



Research Article

MURDER Learning Models and Self Efficacy: Impact on Mathematical Reflective Thinking Ability

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Abstract

The study aims to determine the influence of the MURDER Learning (Mood, Understand, Recall, Detect, Elaborate Review) to the mathematical reflective thinking ability is reviewed from self-efficacy. This type of research used is the Quasi-experimental Design with the research design used Posttest-Only Control. Taking the sample using the cluster random sampling technique, The sample in this study used a two-class, experimental class containing 32 students and class as a control class containing 32 learners. Data collection techniques Using test instruments (posttest). Test data analysis using Two Way Analysis of Variance. The results of the study were obtained that there was an influence among learners who acquired the MURDER learning model with learners who gained conventional learning of Mathematical reflective thinking skills, there is an influence between learners with high efficacy height, moderate, and low to mathematical reflective thinking skills, and there is no interaction between the MURDER and self-efficacy models of mathematical reflective thinking skills.

Keywords:

MURDER learning, mathematical reflective thinking, self-efficacy.

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Introduction

Developments in the 4.0 era today demanded an extraordinary change in the educational world. Transformation in the educational world will develop much (Wijaya, Sudjimat, & Nyoto, 2016). One of the sciences that must be learned to face the era in the field of mathematics. It became important because in mathematics, developed various thinking skills and problem- solving skills. It demands more ability to develop serious and directional thinking skills, so that the maximum completion process and get the right results because of mathematics that has always been a discussion of the lesson difficult. In the process of learning and teaching, mathematics in schools must provide opportunities for students to try to find experiences about mathematics so that mathematics is not only a memorizing lesson or just a formula but understands how to apply it in everyday life. Both educators and students together become actors of learning objectives, namely achieving maximum results.(Thahir, Mawarni, & Palupi, 2019) .

When learning mathematics for learners to think because thinks it is manipulating or managing and transforming information in memory(Anggraeni, Rahayu, Rusdi, & Ichsan, 2018; Arisanti, Sopandi, & Widodo, 2016; Komariyah & Laili, 2018; Nupita, 2013; Purbaningrum, 2017). Especially reflective thinking that uses the ability and creativity (skill), is owned. Because reflective thinking is a process that requires skills that mentally provide experience in solving problems, identifying what is already known, modifying understanding to solve problems, and applying the results obtained in other situations(Angkotasari, 2013). Development of student thinking skills become one of the prioritized(Mayang Sari, Suratno, & Wahono, 2015), the reflective learning approach is useful to sharpen teaching skills, enrich teaching strategies and class management skills, and heightened their awareness of the importance of noticing their reflective learning in the future(Lan & Kai-Ping, 2013; Meiklejohn et al., 2012) and reflective to learning. One example of the ability of reflective thinking is to solve the story and apply it in everyday life. (Gunawan, Suraya, & Tryanasari, 2016; Nur, 2016; Putra, 2016; Winarso, 2014).

Based on the explanation above, the author hopes to solve the problem of learning in schools that can make learners feel comfortable, confident, and do not find it difficult to learn mathematics. The ability to think reflective is to solve the problem of the story and apply it in everyday life influence of the MURDER model of learning against the mathematical reflective thinking skills are reviewed from self-efficacy.

One of the cooperative learning models that can be used to improve the reflective thinking skills in mathematical learning is the MURDER model of learning model that can build the motivation of learners and can provide students with the optimal opportunity for self-study, and understand deeply with discussion activities. The MURDER Model of cooperative Learning is an abbreviation for the

name Mood, Understand (comprehension), Recall, Detect (study), Elaborate (development), Review (revisit) (Herdianto, Sudhita, & Sedanayasa, 2014; Setiyowati & Pramukantoro, 2014; Sumartini, 2019)

The advantages of MURDER learning model: (1) The process of learning makes active learners in the learning process; 2) Learners are trained in solving problems; 3) The establishment of cooperation with other learners; 4) The students ' practice in conveying opinions; 5) Learners can communicate something that is on his mind to teachers and other learners; 6) The knowledge obtained by learners will also be long remembered because it is obtained not only memorization (Ariningsih, Suarni, & Suranata, 2013; Asani, 2012; Juleha, Khuzaemah, & Cahyani, 2014; Nuryanti, 2016; Wahyuningtyas, 2016).

