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# THE EFFECT OF VIDEO ANIMATION ASSISTANT PROBLEM BASED LEARNING (PBL) MODEL ON CRITICAL THINKING OF SUBSTANCE PRESSURE MATERIALS IN CLASS VIII JUNIOR HIGH SCHOOL

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**Abstract**

This study aims to determine whether students' critical thinking skills with the problem based learning (PBL) learning model assisted by animated videos on the substance pressure material can meet the high criteria and what aspects of critical thinking skills are developed through the problem based learning (PBL) learning model assisted by animated videos on the material pressure of the substance. This type of research was conducted using a quasi-experimental research method with a one group pretest-posttest design. The sample in this study consisted of one class totaling 32 students, namely class VIII-8 of 17 Medan State Junior High School which was selected by random sampling. The instrument used is a critical thinking ability test that has been validated in the form of multiple choice as many as 25 questions by fulfilling the content validity requirements, namely in the range of values from 0.357 to 0.757 and fulfilling the reliability requirements of 0.778. From the results of the study, the average pretest was 58.281 and the posttest was 87.813 which stated that the data was homogeneous. In the normality test, the Chi-Square value of the pretest was 23,426 and the posttest was 10,253 which stated that the data were normally distributed. Based on the results of the analysis of the hypothesis test (one sample t-test) obtained $t_{count} > t_{table}$ that is 10,734>1,695. In the normalized gain test, an n-gain value of 0.719 (71.9%) was obtained which stated that the critical thinking skills of students who were taught using a problem based learning (PBL) learning model assisted by animated videos on material pressure substances met the high criteria. The results showed that the students' critical thinking ability for aspects of giving simple explanations was 54.69%, aspects of building basic skills by 53.13%, concluding aspects of 54.69%, aspects of making further explanations of 62.24%, and aspects of making further explanations. Manage strategies and tactics by 71.09%. So it can be concluded that the aspects of critical thinking that are developed are aspects of managing strategies and tactics.

**Keywords:**learning model problem based learning, critical thinking skills, animated videos, substance pressure.

## Introduction

The current era of globalization requires learning to train students to be able to face challenges in today's global life. Permendikbud Number 20 of 2016 concerning the competence of elementary and secondary education graduates says that students are required to have the dimensions of reasoning, processing, and presenting skills creatively, independently, critically, collaboratively, and communicatively in the concrete and abstract realms in accordance with what has been learned in school. and other relevant sources.

Critical thinking is part of a higher-order skill. According to Ennis (1987), critical thinking is the ability to use design skills to get the final result as desired. Critical thinking is the process of processing knowledge through many perspectives to draw a conclusion. This perspective based on reasoning is important to find an argument (Sani, 2019).

PISA (The Program for International Student Assessment) is a basic literacy test program in the fields of reading, mathematics, and science where the target tested is 15 year old students at random. The results of the 2015 PISA results for Indonesian students in successively for reading, math, and science were ranked 61, 63, and 62 out of 69 countries. (Pratiwi, 2019). Indonesia's latest PISA results in 2018 scored 371, 379, and 389 with an average score of 487 for reading and math and 489 for science. The results of the 2015 TIMSS (Trend In International Mathematics And Science Study) Indonesia is ranked 44th out of 49 countries. These results show that Indonesia is at a low level, even under the State of Palestine (Hadi, 2019).

Based on the data on the initial high-order thinking test conducted at SMP Negeri 17 Medan, there were 7 questions which showed that 20% of the students' higher-order thinking results were good and 80% of the students had low-high-level thinking. The right way to solve the problem of low high-order thinking skills is to change old learning with new ones by choosing the right learning model. The learning model that is able to improve higher order thinking skills is the Problem Based Learning (PBL) learning model (Julaifah, 2019).

In addition to learning models, it is also necessary to be assisted by effective learning media to convey learning. In line with research resultsGoddess (2017)which says students are more active and motivated during the learning process, this is because they can see problems and learning materials directly through animated videos.

The stages of critical thinking and the indicators according to Ennis are: 1) providing a simple explanation; 2) making skills; 3) draw conclusions; 4) provide further explanation; 5) develop strategies and tactics (Sunardjo, 2016).

