

# The Use of Undo Process in Improving Self-Efficacy

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## ABSTRACT

The aims of this research are to know the use of the undo process method in the completion of the inverse function. This type of research is a quasi-experiment. The group used in this study consisted of two groups. One group as a control group uses conventional learning methods that use the conventional inverse method of solving conventional function, and one group as an experimental group which in learning use undo process method in solving inverse function. This research was conducted at SMA Negeri 1 Buntu Pane, Asahan Regency, North Sumatra province, Indonesia. The population of this study is the students of class XI IA in the academic year 2016/2017 even semester. The sample was obtained by using cluster random sampling method. The study sample is two classes of 5 existing classes. Implementation of this research by using the undo process method to student ability to solve the problem given. The technique of collecting data using test and questionnaire given to student which become sample. Research data show that by applying this method of learning can improve self-efficacy in the following material about inverse function.

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## 1. INTRODUCTION

Mathematics is a universal science underlying the development of modern technology, has an important role in various disciplines and develop the human mind power (Thahir, 2018; Fonna, 2018b; Mursalin et al, 2018). This is the basis so that mathematics is regarded as a science queen. In addition, rapid development in information technology and communications today is based on the development of mathematics in the field of number theory, algebra, analysis, discretionary theories of opportunity and mathematics (Trisnawati, 2018; Winarso, 2018). To master and create technology in the future requires a strong mastery of mathematics from an early age.

Mathematics courses need to be provided to all students from elementary school to equipping students with logical, analytical, systematic, critical, creative thinking skills, and the ability to work together (Masitoh, 2018; Mursalin, 2014). These competencies are needed so that students can have the ability to acquire, manage, and utilize information to survive in an ever-changing, uncertain, and competitive state. Thus mathematics will greatly assist students in tackling the problem of his life.

To achieve this goal, in high school Mathematics has several aspects, namely: logic, algebra, geometry, trigonometry, calculus, statistics and opportunities (Fonna, 2018a; Setiawaty et al, 2018). Calculus as one of the aspect of Mathematics has an important role in the success of learning Mathematics itself. One element of calculus is the inverse function. You (2018) in general the student is said to be familiar with the inverse function if he can explain the meaning of the inverse of a function, explain the meaning and importance of studying the inverse function, knowing the consequences if not understanding the inverse of a function,

explaining why the inverse function is created.

But the fact is that at this time the subject of Mathematics is still a scourge for the students, as well as in SMA Negeri 1 Buntu Pane. There are still many students who think that math is a subject that is scary and hard to understand. Feelings of fear will lead the students to regard mathematics as an unpleasant and annoying lesson, especially if it can not be done in math problems. Most students immediately give up if facing math problems that are considered difficult and can not, but from the difficult problems that they will be able to know and understand.

The mathematics that seems uninteresting, can be made possible the use of inappropriate learning methods (Afandi, 2018; Nasir, 2018). So as a teacher must be able to use a variety of appropriate learning methods in each material submitted. Not possible in some delivery of material using several variations of the method, this is so that the understanding of the material more acceptable to students and most importantly students are happy with mathematics itself so it does not seem monotonous in learning mathematics. Students who love mathematics will have a positive impact on learning outcomes (Margolis, 2006). Learning outcomes are influenced by several factors, including internal factors and external factors (Amalia et al, 2018; Mursalin, 2016). The internal factors, among others, include intelligence, interest, motivation and cognitive abilities. While external factors include learning methods/learning models used by teachers in teaching, curriculum, facilities, and environment (Margolis, 2006; Graham et al, 2005).

In general, the learning process is still using conventional methods as well as on the process of learning the inverse function (Kendal, 1999; Hohenwarter, 2008). Conventional learning methods applied to the inverse function cause still dominant teachers in the

learning process and the lack of creativity of students in providing an alternative answer to a question (Ball, 2000). In general, teachers in providing materials to students more to provide examples of questions and provide answers to the problem. This causes the students will not feel challenged to find yourself let alone another alternative to answering the issue. It is this habit that will unwittingly lead to misconceptions about the matter, especially about the inverse function. González (2018) Even though instructors' teaching styles in higher education are an issue of major importance because these interactions affect students' self-perceptions, involvement, and achievement.

Responding to that the researcher tried to study an alternative learning that is expected to be one option in overcoming the problem of learning the inverse function by using the undo process.

