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The Effect of Locus Control on Mathematical Problem Solving Ability of Gorontalo City State Middle School Students

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Abstract

The existence of a teacher determinesd the quality of education and graduattin of education. . The realization quality of education process is needed by teachers who have relevant competencies and qualifications, so that students could develop mathematical problem solving abilities. Students' mathematical problem solving ability was a student's ability to solve mathematical problems in his life or other problems to achieve the expected goals. The success of students in the ability to solve mathematical problems was determined by locus of control. Locus of control is a way of looking at the students in instilling his confidence in what he did to achieve mathematical problem solving abilities. This study aims to find out the locus of control has a direct effect on mathematical problem solving abilities of Gorontalo City State Middle School students. Using causal survey method with path analysis model to test the direct influence of locus of control on mathematical problem solving abilities of students in Gorontalo City Junior High School. This research sample was taken by multistage random sampling totaling 95 respondents from 1729 people. Data from measurements of locus of control variables and students' mathematical problem solving abilities were collected through questionnaires, observations sheets and interviews and analyzed descriptive and inferential. Descriptive analyze of the students' mathematical problem solving abilities reached average of 31.07 and the standard deviation of 5.38, with 41 people (43%) getting a score below the average, as much as 30 people (32%) the score was on average and 24 people (25%) had above average scores. The results of locus of control variables obtained average of 150.89 and a standard deviation of 25.53, with 42 people (44%) getting a score below the average, as mauch as 19 people (20%) had scores on average and as many as 34 people (36%) scored above average. The test results showed there was a positive direct effect of locus of control on mathematical problem solving abilities of students in Gorontalo City Middle School. The creation of mathematical problem solving abilities of students is influenced by the locus of control they have.

Keywords: Locus of control, students mathematical problem solving abilities.

A. Introduction

Education is effort to develop the potential of human resources by encouraging and facilitating student learning activities. Education according to constitution number 20 2003 is a conscious and planned effort to create a learning atmosphere and learning process, so that students actively to develop their potential and have religious spiritual strength, self-control, personality, intelligence, character and skills needed by themselves, society, nation and country.

One of the processes to educate the nation the students having skills, creativity, independence, reasoning, being able to analyze the problems faced and be able to solve problems, the students must be diligent in learning activities. One of the learning activities in question is learning mathematics. Many benefits of mathematics for other sciences and also for life, so that when applied in real life, it can solve every problem more easily for students. Mathematics concept is studying with concrete ideas and knowledge to abstract forms through defining variables and parameters according to what they want to be presented. Presentation in abstract form through mathematics will facilitate further analysis and evaluation.

Relevant to the expected goals in mathematics learning by the National Council Teachers of Mathematics (NCTM, 2010, p.60), established five standards of mathematical abilities that must be possessed by students, namely problem solving ability, communication ability, ability connection reasoning ability and the ability of representation.

One of the mathematics abilities studied in this study is the ability to solve mathematical problems. Polya ,1985,p.6) defined problem solving as an attempt to find a way out of difficulties in order to achieve goals that are not so easy to achieve. In this case, students learned how to use problem solving and other

problem solving strategies in solving challenging problems for students. Thus solving mathematical problems could be interpreted as a person's ability to solve mathematical problems that require a process of a number of completion steps to obtain results in accordance with the problems raised

Descriptions above are expectations that students must have after carrying out mathematics learning. But the reality is different from that expectation. Facts in one of the Gorontalo City Middle School, based on the results of interviews with mathematics teachers and the results of observations of the researchers, obtained information that students were less actively involved in mathematics learning in the classroom. Most students did not care about learning activities, mathematics. Most students completed the problem description did not make the solution well, some students also worked on the problem without clear systemics, lack of understanding the questions and others. Such conditions would affect the ability of students to solve problems in learning mathematics which results in students' low mathematical problem solving abilities. This is evidenced by the results of the achievement of the National Examination mathematics.

