# Application of The Problem Based Learning Method Trought Authentic Assessment Approach to Improving the Habits of Mind

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## ABSTRACT

The purpose of this study is to improve the Habits of mind of students through the problem-based learning (PBL) model based on the otetic assessment of mathematics learning. The study was conducted on 39 students of class X. The research method used was an pre-experiment method. with One group pretest-posttest design. Data analysis carried out was Normality Test, Homogeneity Test, t Test, and N gain Test. The results of this study indicate that the application of authentic assessment-oriented PBL method can improve students' habit of mind in mathematics learning. This can be seen from the increasing results of assessment of creative thinking, and student self-regulated. the results of the creative thinking assessment are N-Gain values of 0.47 or included in the medium criteria and the results of the hypothesis test state that the significance is smaller than the reference sig it can be said that there are significant differences between the pretest and posttest values. The results of the assessment of self regulation, show the value of N gain 0.59 in the medium category so that it is said there is an increase between the value of the pretet results and the value of the posttest results.

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## 1. INTRODUCTION.

Education is a process that is carried out to develop a person in improving knowledge, physicality and morals so that they can be used for themselves to realize their dreams and can be beneficial for society, nation and state, while the component components that exist in education are educational goals, students education methods, educational content, educational environment and educational facilities. The level of education in Indonesia is still low due to a number of problems, one of the problems that arises is the lack of qualifications of students in the learning process which results in learning outcomes that are not optimal.

According to Burton (1952) "learning outcomes are patterns of deeds, values, notions, attitudes, appreciation, abilities, and skills". Learning outcomes encompass the cognitive, affective, and psychomotor fields that students get as the output of the interactions they receive with educators. Whereas according to Permendibud No. 21 states that in order to meet future needs and meet Indonesia's golden generation in 2045, a standard of graduate competence based on 21st century competence / learning has been established.

Assessment and Teaching of 21st Century Skills categorizes 21st century skills into 4 categories, Griffin, McGaw & Care (2012) namely way of thinking, way of working, tools for working and living for the world. one of the 21st century skill categories namely Way of thinking which means indirectly 21st century learning will emphasize students on a skill to think, which will create a habit of Habits of mind thinking is a must-have ability students so that students can achieve success in their lives.

Marzano through his writing (1992) describes the habit of mind as one of the dimensions of long-term learning outcomes (learning outcomes). These thinking habits can be categorized into critical thinking, creative thinking and self-regulation. the three habits of thought also determine the level of one's self-confidence and characteristics in solving problems. Assessment of thinking habits has not been much developed. In the field of biological education a variety of learning has been developed to develop thinking skills. But the results have not been satisfactory.

Habits of mind is closely related to high-level thinking processes such as solving a problem. This is because in the process of solving problems students are required to find solutions so that students will think in various interpretations and open a broad perspective in order to find solutions to solutions. However, based on preliminary studies at one of the senior high schools in Bandung that habit of mind of the students still low, this information is obtained from the results of interviews with mathematics teachers. Many educators still do not understand how to measure the three categories of HOM that include, critical thinking, creative thinking and self-regulation. One of the problems that is gained is the habit of thinking creatively, critically and self-control of students is considered still lacking because there is no assessment of this ability specifically.

So the effort to overcome these problems is by conducting this research. Problem based learning (PBL) method was chosen

because Habits of mind is related to high level thinking such as problem solving and PBL is a learning method that encourages students to solve problems and construct learning that is more forced by the use of authentic assessment.

Five dimensions that are interrelated to create authentic assessments are: (1)  Authentical of the tasks or assignment; (2) Learning environment; (3) Social interaction. (4)     Results    of authentic; (5) Authentic assessment criteria. Gulikers, Bastieaens & Kirschner, 2004). The application of authentic assessment can provide benefits for students, they can be active in the assessment process. assessment is formed on the basis of learner's knowledge based on experience and contextual problems, so that it will be meaningful to students (Herrington, 1998).

## 2.    RESEARCH METHOD

The method used is the Pre-Experiment method. Pre-Experiment said because the design of this research is not yet a real experiment. In this method the sample is taken not randomly but chosen intentionally based on the specific objectives of the researcher or known as simple purposive sampling. The research design used in this study is One group pretest-post test design, which is only with one experimental class without control class. In this research design, the effect of the treatment can be known more accurately by measuring the difference between the results before the treatment (pretest) and after the treatment (Posttest). Research subject namely class X-3. Data collection techniques in this study through pretest and posttest interviews, questionnaires and documentation. The instruments used include instruments of creative thinking skills, and self-control instruments. Each instrument is in the form of multiple choice, while self-regulated in addition to using multiple choice questions also uses a questionnaire.