The purpose of this study was to prove that the improvement in students' critical thinking skills was higher than the KKM applied at SMP Negeri 17 Medan with the PBL learning model assisted by animated videos on the material pressure of substances and to find out what aspects of critical thinking were most developed.

## Research Method

The research was conducted at SMP Negeri 17 Medan in the even semester of February-March. This quasi-experimental research uses a one group pretest-posttest design (Ibrahim et al, 2018). The population used is all class VIII TA 2021/2022. The sample taken is class VIII-8 totaling 32 students who are taught with a problem based learning learning model assisted by animated videos. The measured variable is students' critical thinking ability.

Collected datain the form of a critical thinking ability test as many as 25 multiple choice questions with 4 answer choices. All of these questions cover all aspects of critical thinking skills, 20 valid and 5 invalid questions were obtained. Testing r obtained $r_{count}$ = 0.778 tested using the Kuder and Ricardson 20 (KR-20), where $r_{table}$ = 0.349.

Before testing the hypothesis with the one sample t-test, normality testing was first carried out as a prerequisite for the data using the Chi-Square Test and homogeneity

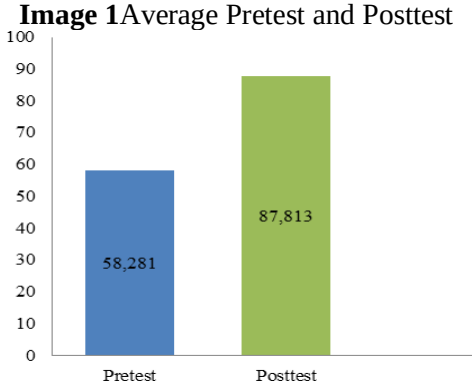
testing was carried out by calculating the standard deviation and sample variance.

## Results and Discussion

Test resultsstudyPBL model is used to assess students' critical thinking skills with the help of animated videos. The learning outcome test was analyzed by gain and then using the N-gain formula to determine the gain value.

The average value obtained through the pretest data is 58.281 and the posttest is 87.813 in the sample class can be seen in Figure 1.

**Image 1**Average Pretest and Posttest




Data analysis begins with a normality test using Chi-Square. Table 1 below is the results of the normality test of the pretest and valuesposttest.

**Table 1**Normality Test Results Pretest and valuesPosttest

| Data source | X2 | X2 table | Conclusion |
|---|---|---|---|
| *Pretest* | 23,426 | 46,194 | Distribute Normal |
| *Posttest* | 10.253 | 46,194 | |

Based on Table 1 above, it is known that the pretest $X^2_{count}$ data = 23,426 and the posttest $X^2_{count}$ = 10.253 which is smaller than the $X^2_{table}$ value = 46,194 where the Chi-Square$(X^2)_{count}$<Chi-Square$(X^2)_{table}$ means that students' critical thinking skills are normally distributed . Furthermore, the second prerequisite test was carried out, namely the homogeneity test. Homogeneity test was conducted to determine whether the data used was homogeneous. This test is done by calculating the standard deviation and sample variance. Table 2 below is the result of calculating the standard deviation and variance of the pretest and dataposttest.

**Table 2**Results of Calculation of Standard Deviation and Variance of Pretest and Posttest Data

| Data source | std | variance | Note. |
|---|---|---|---|
| *Pretest* | 7,992 | 63.89 | Homogeneous |
| *Posttest* | 7.064 | 49.90 | |

Based on Table 2, student reflection data is homogeneous, meaning that the data can be used to test hypotheses.

After knowing that the data is normally distributed and homogeneous, then the hypothesis is tested with one sample t-test. In this study, a hypothesis was proposed that the critical thinking ability of students who were taught using the Problem Based Learning (PBL) learning model assisted by animated videos on the substance pressure material would be greater than the Completeness Criteria Value.Minimum (KKM) which is 70. Determining whether the hypothesis is true is seen on the criteria $t_{count}>t_{table}$, then the hypothesis alternative (Ha) accepted andhypothesis zero (Ho) is rejected. If, $t_{count}>\mathbf{t}_{table}$, then H0 is accepted with degrees of freedom (dK) = n-1 and = 0.05. The results of the analysis of hypothesis testing can be seen in Table 3.

