HUBUNGAN ANTARA KEMAMPUAN PEMECAHAN MASALAH MATEMATIS DENGAN *SELF-EFFICACY*

THE RELATIONSHIP BETWEEN MATHEMATICAL PROBLEM SOLVING ABILITY AND SELF-EFFICACY

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis hubungan antara *self-efficacy* siswa dan kemampuan pemecahan masalah matematis. Penelitian dilaksanakan di kelas XI pada salah satu SMK yang ada di Ciamis. Instrumen yang digunakan pada penelitian ini berupa tes kemampuan pemecahan masalah matematis dan angket skala *self-efficacy*. Analisis data menggunakan analisis korelasi dengan korelasi *Spearman Rank*. Hasil penelitian menunjukkan bahwa terdapat hubungan antara *self-efficacy* siswa dengan kemampuan pemecahan matematis siswa.

Kata Kunci: Relationship, self-efficacy, kemampuan pemecahan masalah matematika.

ABSTRACT

This research aims to analyze the relationship between student self-efficacy and mathematical problem solving ability. The research was conducted in class XI at one of the Vocational High Schools in Ciamis. The instrument used in this research was a test of mathematical problem solving ability and self-efficacy scale questionnaire. Data analysis using correlation analysis with Spearman Rank correlation. The results showed that there was a relationship between students' self-efficacy with students' mathematical solving ability.

Keywords: Relationship, self-efficacy, Mathematical problem solving ability.

INTRODUCTION

Problem solving ability is one of the most important things that humans have. Not only because humans will be faced with life problems that must be solved, but also with problem solving, it can improve their analytical abilities and can solve problems in any situation. This is in line with Cooney's statement (Hudojo, 2003), teaching students to solve problems will enable these students to be more analytical in making decisions in life..

Problem solving ability will not develop properly if no effort or activity is taken to develop that ability. One of the activities carried out to develop problem solving activity is in mathematics. One of the goals of mathematics is to solve problems, this is in accordance with the Ministry of National Education (2006) that the purpose of mathematics is for students to obtain : (1) have mathematical knowledge (concepts, interrelationships between concepts, and algorithms); (2) use reasoning; (3) solving problems; (4) communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem; and (5) have an

attitude of appreciating the usefulness of mathematics. Based on Branca (Sumarmo, 1994) problem solving ability is the ability that must be possessed by students, even the mathematical problem solving ability is as the heart in learning mathematics.

Problem solving is a process to overcome difficulties encountered to achieve a desired goal (Sumarmo: 2000). Problem solving in mathematics involves non-standard and previously unknown methods (Turmudi, 2008).

Based on Branca (Sumarmo, 1994) problem solving can be interpreted using general interpretations namely: problem solving as a goal, problem solving as a process and problem solving as basic skills.

Problem solving as a process of an activity that prioritizes the importance of procedures, the steps of the strategy taken by students in solving problems, and finally can find answers to questions not only on the answers themselves. As stated by Ruseffendi (2006) that problem solving is a general approach that prioritizes processes rather than results (*output*).

So, problem solving in mathematics is seen as a process where students find a combination of principles or mathematical rules that have been studied before and are used to solve problems by paying attention to certain steps.

In solving mathematical problems steps must be taken so that the process and the results obtained are correct. Ruseffendi (2006) stated that in problem solving there are five steps that must be done, namely: 1) present the problem in a clearer form, 2) state the problem in an operational form (can be solved), 3) arrange alternative hypotheses and work procedures that are thought to be good for use in solving that problem, 4 test hypotheses and do work to get results (data collection, data processing, etc.); the result may be more than one, 5) re-examine whether the results obtained are true; maybe choose the best solution.

Meanwhile, Wahyudin (2008) wrote a five-step method of solving Dewey's problem: 1) Realizing the problem, 2) Defining (formulating) the problem, 3) Proposing various hypotheses to solve it, 4) Assessing the consequences of each hypothesis based on past experience, and 5) Testing the most probable solution.