## 3.    RESULT AND DISCUSSION

The pretest results obtained a score of the results of creative thinking of the pretest and posttest students. At the lowest pretest score is 20 and the highest score is 73. After being analyzed, the average score is 40 or when viewed on the scale of the assessment criteria for creative thinking test results, the score can be said to be less creative. while the results obtained from the posttest score of the results of creative thinking (posttest) with the number of students 39 people namely the lowest score of 47 and the highest score of 87. an average score is 68.72 or on the assessment criteria of creative thinking (creative thinking), the score can be said to be creative.
a.    N Gain Test Result
      The results of the n-gain test can be seen in table 3.4 below.

**Table 3.1**: N Gain Test Results

| Test Type | $\overline{x}$ | N-Gain | Criteria |
|-----------|------|--------|----------|
| Pretest | 40 | 0,47 | Medium |
| Posttest | 68,72 | | |

Based on Table 3.1 above the average score pretest is 40 while average score posttest is 87. After calculated using the normality gain formula, the value obtained is 0.47 or in category scale including medium criteria.
b.    Hypothesis Test Result
      1) Normality Test Results

In this study the normality test used was Shapiro-Wilk. The results of the normality test are presented in Table 3.2 as follows.

**Table 3.2**: Normality Test Results Pretest and Posttes

| DATA | Shapiro-Wilk | | |
|------|-----------|------|------|
| | Statistic | Df | Sig. |
| Pretest | 0,951 | 39 | 0,091 |
| Posttest | 0,949 | 39 | 0,079 |

Table 3.2 can be seen that the normality at the pretest value is 0.091 while the posttest is 0.079. Both data are > 0.05, so it can be said that the pretest and posttest data are normally distributed.

2) Homogeneity Test Results
The test used in this study uses levene statistics. The homogeneity test results are presented in Table 3.3 below.

**Table 3.3** Calculation Results Homogeneity Test

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 1,910 | 1 | 76 | 0,171 |

Based on Table 3.3 the homogeneity test results show a value of 0.171 which is greater than 0.05. Then it can be concluded that the variance of pretest and posttest data is homogeneous.

3) Test Results T
Hypothesis testing used is the paired samples test. The results of the t test can be seen in Table 3.4 as follows:

**Table 3.4** Calculation Results of T Test

| Paired Differences | | | | | t | df | Sig. |
|------|------|------|------|------|------|------|------|
| Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval od the Difference | | | | |
| | | | Low | Up | | | |
| -28,7 | 11,67 | 1,868 | -32,5 | -24,9 | -15,3 | 38 | 0,0 |

Based on Table 3.4 t test the pretest and posttest data above with a significance value of 0.00 or <0.05 (sig. Reference) so that it can be said that there are significant differences between pretest and posttest. Then the Problem Based Learning (PBL) model can improve creative thiking students on the mathematics class.
Based on the results of research data analysis that has been carried out it can be seen that the initial ability of students in creative thinking on average gets a score of 40 or classified as less creative. Amtiningsih (2016) Saying that the low ability to think creatively causes students to have difficulty solving problems faced in learning activities

The results of the assessment of creative thinking after receiving treatment showed the highest score obtained was 87 while the lowest score was 47 with an average score of 68,72 or included creative criteria, and the percentage of achievement of

each indicator of creative thinking increased.

Rachmawati (2005) argues that creative thinking is the ability to propose new ideas and be implemented in the problem solving process. Whereas according to Torrance in Kyung Hee (2007) suggests that someone who thinks creatively means that he must be brave to take a different way or path from most people and is not afraid to take risks for what he will face.

Creative thinking refers to thinking activities that are closely related to the process of solving a problem, so creative thinking is in line with the problem based learning (PBL) model. In this study the increased creative thinking of students is possible Trianto (2015) problem-based learning is a learning method by students working on authentic problems intended to compile their own knowledge, develop inquiry and high-level thinking skills , develop independence and confidence. This problem based learning (PBL) model can train students to think logically, analyze so that they can express new views and ideas to solve a problem, this is in line with the definition of creative thinking.