One of the factors that influence students' mathematical problem solving ability is internal factors. One of them is locus of control. Relevant to the findings of Abzani and Leonard (2017), showed that locus of control influenceed students' mathematical problem solving abilities, where there were differences in mathematical problem solving abilities of students who had internal locus of control with mathematical problem solving abilities of students who had external locus of control. The higher internal locus of control students had higher their mathematical problem solving abilities.

Locus of control is the ways of person's perspective instilling his confidence in what he does to achieve mathematical problem solving abilities. While according Robbins & Judge (2010,p.139), locus of control is the level at which individuals believe that they are determinants of their own destiny. Locus of control in students is divided in two, namely internal and external locus of control. For students who have internal locus of control they are mature in achievement and tend to instill their belief that to achieve the ability to solve mathematical problems optimally can not be separated from hard work and own effort. Conversely, for students who believe in luck, good fortune / bad luck, argue that what is gained or achieved in the ability to solve mathematical problems is based on luck or control of others. Students who have this belief are called external locus of control.

This condition illustrates the ability of students to solve mathematical problems and locus of control needs to be studied through research with the title, "The Influence of Locus of Control on Students' Ability to Solve Mathematical Problems in Gorontalo City Public Middle School". The problem that was attempted to be answered in this study was whether locus of control had a direct effect on students' mathematical problem solving abilities in Gorontalo City Public Middle School? Research that aims to find out locus of control has a direct effect on Mathematical Problem Solving Ability of Students in Gorontalo City Middle School, is expected to: (1) provide information for teachers in relation to the influence of locus of control on students' mathematical problem solving abilities, so consider the psychological aspects of students ; (2) provide information the students so they can develop their potential, knowledge, understanding and abilities as well as insights related to mathematical concepts. By doing a lot of practice solving math problem solving problems; and (3) As input for the school, in order to motivate and direct the teacher to be creative and innovative in applying methods that are appropriate to the material in the learning process in order to improve the quality of student learning.

B. Theoretical Study

Mathematical Problem Solving Ability

The ability to solve mathematical problems is an integral part of mathematics learning. This is similar to what the National Council of Teachers of Mathematics (NCTM, 2010,p.60) affirms that one of the goals of students in learning mathematics is so that students have the ability to solve mathematical problems. Problems in mathematics are questions that can provide a challenge for someone who cannot be solved directly by a student. Acording to Krismanto (2013,p. 5) that a problem is a question and then the question will become a problem only if the question shows that there is a challenge that cannot be solved by a routine procedure that is already known by students. Thus it could be concluded that the problem in mathematics learning is a problem for students in doing mathematics learning activities, if students do not know the procedure that can be used to find solutions to mathematical problems in the form of questions on a particular subject, but students feel challenged to solve the problem in a way that has been learned and required to be able to find a solution.

Soedjadi (2010,p.36) defined that problem solving ability is a skill in students to be able to use

mathematical activities to solve problems in mathematics, problems in sciences and the problems of daily life. While Bransford & Stein (1984,p.31) stated that "creative problem solving is often a matter of attitude, not the method or approach used". Often problem solving involves reasoning along with creativity and depends on how individuals perceive the information that is a available ". Problem solving according to Suherman (2009,p.93) is part of a very important mathematical curriculum because in the process of learning and its completion, students are allowed to gain experience by using the knowledge and skills they already have to apply to solving problems that are not routine. Polya (1985,p. 6) defined problem solving as an attempt to find a way out of difficulties in order to achieve goals that are not so easy to achieve. In this case, students learn how to use problem solving and other problem solving strategies in solving challenging problems for students.

Ruseffendi (2009,p.169) suggested that in problem solving there are five steps that must be done, namely: (1) presenting the problem in a clearer form, (2) stating the problem in an operational form can be solved, (3) compiling alternative hypotheses and work procedures that are estimated to be good to use in solving the problem, (4) testing hypotheses and doing work to obtain results (5) rechecking whether the results are get it right, maybe also choose the best problem solving.

