

Profile of Creativity in Mathematical Problem Solving in terms of Self-Efficacy and Gender

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Abstract

This research is a qualitative research that aims to determine the profile of creativity in solving mathematical problems in terms of self-efficacy and gender in class X SMKN 4 Bone. The subjects in this study were X students of SMKN 4 Bone Pinrang which consisted of 4 subjects namely one male with high self-efficacy, one female with high self-efficacy, one male with low self-efficacy and one female with high self-efficacy -low efficacy. The instrument used is the researcher himself as the main instrument assisted by self-efficacy tests, math problem solving tests and interviews designed to suit creativity. Data was collected by means of task analysis and interviews. The collected data were analyzed using qualitative content analysis techniques. The results of the study show that: 1) the profile of creativity in solving math problems of high self-efficacy male students are: a) at the stage of formulating problems, high self-efficacy male students are able to interpret the problem by illustrating what is known in the form of pictures according to their understanding through writing. b) at the stage of planning problem solving, high self-efficacy male students are able to plan appropriate ideas or methods that will be used to answer the given problem, c) at the stage of generating problems, self-efficacy male students students with high self-efficacy are able to do calculations through ideas or previously planned methods 2) the profile of creativity in solving mathematical problems of female students with high self-efficacy are: a) at the stage of formulating problems, female students with high self-efficacy are able to collect and organize information to understand problems according to their understanding through writing, b) at the stage of planning problem solving, female students with high self-efficacy are able to plan ideas or appropriate methods that will be used to answer problems, c) at the stage of producing, female students with high self-efficacy are able to answer problems through ideas that are planned as before. 3) the profile of creativity in solving mathematical problems of male students with low self-efficacy are: a) at the stage of formulating problems, male students with low self-efficacy are able to collect and organize information to understand the problem, b) at the planning stage, students boys with low self-efficacy are able to plan ideas, c) at the stage of generating, male students with low self-efficacy are able to do the correct calculations through formulas or previously planned methods. 4) the profile of creativity in problem solving in female students with low self-efficacy: a) at the stage of formulating, women with low self-efficacy do not understand the problem as a whole because they only quote the information written in the questions, b) at the planning stage, women with low self-efficacy has not been able to plan the right ideas or methods that will be used to answer the given problems, c) at the generating stage, women with low self-efficacy are not able to do calculations correctly through ideas or methods. pre-planned way

Keywords: Creativity, Mathematical Problem Solving, Self-Efficacy, Gend

INTRODUCTION

Creativity in learning mathematics is needed in solving various mathematical problems. In essence, humans have the potential to be creative. Students' abilities will be better if their creative abilities are also involved both formally and informally. One type of higher order thinking that is currently getting wide attention among cognitive psychologists and is the goal of education in every country is creative thinking or creativity. Creative thinking and creativity are defined by many experts differently. Some

experts define creative thinking as the same as creativity, but not a few are of the view that creative thinking is different from creativity. This difference is understandable, because creative thinking has a broad and complex field of study.

The description of the students' mathematical creative thinking process can be seen from the students' activities in solving a mathematical problem. Aizikovitsh (2004) says that creative thinking is closely related to solving mathematical problems. Pehkonen (1997) also categorizes several reasons to teach problem solving, one of which is problem solving encourages creativity. Someone who has the ability to think creatively is not only able to solve non-routine problems, but is also able to see alternatives to solving these problems.

According to Hamidah (2012), the diversity of students' thinking characteristics is influenced by several factors. The internal factor that is very influential is students' self-confidence. These beliefs include self-confidence in solving math problems, how to learn/work in understanding concepts, the ability to communicate mathematics with peers and teachers, as well as skills in displaying a certain level of thinking. This is the concept of self-efficacy.

The gender aspect in learning mathematics is a concern for educators. Gender differences not only result in differences in ability in mathematics, but also in how to acquire mathematical knowledge. Many opinions say that women are not quite successful in learning mathematics compared to men. In addition, women almost never have a thorough interest in theoretical questions like men. Women are more interested in practical things than theoretical. But on the other hand, not a few female students who have success in math skills. The importance of the creative thinking process in solving mathematical problems because in addition to the results of this study enriching the theory of the role of gender in creativity, it can also be a reference in learning in classes that are heterogeneous in gender, so that national education goals related to creativity can be realized. For the reasons above, the author tries to conduct a study with the title Profile of Creativity in Solving Mathematical Problems in terms of Cell-Efficacy and Student Gender.