The PBL model used in this study is web-oriented or learning that utilizes internet technology in the form of a website to achieve the expected goals. Web-based learning which is popular as Web Based Education (WBE) or sometimes called e-learning (electronic learning) can be defined as the application of web technology in the world of learning for an educational process Rusman (2016). The use of this website is chosen after considering the rapid technological advances with internet network facilities that can be used to make it easier for students to search for literature without being limited by time and space.

### 3.2    Assessment of Self-Regulation

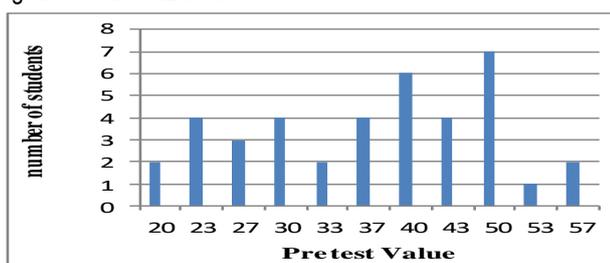The pretest and posttest acquisition scores can be seen in Diagram 3.1 and 3.2 below:

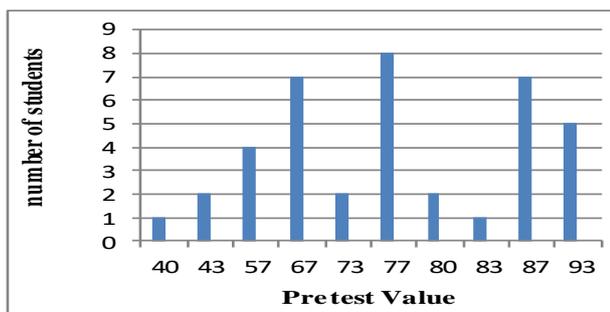**Figure 3.1** Results of self regulation assessment (pretest)

**Figure 3.2** Results of self regulation assessment (Posttest)

Based on Diagram 3.1 and 3.2, the lowest pretest score is 20 and the highest score is 57 while the lowest posttest score is 40 and the highest is 93.

a. Test results Normality of    N Gain

The results of the N Gain test of self-regulation of pretest and

posttest are increases. from an average value of 38 to 74. After calculating using the formula the N Gain value reaches 0.59 in the medium category.

b. Hypothesis Test Results

1)    Normality Test Results

The pretest score is 0.092 while the posttest is 0.080. Both data are > 0.05, so it can be said that the pretest and posttest data are normally distributed.

2)    Homogeneity Test Results.

The score of homogenity test is 0.127 which is greater than 0.05. Then it can be concluded that the variance of pretest and posttest data is homogeneous.

3)    T test results

The results of the t test can be seen in Table 3.5 as follows:

| Component | Pretest | Posttest |
|---|---|---|
| Normality test | 0,092 | 0,08 |
| Homogeneity Test | 0,127 | |
| T test | 0,000 | |

The t test in this study shows whether there are differences from the results of the pretest and posttest. Apparently. 000 means there are significant differences in the results of the pretest and posttest.

Based on the results obtained the lowest score pretest score is 20 and the highest score is 57. after being analyzed. while the posttest score shows the lowest score of 40 and the highest score is 93.

Self regulated learning is a combination of academic learning skills and self-control that makes learning easier, so students are more motivated Glynn, Aultman, & Owens (2005). Whereas according to Alwisol (2009) states self regulation is an ability possessed by humans in the form of the ability to think and with that ability individuals can manipulate the environment, resulting in environmental changes due to these activities. From some of these theories we can conclude that self-control greatly influences and correlates with student learning outcomes including mastery of the concept.

Human behavior in self-regulation is the result of the influence of external and internal factors. Schunk (2012) Determination and adherence to internal standards is one of the processes in the stages of self-regulation based learning, namely the stage of self-reflection, so that a student will begin to assess himself

The theory that has been stated explains that the factors that influence self-control can come from oneself examples of self-observation or from the environment, for example the prevailing standard factors. Zimmerman in Puspitasari (2013) said stresses that to be considered able to regulate oneself, the learning process of students must use specific strategies to achieve academic goals. can improve self-regulated.

## 4.  CONCLUSION

Based on the results of a detailed analysis and discussion of research can be concluded that the average value of creative thinking of students significantly increases after the application of Problem Based Learning (PBL) trouhgt authentic assessment on mathematics class, it can be seen from the normality gain score is 0.47 which is categorized as moderate. The average value of self-regulation of students significantly increased, score of normality gain is 0.59 which is categorized as medium. Problem Based

Learning (PBL) method trought authentic assessment can be used as an alternative learning to improve the habits of mind of students.

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