Guroll (2011) also describes reflective thinking as an activity that is directional and precise, where each individual can also analyze, motivate, evaluate, and acquire a very deep meaning using a variety of appropriate learning strategies. (Ernawati, 2018; Fuady, 2017) Reflective thinking it will get the answer in the right way.

Self-efficacy is the opinion of each individual with his ability and is expected to do some action (Nursito & Jati, 2013; T. Wijaya, 2009). Because Self-efficacy which must have learners in the learning process and can determine how much effort to be poured and how long the learners persist in facing obstacles in learning or quality Duties (Agustina, 2015). Self-Efficacy affects the choice of an action that will be carried out from the magnitude of endurance and effort when dealing with difficulties and obstacles. A person with a high self-efficacy will choose to make a bigger effort, and it is not easy to give up (Apsari, Adi, & Octoria, 2015).

Individuals with high self-efficacy have features including a) able to handle the problems faced effectively; b) convinced of success; c) The problems encountered are considered; D) as a challenge to face; e) persistent in trying; f) believe in its ability; g) quickly arose from failure; h) Love to find new situations(Purnomo & Lestari, 2010; Warsito, 2012). About the above description, researchers will research to know whether there is an influence of learners who acquire learning by using the learning model of MURDER reviewed from self-efficacy and conventional learning model against mathematical reflective thinking skills.

Research Problem

Problems in this learning research are formulated as follows:

- Is there an influence of the MURDER learning model on mathematical reflective thinking abilities?
- Is there an effect of self-efficacy on mathematical reflective thinking ability?
- Is there an interaction between self-efficacy to the ability to think mathematically reflective?

Methods

Research Model

The study contained two free variables of the MURDER model (X_1) and self-efficacy (X_2) as well as one of the most variable-mathematical reflective thinking Skills (Y). This type of research is Quasi-experimental Design with Posttest only Control research design and research using a 3×2 factorial design with the intent to know the effect of two free variables against bonded variables as seen in Table 1:

Table 1.

Factorial Research Design

Treatment (A_i)	Self Efficacy Category (B_j)	
	High (B_1)	low (B_2)
MURDER Learning Model (A_1)	A_1B_1	A_2B_1
Conventional Learning Model (A_2)	A_2B_1	A_2B_2

Researchers conducted a prerequisite analysis, test normality test using the Lilliefors test, and homogeneity test using the Barlett test. After that, a hypothesis test was conducted in this study that was with two Way Analysis of Variance with the same cell. This test is used to determine the effect of free variables on a variable bound by comparing the rate of multiple groups.

Participants

The research is grouped into two groups. The first group of students received mathematical learning treatment with the MURDER modeling model, while the second group of learners received mathematical learning treatment with conventional models. The population in this study was a class VIII student at SMP N 3 Jati Agung with a sampling technique in using random grade research. The sample in this study used two classes of VIII A class as an experimental class containing 32 students and a VIII D class as a control class containing 32 learners. Collection of data using polls and tests.

Then to know the feasibility of the questionnaire instrument conducting a validity and reliability test while the test is used to measure the mathematical reflective thinking ability, then researchers do the validity test, differentiator power, difficulty level, and reliability in the matter.