According to Polya (1985,p.5) the steps recommended in solving mathematical problems are as follows: 1) Understanding the problem. First of all, the verbal statement of the problem must be understood. The teacher can check this, ask the students to repeat the statement, and the student should be able to state the problem fluently. The student should also be able to point out the principal parts of the problem, the unknown, the data, the condition. 2) Devising a plan. If we succeed in recalling formerly solved the problem which is closely related to our present problem. Could you use it? The questions, well understood and seriously considered, are very often the right train of ideas; Could you restate the problem? If you cannot solve the proposed problem, try to solve first, some related problems. Trying to know various problems or theorems, considering various modifications, experimenting with various auxiliary problems. 3) Carrying out the plan. To devise a plan, it takes a lot of knowledge, good mental habits, concentration on the purpose. Where should I start? Starts from the idea that led you to the solutions. What can I do? Carry through in detail all the algebraic or geometric operations that you have previously recognized as feasible. What can I gain by doing so? A presentation of each step which is correct beyond doubt; 4) Looking back. The student has now carried through his plan. He has written down solution, checking each step. Therefore, it should have good reason to believe that the solution is correct. Hence, verifications are desirable. Especially, if there is some rapid and intuitive procedure to test either the result or the argument, it should not be overlooked.

Thus it could be concluded that the ability to solve mathematical problems is the ability of a person in the form of intellectual ability to solve mathematical problems faced either in everyday life problems or unusual problems to achieve satisfactory results. The indicators used to measure mathematical problem solving skills, namely, among others: identifying problems, planning problem solving, making conclusions and rechecking the calculations obtained.

Locus of control

Locus of control relating to one's self-control towards the success achieved in everyday life. This success is believed to be influenced by internal factors and external factors. Robbins and Judge (2010,p. 139) defined locus of control is a grade of personality that believes that they are indicators of the success of their self. According to Gibson, Ivancevich and Donnelly (2012,p.161) argued that locus of control of personality that explained people assume that controlling their life from their self and think that their life is controlled by external factors. Greenhaus, Larsen and Buss (2008,p.321) explained "Locus of control is a concept that decribes a person 's perceptional responsibility for events in his or her life". Thus Locus of control is interpreted as a person's perception of what is gained in his daily life or what is experienced by good or bad life fluctuations is the result of what the individual tried. A person's belief in self-control in his life depends on himself also depends on beliefs outside of his control, such as luck, the existence of supernatural powers and so forth.

According to Hiriyappa (2009,p.72) locus of control tend to buy is one of the things that happened because of his self control namely internal and external. It can be understood that Locus of control is defined as a person's perception of what he experiences in his daily life because it is under his control or out of his control. Thus locus of control can be categorized into internal and external locus of control.

Phares, (1976,p.120) suggested that locus of control had two aspects, namely: internal aspects and

external aspects. Internal aspects are related to the events they experience with factors in themselves. Factors in internal aspects include: a) ability possessed, b) desires, and c) efforts made. Then external aspects, related to success and behavior caused by external factors. Factors in external aspects include: a) fate (good or bad), b) luck, c) socio-economic, and d) influence of others. According to Crider (in Ghufron and Risnawati 2010,p.124), namely: 1) Internal locus of control indicators: a) Like working hard, b) having high initiative, c) always trying to find problem solving, d) always trying to think effective as possible and e) always have a perception that effort must be made if you want to succeed. 2) Indicators of external locus of control: a) lack of initiative, b) have hope that there is little correlation between effort and success, c) lack of effort, because they believe that success is controlled by external factors, d) lack of information to solve problem.