Undo process is defined as a process of retreat from an event (Wood, 2008). This description of the undo process is easier to see in everyday life. Various events can be ensured there are flashbacks. For example, Bob walks 4 steps forward, then 4 steps back. The final result of the trip, Budi back to its original position. In the computer there is the term "undo typing" used when wanting to go back to before. So, an undo process is an attempt to get back to the original with regard to the sequence of events.

The function is a sequence of events a composition of various events, of course with the help of operations. The undo process of a function is called the inverse of the function (Tay et al, 2012). Suppose a function contains a forward sequence, then the inverse of the function is the reverse order. In the formal teaching of function, the sequencing process of the function is not known so that the term "undoing" of the function is also unknown (Beckmann, 2004). As a result, students will be foreign when undoing is used to determine the inverse of a function (Fulton, 2012).

Providing an understanding of the inverse function to the student is an absolute thing to do. Learning with an undo process should begin by providing a basic understanding to students about the inverse in general. Using Algorithms, in mathematics and computation, algorithms are a collection of commands to solve a problem. These commands can be translated gradually from beginning to end. The algorithm will always be over for some problems that meet the criteria. The criteria of an algorithm are as follows: (a) there are input and output; (b) effectiveness and efficiency; (c) structured (Usher, 2009).

Algorithms for a particular problem often have repetitive steps or require decisions until the task is completed. Broadly speaking, the algorithm is a sequence of steps to solve a problem systematically. In determining the inverse function there are several things to be considered in using the algorithm, in the reduction is the inverse for the addition operation, and the division is the inverse for the multiplication operation (Tay et al, 2012).

**2. METHODS**

This type of research is a quasi-experiment. The group used in this study consisted of two groups. One group as a control group uses conventional learning methods that use the conventional inverse method of solving conventional function, and one group as an experimental group which in learning use undo process method in

solving inverse function.

This research was conducted at SMA Negeri 1 Buntu Pane, Asahan Regency, North Sumatra province, Indonesia. The population of this study is the students of class XI IA in the academic year 2016/2017 even semester. The population of this study consists of 160 students divided into five classes. The sample of this research is obtained by using cluster random sampling technique. The study sample consisted of two classes, one class for the experimental group and one class for the control group.

This research data is quantitative data in the form of student self-efficacy data on mathematics only. Research data in the form of questions and answers results at the beginning of learning and at the end of learning related to student self- efficacy on learning in discrete mathematics lessons.

Quantitative techniques are used in data analysis. To determine the different teaching methods from the self-efficacy test t independent score is used. To find out the relationship between applying the competition in learning by rewarding and ranking and using conventional learning methods, Pear-son product-moment correlation is applied to the data.

**3. RESULTS AND DISCUSSION**

To improve student self-efficacy especially in the eyes of inverse function material, the researcher changed the conventional method commonly used by the teacher into a method using the undo process in the completion of the inverse function.

Before the treatment is given, the two sample classes are pre-tested first. The pre-test relates to the student's self-efficacy from both sample classes regarding the function of the composition and the inverse function. The composition function is used as a benchmark because the material is an apperception of the material of the inverse function. While the question of the inverse function should be based on the cloud knowledge of all sample students in this study. The mean and standard deviation values of the self-efficacy pre-test in the experimental class and control class for the survey items appear are shown in table 1 and table 2.

The data in table 1 and table 2 it was found that before treatment there was no significant difference from the two sample groups. Both groups of samples had statistically different values for mathematics lecturers' efficacy in teaching, make to motivate and take on responsibility, and effective teaching. For the purpose of determining whether the method of learning with respect and self-efficacy beliefs on the teaching of mathematics on discrete mathematics shows significant differences according to sample groups, independent t-test was applied to the data with a significance level of 0.05 As seen from table 5 independent t-test results show that there is no significant statistical difference between averages ( $t(144)=0.900, p<0.05$ ).

After reporting different treatment in both groups, in table 3 and table 4 it was found that there was a difference of self- efficacy from both groups of samples. in the experimental group that reported treatment by providing an undo process method on the learning of inverse function has a higher value than the control group treated by conventional methods.