Data Analysis

The data analysis technique used to test the hypotheses in this research is the analysis of variance of two paths with different cells. In two ways Anova will understand whether or not there are independent variables on the agreed variables and each variable has two or more levels. Analysis of two-way variance with unequal cells using the formula, namely:

$$X_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk}$$

- X_{ijk} = observing data of row i -th and column j -th
- μ = average of all observed data (large average)
- α_i = line effect to the i -th dependent variable, with $i = 1, 2$
- β_j = j -th column effect on the dependent variable, with $j = 1, 2, 3$
- $(\alpha\beta)_{ij}$ = combination of i -th row and j -th column bound variable
- ε_{ijk} = the observed deviation of the population mean μ_{ij} that has a normal distribution with a mean of 0, the observed deviation of the population mean is also called an error.

where μ is the overall mean response, α_i is the effect due to the i -th level of factor **A**, β_j is the effect due to the j -th level of factor **B** and $\alpha\beta_{ij}$ is the effect due to any interaction between the i -th level of **A** and the j -th level of **B**.

Procedure

The research instrument, before being used, was tested for validity, difficulty level, distinguishing features, and reliability.

While the Mathematical reflective thinking ability test uses test questions. This test question includes a matter of description. The form of the description problem is used to calculate the students' mathematical reflective level. Researchers use the problem description with the goals agreed upon by students can help argue that discuss mathematics.

The self-efficacy preparation instrument begins by arranging the questionnaire grid according to the self-efficacy indicator after the questionnaire instrument has been developed, then provides an objective scale with the Guttman scale, made in the form of multiple-choice, the choice with the best-added value and lowest zero.

Results

The ANOVA test to find out which influences good reflective thinking ability of both samples, previously conducted normality test using the Lilliefors method and test homogeneity using Barlett test.

Table 2.

Data Recapitulation of Reflective Thinking Ability Test Results

Class	X_{max}	X_{min}	Size of Central Tendency				Size of Group Variance
			\bar{X}	M_e	M_o	R	SD
Experiment	95	38	66,28125	69,25	80	57	15,57807
Control	89,5	37	55,79688	52,25	44	52,5	14,43162934

Based on 2, the results were obtained that for the experimental class of the highest value 95, the lowest value was 38. With an average $(\bar{X}) = 66.28$, $(M_o) = 80$, median $(M_e) = 69.25$, range $(R) = 57$ and Standard deviation $(S) = 15,578$. In the highest value control class is 89.5, the lowest value is 37. With an average $(\bar{X}) = 57.96$, mode $(M_o) = 44$, median $(M_e) = 52.25$, range $(R) = 52.5$, and standard deviation $(S) = 14.43$. The results of the analysis from the above data can be concluded that the average of reflective thinking of the students mathematically there is a difference between the control class and the experimental class.