Miller & Toulouse, (1986,p.342) argued that the characteristics of someone who tended to internal locus of control were: 1) preferred innovative strategies and proactive strategies, 2) made more plans for the future, 3) became leaders of competitors and 4) willing to take risks be responsible. According to Rotter (Allen 2010,p.490), an indicator of someone who has an internal locus of control is: a) everything an individual achieves as a result of his own business; b) become leaders because of their own abilities; c) individual success due to hard work; d) everything that an individual acquires is not by luck; e) the ability of individuals to determine events in life; f) the life of an individual is determined by his actions; g) failures experienced by individuals due to their own actions. While the indicator of someone who has an external locus of control, namely: a) failure experienced by individuals due to lack of cooperation; b) reaching planning of futile work; c) the events experienced in life are determined by the person in power; d) individual success due to fate.

Thus it can be concluded that locus of control is an individual's belief in the success achieved due to the events experienced in his life. These sources can be categorized in internal dimensions and external dimensions. Internal locus of control relates to one's beliefs about events experienced such as achievement, failure, due to what he did, with indicators: a) like to work hard, b) have initiative, c) have the ability to overcome problems, d) everything that is achieved individual results from his own business; e) satisfied with the results of work achieved; f) find relevant information in solving problems, and g) responsible. Then external locus of control is related to events experienced by someone it is caused by external factors, such as a person's belief in good or bad fate, destiny, luck, opportunity and control of others, with indicators: external factors; b) individual success due to fate, c) failure experienced by an individual due to dishonesty; d) have confidence in luck, e) events in his life are all influenced by others.

Relationship between Locus of Control and Students' Problem Solving Ability

Optimal mathematical problem solving ability is the main target to be achieved in each learning implementation. Mathematical problem solving skills related to the ability to identify problems, plan problem solving, solve problems, make conclusions from problems faced and re-examine the results of answers. The mathematical problem solving ability in question is the problem solving ability achieved by individuals in grade VII. Study mathematics involve subject matter, fraction numbers, algebraic calculating operations and one variable equations and linear inequalities. To achieve optimal problem solving abilities is certainly influenced by various factors that determine the high or low ability of problem solving achieved by certain individuals. Thus, every learning should pay attention to the factors that can influence the achievement of mathematical problem solving abilities in question.

Locus of control is related to one's belief in what is experienced or the acquisition of something in their daily lives for their own efforts or otherwise the results achieved / something experienced by someone because of the influence of others, good luck and luck. Locus of control that is owned by each individual in learning activities or in his daily life consists of two namely internal locus of control and external locus of control. Internal locus of control believes that the results achieved by the hard work he does without any help from anyone. This means that students who have confidence in the achievement of their problem solving abilities for tangible work done during learning activities, perseverance in learning, active learning can be categorized on internal locus of control. Conversely, external locus of control has confidence that what is obtained in terms of work activities or similar activities can not be separated from assistance or interference from others. Characteristics of students who have confidence that the achievement of problem-solving abilities acquired in the learning process activities with the help of peers, teachers, parents and interference is characteristic of individuals who have external locus of control.

In addition, locus of control has a contribution to the mathematical problem solving abilities that students will achieve in their learning activities. Because a person's belief in what is obtained, will have an

impact on the desire of students to actively study, diligently read books, have the desire to excel, diligently doing experiments or vice versa. Thus in turn the locus of control will have a direct impact on students' mathematical problem solving abilities that they obtain. From the construction of thought above as described, it can be assumed that there is a direct positive effect of locus of control on mathematical problem solving abilities that students will obtain in learning activities.

C. Method

The method used in this study is a causal survey with a path analysis model that is used to test the direct influence of locus of control on students' mathematical problem solving abilities in Gorontalo City Middle School. There are two researches, namely locus of control as an independent variable (X) and the ability to solve mathematical problems as non-independent variables (Y). The study population was all subjects related to mathematical problem solving abilities and locus of control of Gorontalo City Middle School students totaling 1729 people. The sample was taken by multistage random sampling with 95 people obtained.