Djamarah and Zain (2006) wrote the following problem solving steps: 1) the existence of a clear problem to solve, which grows from students according to their level of ability, 2) look for data or information that can be used to solve the problem, 3) set a temporary answer to that problem, 4) test the correctness of the interim answers, and 5) draw conclusions.

According to Polya (MKPBM, 2001) there are four steps in solving problems, namely: (1) understanding the problem, (2) planning the solution, (3) solving the problem according to the plan of the second step, (4) re-examining the results obtained (*looking back*).

Polya (1973) suggested the process carried out at each step of solving problems through questions:

- a. Understanding the problem, including: (1) what is unknown? (2) what data is given? (3) is the condition given sufficient to find out what is being asked?
- b. Devising a plan. This step involves several aspects including the following: (1) which theory can be used in this problem? (2) pay attention to what is

- being asked or try to think of a question that was once known by the same question or something similar? (3) can the results and methods used be used here? (4) have all data and conditions been used? (5) have important ideas taken into account been taken into account?
- c. Carrying out the plan. This step emphasizes the implementation of the settlement plan. The procedure taken is: (1) checking each step is it correct or not? (2) how to prove that the step chosen is correct?
 - d. Re-checking the process and results (looking back) at the end, Polya emphasizes on how to verify the answers that have been obtained. The procedure that must be considered is: (1) can the question be examined? (2) can the answer be sought in another way?

The problem solving step used in this research is the problem solving step according to Polya. In solving mathematical problems, students are required to understand what is the problem in questions, whether the data provided can be used to solve the problem. After students understand the problems of the questions given, students are required to plan what will be done to solve the problem, what is the right way to solve the problem. Next do the calculation in accordance with the plan that has been made to solve the problem, then carried out to solve the problem until a conclusion is obtained from the problem solved. After solved, the next thing that must be done by students is to look back on what they have done, are right or not what they are doing.

In addition to the problem solving ability that must be possessed by students, there are also soft skills that must be possessed by students including self-efficacy.

Self-efficacy consists of two words namely "self" which is interpreted as an element of personality structure, and "efficacy" which means self-assessment, whether it can do good or bad actions, right or wrong, can or cannot do something as required (Alwisol, 2010). Self-efficacy is based on Bandura's socio-cognitive theory which postulates that a person's performance depends on the interaction between behavior, personal factors (for example: thoughts, beliefs) and the condition of one's surroundings. (Sudrajat, 2008).

Self-efficacy is not a general belief about ourself but a specific belief that leads to a particular task (Widiatmojo, 2004). Self-efficacy can be seen as an individual's perception of his/her ability to organize and carry out actions in certain uncertain situations. More specifically, Wood (Widiatmojo, 2004) stated that self-efficacy refers to the belief in our ability to grow motivation, cognitive sources and a series of actions needed to deal with the demands of the situation. Maddux (Sudrajat, 2008) describes several meanings and characteristics of self-efficacy, namely:

- a. Self-efficacy is a skill related to person's belief to do or solve something with his/her skills in certain situations or conditions. Usually revealed from the statement "I am sure I can do it".

- b. Self-efficacy does not describe about motives, encouragement, or other needs that are controlled.
- c. Self-efficacy is a person's belief about his/her ability to coordinate, mobilize skills and abilities to change and face situations that are full of challenges.
- d. Self-efficacy is a person's belief in his/her capability.
- e. The proportion of self-efficacy in the domain of self-esteem directly has an important role of someone's adaptation.
- f. Self-efficacy simply describes a person's belief in displaying productive behavior.
- g. Self-efficacy was not identified and measured as characteristic, but as a belief about the ability to coordinate various skills and ability to achieve expected goals in certain domains and conditions.
- h. Self-efficacy develops over time and is obtained through experiences. Its development began in infancy and continued throughout life.