**Table 1.** Descriptive statistics of dimension of before learning model at experiment class

| Item  | N  | Lowest Score | Highest Score | Mean  | SD   |
|---|----|--------------|---------------|-------|------|
| Mathematics teachers' efficacy in teaching  | 32 | 4            | 13            | 11.53 | 2.45 |
| Make to Motivate and Take on Responsibility | 32 | 8            | 16            | 14.75 | 2.26 |
| Effective Teaching                          | 32 | 7            | 11            | 9.31  | 2.48 |

**Table 2.** Descriptive statistics of dimension of before learning model at control class

| Item  | N  | Lowest Score | Highest Score | Mean  | SD   |
|---|----|--------------|---------------|-------|------|
| Mathematics teachers' efficacy in teaching  | 32 | 4            | 12            | 11.50 | 2.38 |
| Make to Motivate and Take on Responsibility | 32 | 7            | 15            | 13.95 | 2.20 |
| Effective Teaching                          | 32 | 7            | 8             | 7.55  | 2.50 |

**Table 3.** Descriptive statistics of dimension of after learning model at experiment class

| Item  | N  | Lowest Score | Highest Score | Mean  | SD   |
|---|----|--------------|---------------|-------|------|
| Mathematics teachers' efficacy in teaching  | 32 | 12           | 28            | 24.83 | 1.13 |
| Make to Motivate and Take on Responsibility | 32 | 15           | 25            | 25.12 | 1.46 |
| Effective Teaching                          | 32 | 15           | 27            | 22.56 | 1.55 |

**Table 4.** Descriptive statistics of dimension of after learning model at control class

| Item  | N  | Lowest Score | Highest Score | Mean  | SD   |
|---|----|--------------|---------------|-------|------|
| Mathematics teachers' efficacy in teaching  | 32 | 10           | 28            | 20.56 | 2.22 |
| Make to Motivate and Take on Responsibility | 32 | 12           | 23            | 19.98 | 2.10 |
| Effective Teaching                          | 32 | 11           | 25            | 20.74 | 2.38 |

For the purpose of determining whether the experimental group that reported the treatment by providing an undo process method in the inverse function settlement had a higher value than the control group treated by conventional methods, independent t-test was applied to data with a 0.05 level of significance.

After reporting different treatment in both groups, in table 3 and table 4 it was found that there was a difference of self-efficacy from both groups of samples. in the experimental group that reported treatment by providing an undo process method on the learning of inverse function has a higher value than the control group treated by conventional methods.

For the purpose of determining whether the experimental group that reported the treatment by providing an undo process method in the inverse function settlement had a higher value than the control group treated by conventional methods, independent t-test was applied to data with a 0.05 level of significance

As seen from table 6, independent t-test results show that there is significant statistical difference between averages ( $t_{(62)} = 0.451$ ,  $p > 0.05$ )

**Table 5.** T-test by sample groups of before learning model

| Group            | N  | df | t     | p     |
|------------------|----|----|-------|-------|
| Experiment Class | 32 | 62 | 0.900 | 0.370 |
| Control Class    | 32 |    |       |       |

**Table 6.** T-test by sample groups of after learning model

| Group            | N  | df | t     | p     |
|------------------|----|----|-------|-------|
| Experiment Class | 32 | 62 | 0.416 | 0.580 |
| Control Class    | 32 |    |       |       |

The relationship between mathematics teaching the method of learning with respect and self-efficacy score and the teaching of mathematics on discrete mathematics score was investigated by using the Pearson product-moment correlation coefficient. preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. there was a positive effect associated with high levels of mathematics self-efficacy.

At the beginning of learning many students are pessimistic able to solve problems related to inverse function. This is due to many students from the sample class who find it difficult in completing the composition function. Many students consider the next lesson less difficult.

As students in the experimental class introduced the undo process method in solving the inverse function, many students were happy and easily solved the problem. Students feel confident in working on the inverse function assigned to them. This is certainly data increase student persistence in learning. You (2018) persistence is an important indicator of academic success in higher education.

This condition is different from the students who are in the control class. Student perceptions of the difficulty of completing the composition function are affected by student self-efficacy while working on the inverse function. This is due to the conventional methods teachers used when learning inverse function does not help students' self-confidence and student motivation in working on inverse functions.

#### 4. CONCLUSION

The use of process process in the inverse function is correct in learning because it can improve student self-efficacy. This is due to the process of canceling the process of making the students easier. By improving self-efficacy students can improve student learning outcomes.

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