Operational Definition

The mathematical problem solving ability is the ability of a student in the form of intellectual ability to solve mathematical problems on the subject of integers, fractions, algebraic form operations, equations and linear inequalities of one variable. The grid of mathematical problem solving skills, namely: the ability to identify problems or problems, plan problem solving or problems, solve problems or problems, make conclusions from problems or problems, and re-examine the calculations obtained.

Locus of control is the student's perception of the tendency of his beliefs towards the success of learning that he obtained. The lattice of the instrument locus of control, includes: 1) internal locus of control, which is like working hard, having initiative, having the ability to overcome problems, everything that is achieved by individuals resulting from their own efforts, satisfied with the results of work achieved, looking for relevant information in solving problems, and being responsible; 2) external locus of control, namely lack of effort because it has the trust of success controlled by external factors; individual success due to fate, failure experienced by individuals due to dishonesty, having confidence in luck, events in his life were all influenced by others.

Data analysis technique

The data analysis technique used descriptive and inferential analysis. Descriptive analysis techniques are used to obtain a description of the characteristics of the distribution of scores for each variable score studied. Description of the score data from the research results is based on the mean, median and group data modes. In addition, the data variance is also calculated. The distribution of data based on the frequency distribution of group data tables is visualized in the form of histograms. Inferential analysis is used to test the research hypothesis. Because this study aims to obtain information about the influence between the variables studied, the related statistical test is Path Analysis. The path analysis requirement is that the relationship between variables in the research model must be linear. For this reason, a test of requirements is required which includes the linearity test of the regression equation, the homogeneity test and the estimated error normality test.

D. Results and Discussion

Result

The processed data results of students' mathematical problem solving ability have a mean value of 31.07, a mode value of 30.72, a median value of 31.23 and a standard deviation of 5.38. In frequency distribution, that 41 people or 43% of respondents score below the average interval class, as much as 30 people or 32% of respondents who have a score in the average interval class and as much as 24 people or 25% of respondents who obtain the score above average class interval. Then if you pay attention to the average, median and mode values, then based on the normal reference assessment the mathematical problem solving ability tends to be lower than the average score obtained

Processed data from locus of control variables have an average value of 150.89, mode (Mo) of 146.64 median (Me) of 158.57 with standard deviation of 25.53. In frequency distribution there are 42 people or 44% of respondents score below the average interval class, as many as 19 people or 20% of respondents who have scores in the average interval class and as many as 34 people or 36% of respondents who load the score above average class interval. Then if you pay attention to the average, median and mode

values then based on the normal reference assessment the locus of control score tends to be lower than the average score obtained. Hypothesis testing uses F test parametric statistical analysis techniques which are calculated using SPSS software. The results of the analysis obtained a regression equation $\hat{Y}$ = 9.92 + 0.06X, the correlation coefficient (rxy) = 0.301 and F_{count} = 9.224, with p-value = 0.003 <0.05, indicating Ho was rejected. The test results illustrate that the regression model Y over X is significant.

Referring to the results of simple regression calculations the effect of locus of control on mathematical problem solving ability of the regression model Y on X is $\hat{Y}$ = 9.92 + 0.06X obtained by the value of F_{count} (TC) = 0.748 with p-value = 0.831> 0.05. This means that Ho is accepted, illustrating that the regression equation $\hat{Y}$ = 9.92 + 0.06X is linear. That is, the variable regression equation of the ability to solve mathematical problems on locus of control is very linear.

The test results of positive direct effect of locus of control on mathematical problem solving abilities, obtained path coefficient locus of control (X) on mathematical problem solving ability (Y), namely $\beta y1 = 0.213$ with $t_{count} = 2.198$ and t_{table} ($\alpha = 0.05$; dk = 91) = 1.98. These results indicate tcount> t_{table}, or p-value = 0.031 / 2 = 0.015 <0.05 which means Ho is rejected or the path coefficient between locus of control and the ability to solve mathematical problems is significant. This means that there is a positive direct effect of locus of control on the ability to solve mathematical problems.