Based on the explanations above, the meaning of self-efficacy basically leads to "self-confidence and ability" to regulate, implement, and get results as expected. Self-efficacy refers to the power of belief, for example a person is very confident, but ultimately fail. It can be concluded that self-efficacy is the belief of person to perform or carry out certain tasks successfully. Self-efficacy is an individual belief of person to overcome and complete a task that might make embarrassed, fail, stress, or success. Self-efficacy is a self-belief and one component of self-regulated (independence).

From these influences, self-efficacy plays a role in the level of achievement to be obtained, then Bandura (Pajares, 2002) stated that self-efficacy is almost found in all aspects of human life, whether humans think productively, pessimistically or optimistically, how to motivate themselves, vulnerability to stress and depression, and decisions chosen.

REASEARCH METHODS

This research aims to analyze the relationship between self-efficacy and mathematical problem solving abilities of students.

The research was conducted in class XI at one of the Vocational Schools in Ciamis. The instruments used in this research were tests and non-tests. The test instrument is about mathematical problem solving abilities in the form of essay, while the non-test instrument is a self-efficacy scale questionnaire.

The data was analyzed using correlation test. The statistical analysis was used to find the correlation between self-efficacy and students' mathematical problem solving abilities is a spearman rank correlation. The data obtained in this research were interval data and self-efficacy (ordinal data), because one of the data was in the form of ordinal data, then the data analysis was used is a non-parametric test using the Spearman rank correlation test.

RESULTS AND DISCUSSION

Correlation analysis was carried out to see the relationship between self-efficacy and students' problem solving abilities. The data was used to see the

correlation between self-efficacy and mathematical problem-solving ability is the questionnaire score data on self-efficacy and score data on students' mathematical problem solving abilities. The data obtained in this research were interval data and self-efficacy (ordinal data), because one of the data is in the form of ordinal data, then the data analysis used is a non-parametric test using the Spearman rank correlation test. Correlation test using Spearman rank correlation test with significance level $\alpha = 0,05$.

The hypotheses of this research were as follows:

H_0 : There was no relationship between student self-efficacy and students' mathematical problem solving abilities

H_1 : There was a relationship between student self-efficacy and students' mathematical problem solving abilities.

The results of the analysis using SPSS are presented in the following table:

Table 1 Correlation Test Self-Efficacy and Mathematical Problem Solving Abilities

Correlation		Mathematical Problem Solving Abilities	Self-Efficacy
Mathematical Problem Solving Abilities	Correlation coefficient	1,000	0,602
	Significance	-	0,000
	N	38	38
Self-Efficacy	Correlation coefficient	0,602	1,000
	Significance	0,000	-
	N	38	38

Based on Table 1, showed a significance value of 0.00 less than 0.05, then it can be concluded that H_0 (there was no correlation between self-efficacy with students' mathematical understanding ability) was rejected.

This means that there was a correlation between self-efficacy and students' mathematical problem solving abilities. The correlation coefficient value is 0.602, means the correlation between self-efficacy and students' mathematical problem solving abilities is in the strong category.

This positive correlation value shows interplay between self-efficacy and mathematical problem solving abilities of students. This means that if self-efficacy increases, the ability to solve mathematical problems also increases, and vice versa.

The result of this research is in line with Jatisunda (2017) and Amalia (2018) in junior high school students it shows that there was a positive correlation between self-efficacy and mathematical problem solving abilities. Likewise the result of research from Andriana (2017) showed that there was an effect of self-efficacy on mathematical problem solving abilities.

CONCLUSSION AND RECOMMENDATIONS

Conclusion

Based on the result and discussion, it can be concluded that there was a relationship between students' self-efficacy with mathematical mathematical problem solving abilities of students.

Recommendations

Teachers not only have to improve cognitive abilities but also have to improve students' soft skills, because cognitive abilities and soft skills are correlated

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