**Table 3**Hypothesis test analysis results

| | t count | t table | Note: |
|---|---|---|---|
| X = 71.9<br>S = 5.657 | 10,734 | 1,695 | Ho is rejected and Ha is accepted |
| 0 = 70<br>n = 32 | | | |

From the results of the above calculations, the values $t_{count}$ = 10,734 and $t_{table}$ = 1,695, which means $t_{count} > t_{table}$, then H0 is rejected and Ha is accepted so that it can be concluded that the students taught in

the PBL model of animated video on substance pressure material are higher than the Criteria Values. Minimum completeness (KKM) specified.

The n-gain test of research data aims to measure how much students understand after being givenlearning. Before studying with the existing learning models and media, students were given a pretest of 20 multiple choice questions to see the students' initial abilities.Then,at the endIn the meeting, students were given a posttest with identical questions in order to determine the level of student understanding. Through calculations, it was found that an increase in critical thinking skills (N-gain) was 0.719 (71.9%). A clearer explanation can be seen in Table 4.

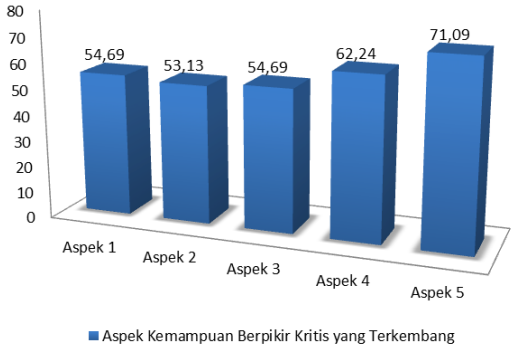
**Table 4**Improved N-gain

| Kel | *Pre* | *Post* | N | N-gain | Note: |
|---|---|---|---|---|---|
| Experiment | 58,281 | 87,813 | 32 | 0.719 | High |

From the data obtained the results of the average value of *pretest*ie 58.281, after being taught, the posttest results were 87.813 with an increase in student learning outcomes, namely 0.719 or 71.9%. Research conducted by Cerling,P et al (2020) said that problem based learning showed an increase in student learning outcomes as evidenced by the learning outcomes of students who completed the KKM as many as 29 students, while students who had not completed as many as 9 students. Research conducted Bunga et al (2016) said that the provision of learning models needs to be considered, because when learning activities need to be directed to achieve goals. High learning outcomes using the PBL model because before starting the learning process students are introduced to problems and students find concepts and facts relevant to the problems that will be obtained through learning so that students are able to remember the knowledge in the long term which will have an impact on their learning outcomes. According to research (Ridho. 2017) the provision of media is something that must be considered by educators so that students achieve the desired learning outcomes. The selection of the right media will encourage students to fulfill their learning objectives. Through student learning outcomes, the use of animation media is higher than the use of media in the form of images.

In order to know the aspects of critical thinking skills that were developed from the sample given the learning model*problem based learning*with the help of animated videos, the calculation of the gain value for each critical thinking aspect is carried out. The test results of the percentage gain of critical thinking power from each aspect are shown in Figure 2.

**Figure 2**Test Results Percentage Gain Critical Thinking Ability for each Aspect




Based on Figure 2, it can be seen that the aspect of students' critical thinking skills in the class given the modellearningproblem based learning, namely aspect 1 provides a simple explanation of 54.69%, aspect 2 makes basic skills by 53.13%, aspect 3 provides a conclusion of 54.69%, aspect 4 provides further explanation of 62.24%, and aspect 5arrange strategyand tactics of 71.09%. research conducted by Kurniahtunnisa (2016) the occurrence of in-class discussions to complete discussion sheets, aims to encourage students to use their knowledge and experiences during learning to solve problems.

## Conclusion

Based on analysisThe learning outcomes of students' critical thinking skills who are taught using the Problem Based Learning (PBL) learning model assisted by animated videos on the substance pressure material meet the criteria for a

predetermined value of >70, the value of $t_{count} > t_{table}$ is 10,734 > 1,695, and the n-gain obtained by high criteria of 0.719 or 71.9%. Meanwhile, the most developed aspect of critical thinking skills is the aspect of formulating strategies and tactics by 71.09%.

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