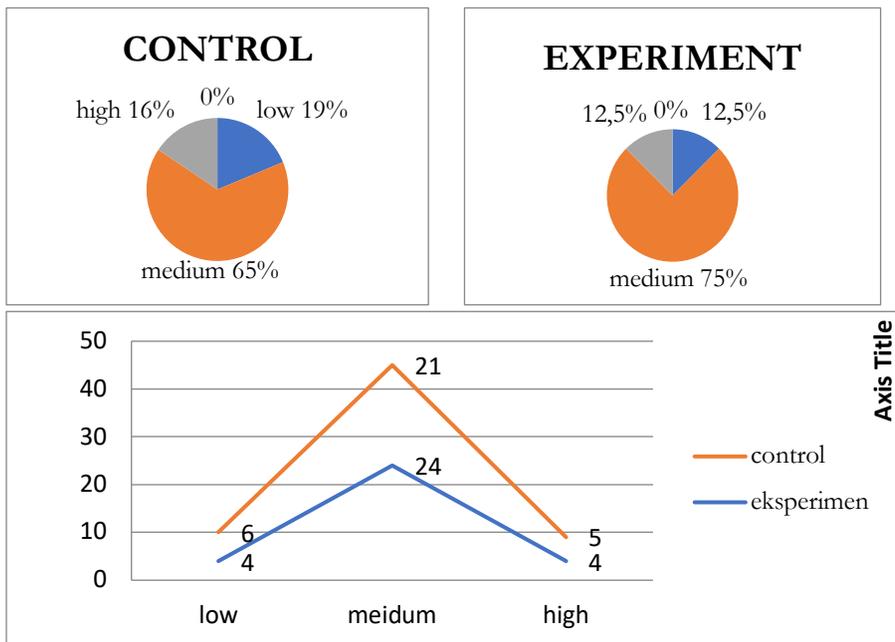


Figure1

Data Recapitulation of Self-efficacy Scale Test Results

Based on the calculation result, the experiment class gets a rating of 56.625 and obtained standard deviation 5.9946, in the experiment class score ≥ 62.56964 entered in the high category of 4 learners, $51.2488 < 62.56964$ Score entered in the category is 24 learners and the score of < 51.2488 is in the low category of 4 learners. While the control class obtains an average value of 57.7742 and standard deviation 6.525, in the score control class ≥ 64.2996 entered in the high category of 5 learners, $51.2488 < 64.2996$ score is in the medium category of 21 learners, and the score is < 51.2488 Entry in the low category of 6 learners.

Table 3.*Summary of Two-way Variance Analysis*

SK	JK	Dk	KT	F _{count}	F _{table}	Conclusion
Line	1800,941406	1	1800,9414	9,3975	4,007	rejected
Column	2802,96901	2	1401,4845	7,3130	3,156	rejected
Interactions	-24,1247	2	12,0624	-0,0629	3,156	are accepted
Error	11115,1167	58	191,6399			
Total	15694,9023	63				

The two-way Anava test results state that the hypothesis was rejected if the $F_{\text{count}} > F_{\text{table}}$. So, if $F_{\text{count}} \leq F_{\text{table}}$, then the hypothesis is acceptable. According to table 6, The conclusion is as follows:

a. First hypothesis

$F_{A \text{ count}} = 9.3975$ and $F_{A \text{ table}} = 4.007$. Based on such calculations, that $F_{A \text{ count}} > F_{A \text{ table}}$. It is concluded that H_{0A} rejected, which means there is an influence among students who acquire the MURDER model with students who get conventional learning to mathematical reflective thinking skills.

b. Second hypothesis

$F_{B \text{ count}} = 7.313$ and $F_{B \text{ table}} = 3.156$. Based on such calculations that $F_{B \text{ count}} > F_{B \text{ table}}$. It is concluded that H_{0B} rejected, which means there is an influence among students with self-efficacy high, moderate, and low to mathematical reflective thinking skills.

c. Third hypothesis

$F_{AB \text{ count}} = -0.0629$ and $F_{AB \text{ table}} = 3.156$. Based on such calculations That $F_{AB \text{ count}} < F_{AB \text{ table}}$. It was concluded that H_{0AB} was accepted, $F_{AB \text{ count}} \leq F_{AB \text{ table}}$, meaning there was no interaction between the MURDER and self-efficacy models of mathematical reflective thinking skills.

Based on the calculation of the Scheffe method is used as a follow up from the analysis test of two-way variances because of variance analysis test results showed that H_{0A} and H_{0B} were rejected.

Discussion and Conclusion

Based on the two-way Anava calculations acquire $F_{\text{count}} > F_{\text{Table}}$, which means H_{0A} is rejected. So, it shows that there is an influence of the MURDER learning model of mathematical reflective thinking skills. MURDER Model is learning with Group division as well as developing mathematical problem solving with the ability to use the mathematical reflective thinking skills of the students. MURDER's Learning Model directs learners to be active and self-reliant in resolving a problem.

Learning in the experiment class uses the MURDER learning model, in which learning students do group discussions. In a discussion group of learners, improve skills in communicating and working together as well as responsibilities in resolving problems with mathematical reflective thinking skills precisely according to appropriate measures, because Reflective thinking is a form of inter achievement thinking with the ability of learners to find the solution of a problem. The reflective thinking skills demonstrated by learners are the expressions of ideas in an effort to find solutions to the problems they are facing.