Research Discussion

Based on the path coefficient equation locus of control (X) to the mathematical problem solving ability (Y) that is t_{count} = 2.198 and t_{table} ($\alpha = 0.05$; dk = 91) = 1.98. Thus t_{count} = 2.198> t_{table} = 1.98, which means Ho is rejected. This means that there is a positive direct effect of Locus of control on the ability to solve mathematical problems. This shows that locus of control contributes to the improvement of mathematical problem solving abilities.

Locus of control is a person's belief in success achieved by the source of his own business or because of external factors. As stated by Gibson, Ivancevich and Donnelly (2012,p.161) argued that locus of control of personality that explains people assume that controlling their life from their self and think that their life is controlled by external factors. Referring to this opinion, it can be interpreted that Locus of control is related to one's belief in self-control in this life depends on itself also depends on beliefs outside of self-control, such as luck, supernatural powers and so on.

Locus of control in a person can be divided into two, namely internal and external locus of control. Robbins and Judge (2010,p.138) Internal locus of control are individuals who believe that they are the holders of control over whatever happens to them. Thus it can be interpreted that individuals with the type of locus of controlus of control internally have a perception that the environment can be controlled by itself so as to be able to make changes according to their wishes. Individual internal factors which include work ability, personality, work actions related to work success, self-confidence and failure to work individually are not due to relationships with working partners. The characteristics that appear in students who have a Locus of control include: working hard, having initiative, having the ability to overcome problems, everything that is achieved by individuals as a result of their own efforts; satisfied

with the work achieved; looking for information that is relevant in solving problems, and is responsible.

Then external locus of control is a person's belief in the success achieved by the influence of others even his belief in the fate that determines his destiny. While Kreitner & Kinicki (2009,p.155), individuals who have a tendency to external Locus of control are individuals who have confidence that performance is the result of events outside their direct control. For example, a person who is able to pass a written test due to his belief in external matters such as easy test questions or good luck. This can be interpreted that individuals with external locus of control tend to be resigned to what befalls him without any effort to make changes, so they tend to like self-adjustment behavior towards the development of the times in order to survive in the existing situation. The characteristics shown to students have external locus of control, among others: lack of effort because they have the confidence of success controlled by external factors; individual success due to fate, failure experienced by individuals due to dishonesty; having faith in luck, the events in his life were all influenced by others.

This finding is relevant to the results of research conducted by Abzani and Leonard (2017). The findings show that Locus of control affects students' mathematical problem solving abilities. Further explained that there are differences in mathematical problem solving abilities of students who have internal locus of control with mathematical problem solving abilities of students who have external locus of control. The higher the internal Locus of control students have, the higher their mathematical problem solving

abilities.

Conclusion

Based on the results of testing the hypothesis it could be concluded that there was a positive direct effect and significant locus of control on mathematical problem solving abilities of Gorontalo City State Middle School students. The results indicated that the increase in locus of control of students resulted in an increase in mathematical problem solving abilities of Gorontalo City Public Middle School students.

Implications

The research results showed that the improvement of mathematical problem solving abilities of Gorontalo City State Middle School students occurs as a result of an increase in locus of control. Thus it can be understood that one of the efforts to improve students' mathematical problem solving abilities is to increase the locus of control of Gorontalo City Public Middle School students. Thus, in the learning activities the teacher seeks to improve the locus of control of students by fostering positive views and thinking, motivating students in learning activities, providing opportunities for students to do assignments in front of the class, giving appreciation to students who can complete the task. Subsequent efforts to improve the locus of control of students are teachers and parents to convince students that in order to improve mathematical problem solving skills students do a lot of activities in solving math problems at home, then grow students' confidence that they can complete tasks or math problems well as long as active learning and sincerity in students to achieve good mathematical results.

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