on the ability to understand mathematical concepts of grade VII Students. Based on the results of the study it was concluded that learning with the problem posing model significantly affected the experimental class of 85.90 and the control class of 75.20 on the understanding of concepts on indicators restating a concept, applying concepts or problem solving and indicators classifying objects according to certain properties according to their concepts.

Analysis of Differences in Students Mathematical Understanding Abilities Using The Problem Posing Model with a Scientific Approach

Table 6. Independent samples test.

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**
Ability of students' mathematical understanding	Equal variances assumed	0.701	0.405	6.432	68.000	.000
	Equal variances not assumed			6.432	64.264	.000

Table 6 shows t-test obtained by value $t_{arithmetic}$ amounted to 6.432 with a level of significance , because Sig. 0.000 <0.05 so H_0 is rejected and H_1 accepted. It means that there is a difference in the average preliminary test and final test. In line with Falach (2016), problem posing approach effective in terms of mathematical understanding and reasoning abilities. Problem Posing is a learning model that guides students to make their own questions that are simpler and lead to solving the problem.

Student's responses to mathematics learning with the Problem Posing model

The questionnaire in this study is the number of statements that must be filled out by students regarding student responses to learning with the Problem Posing model that has been carried out in the teaching and learning process in the experimental class. The questionnaire was given aiming that researchers could find out student's responses to mathematics learning with the Problem Posing model in Table 7.

Table 7. Summary of results response students.

Aspect	Number	Percentage	Average
Student attitudes towards learning mathematics	1	81.00%	70.25 %
	2	78.00%	
	3	60.00%	
	14	62.00%	
Student attitudes towards learning with the Problem Posing model	8	73.00%	69.087 %
	15	80.00%	
	5	59.00%	
	10	56.00%	
	4	81.00%	
	6	59.00%	

Aspect	Number	Percentage	Average
	11	85.00%	
	12	83.00%	
	7	58.00%	
	16	58.00%	
	13	79.00%	
	9	58.00%	
	17	78.00%	
The attitude of students towards the Camtasia learning video	19	76.00%	71.25 %
	18	65.00%	
	20	66.00%	

The number of items that must be filled out by students in this questionnaire are 20 statements consisting of 10 positive statements namely items 1, 2, 4, 8, 11 , 12, 13, 15, 17 and 19. Then 10 negative statements namely items 3, 5, 6, 7, 9, 10, 14, 16, 18 and 20. The percentage of respondent groups for positive statements is 72.71%, and is between 61%-80%, with good interpretation. The percentage of respondent groups for negative statements is 54.93%, and is between 41% - 60%, with adequate interpretation. Research Subekti et al. (2017), multimedia Learning Based on Camtasia Studio in Mathematics Subjects for prospective primary teacher education. The results of this study indicate that the learning outcomes of students whose learning using camtasia-based video media is better than students with conventional learning models. With an average value in the experimental class reaching 70. The results of this study are in line with the results of other studies that technology integration can increase students' learning motivation and students feel easier to understand learning materials (Lim et al., 2016; Wijaya et al., 2021). Camtasia's software-assisted learning process environment is one form of effort to increase the competency of students, namely the ability to understand in facing the needs of a dynamic industrial revolution 4.0 (Sukmawati et al., 2020).

CONCLUSION

The conclusion of this research showed that student activities during the three meetings were categorized as good. There was an effect of the problem posing learning model with the help of camtasia software on students' mathematical understanding abilities (3) student responses after using the problem posing model with the help of camtasia software on mathematical understanding abilities students belong to the good category. The use of learning media must use the right learning model, so that when learning takes place, the selected learning model can be supported by the prepared media. At the time of making the Camtasia learning video, the material to be included in the video content should be re-examined with the allocation of learning time, so that it does not take up a lot of time during learning hours. Pay attention to the clarity of the sound so that when it is broadcast, students can listen to it well. In learning in the classroom the teacher still plays a role and does not get hung up on the media, the teacher must also be able to make students active during learning. Do not let students become passive because they are too focused on the media. This research is only limited to looking at the effect of the Camtasia-assisted problem posing model on students' mathematical understanding abilities. For further research, we can see how the process of mathematical understanding uses Camtasia-assisted problem posing with qualitative research.

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