While in the control class used is the conventional learning model. The conventional learning Model is the learning that is delivered directly by educators so that more attention is centered on educators so that students only receive passively, where students only hear, listen, take notes Delivered by educators. Students are accustomed to being less active, so when facing the problems of learners are accustomed to working individually and reluctant to ask questions. This certainly makes learners less understanding of the material that has been delivered.

Based on that, learners will use better reflective thinking skills if taught using MURDER model as compared to conventional models.

Results of analysis of Anava two avenues obtaining $F_{\text{count}} > F_{\text{Tebel}}$, meaning H_{0B} rejected, concluded that there is a difference in the influence of each category self-efficacy students to mathematical reflective thinking skills. Judging by the double comparison between the columns and each category self efficacy learn to acquire mathematically reflective thinking skills of learners in high self efficacy category better compared to learners in self category efficacy Medium, and students with high self-efficacy categories better than students with low self-efficacy categories, as well as student essays with self-efficacy are being better than students with category self-efficacy Low. Because the self-efficacy category is high and there is a greater desire, as well as encouragement than students of the self-efficacy category, it is low.

The conformity of the second hypothesis is that there is an influence on the self-efficacy high, medium, and low in students to the mathematical reflective thinking ability by gaining a MURDER model as well as a conventional model in the formulation of this research. Calculations, there are significant differences between high self-efficacy categories when understanding and learning the material Statistics so that it is implicated with reflective thinking skills.

Students of the High self-efficacy category tend to be active in the learning process, such as students in following mathematical learning are enthusiastic and give a lot of relevance. Also, learners have the courage to do exercises in front of the class, so it can be assessed easily to capture material and arguably, the ability of reflective thinking is better than the learners in the Self-efficacy category Low.

Students in the self-efficacy category are slightly passive from learners in high self-efficacy categories i.e. learners rarely give questions, lack of courage when expressing opinions and a little harder in the capture app Given material. While students in the category of low self-efficacy are less enthusiastic in following the math lessons in class, not seen doing things like asking questions, going forward, or difficult to capture the material provided. In addition, the students are less than maximization in working on mathematical reflective thinking skills post-test.

Based on the explanation above can be concluded that the student's category self-efficacy high as well as students category self-efficacy sedan self-explanatory grid efficacy skills mathematical reflective thinking is better than the learners The self-efficacy low.

The conclusion that there is no interaction between the learning treatment with the category self-efficacy learners to the ability reflective thinking mathematically because the results of analysis calculations Anava two roads with the same cell obtained $F_{\text{Count}} < F_{\text{Tebel}}$, means H_{0B} is accepted and there is no difference in the influence between learning and self-efficacy on mathematical reflective thinking skills. The preferential treatment used was a MURDER lesson and a conventional learning model.

Then self-efficacy is grouped into several categories, namely high, medium and low. Several conditions can influence mathematical reflective thinking skills from the learning model and also self-efficacy. Students with high self-efficacy categories match the MURDER learning model but are less suitable for students with low self-efficacy categories. The learning process is expected to influence mathematical reflective thinking skills. Because when the conventional learning model learners are more passive because they only listen, hear and record those who have been delivered.

It has been seen that the research result is no interaction between the model learning model and self-efficacy to mathematical reflective thinking skills. Discrepancy of research results with hypotheses can be caused by learners who are less honest at the time of filling in the questionnaire and problem or not independent in working on the problem, and it can affect the mismatch of results with Hypothesis. There should be interactions between the learning and self-efficacy models of mathematical reflective thinking skills.

Based on data analysis, it can be learned that: 1) there is the influence of MURDER learning model for mathematical reflective thinking skills. 2) There is an influence between learners with self-efficacy high, moderate, and low to mathematical reflective thinking skills. 3) There is no interaction between the learning and self-efficacy models of mathematical reflective thinking skills.

The proposed suggestion is to use the MURDER model to improve mathematical reflective thinking skills and for learners whose mathematical and

reflective thinking skills are low and can be developed on the ability to Other mathematically.

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