METHODS

This type of research is qualitative research because it is carried out by fulfilling the characteristics of qualitative research. This research was conducted in the even semester in class XI of SMKN 4 Bone. because this study aims to describe the profile of mathematical creativity in terms of self-efficacy and gender, the subject selection is made based on the consistent nature of the data obtained from one subject to another by considering several things, including: student creativity in solving math problems, self-efficacy students and gender. After the subject is selected, the researcher conducts a continuous search for information and stops when the information found has formed a certain pattern.

The prospective subjects in this study were four students in class XI of SMKN 4 Bone who had high and low self-efficacy, namely two male students and two female students. The consideration for choosing male and female subjects is because many studies have shown differences in math and science abilities between boys and girls. The selected subject candidate is expected to be willing to be the subject of research and be able to communicate his thoughts well

RESULTS AND DISCUSSION

1. Profile of Students' Mathematics Problem Solving in the category of High Self-Efficacy Male (LSET)

a. Creativity in terms of process

In formulating the problem, the subject already understands the problem as a whole because it can explain correctly what is known and what is asked, the subject illustrates what is known and what is being asked in the form of a circle image accompanied by logical reasons, and builds ways to solve problems different and appropriate by involving the knowledge and experience gained. Subjects can give a clear response orally. This shows that the subject can observe some of the information contained in the problem. Then the subject makes an initial guess about the answer to the problem by

remembering the formulas that have been given previously. In responding to the problem, the subject initially felt a little confused because the problem had to be solved in more than one different way, but mathematical problem solving could still be controlled. This can be seen at the time of the interview, LSET students are very confident that they are able to complete the TPMM-01 and TPMM-02 correctly and correctly.

In planning problem solving, LSET is able to plan overall problem solving because the subject explains different methods and ideas or methods (formulas and calculations) that will be used to answer these problems, from the first step to the final step. This is in accordance with the characteristics of high *self-efficacy* subjects who do not give up easily and are confident in their ability to write down what formulas are used in planning to solve the problem.

In producing, LSET is able to work on the questions given. LSET subjects can analyze a problem based on the information that has been obtained so that with this information they can easily solve the problem according to the overall plan with a sense of optimism and strong belief in solving the problem even though the question has never been found. LSET implements and writes down ideas or solutions according to the plan, and performs calculations correctly to obtain the correct final result. LSET subjects explain new ideas of solutions that are implemented by performing calculations correctly. The subject in solving the problem does not take a long time, the subject is able to solve the problem less than the allotted time. Subjects are fluent in calculating and crossing out numbers that have a divisor factor so that the time required is very efficient.

b. Creativity in terms of products

Creativity in terms of products in the form of answers given by students shows that male *gender* students with high *self-efficacy* are more creative in providing alternative answers in solving problems given by paying attention to ideas or ways that are applied both from terms of *fluency*, *flexibility*, and *originality*. From the research results in terms of *fluency*, male subjects with *self-efficacy* are classified as very *fluency*, it can be seen that the subject smoothly completes and explains ideas for solving TPMM correctly and precisely. In terms of *flexibility*, the subject is able to explain and solve TPMM with different ideas correctly. In terms of *originality*, the subject is able to find new ideas to solve problems correctly.

2. Profile of Student Mathematics Problem Solving Category Female High Self-Efficacy (PSET)

a. Creativity in terms of process

In formulating the problem, the subject understands the problem as a whole because it can correctly explain what is known and what is being asked in its own words. develop different and appropriate ways of solving problems by involving the knowledge and experience gained. Subjects can give a clear response orally. This shows that the subject can observe some of the information contained in the problem. Then the subject makes an initial guess about the answer to the problem by remembering the formulas that have been given previously. In responding to the problem, the subject initially felt a little confused because the problem had to be solved in more than one different way, but mathematical problem solving could still be controlled. This can be seen at the time of the interview, PSET students believe they are able to complete the TPMM-01 and TPMM-02 correctly and correctly given.

In planning problem solving, PSET is able to plan overall problem solving because the subject explains different methods and ideas or methods (formulas and calculations) that will be used to answer the problem, from the first step to the final step. This is in accordance with the

characteristics of high *self-efficacy* subjects who do not give up easily and are confident in their ability to write down what formulas are used in planning to solve the problem.

In producing, PSET is able to work on the questions given. PSET subjects can analyze a problem based on the information that has been obtained so that with this information they can easily solve the problem according to the overall plan with a sense of optimism and strong belief in solving the problem even though the question has never been found. PSET implements and writes down ideas or solutions according to the plan, and performs calculations correctly to obtain the correct final result. PSET subjects describe a new idea of a solution that is implemented by performing calculations correctly.

b. Creativity in terms of products

Creativity in terms of products in the form of answers given by students shows that female *gender* students with high *self-efficacy* are creative in providing alternative answers in solving problems given by paying attention to ideas or ways that are applied both in terms of *fluency*, *flexibility*, and *originality*. From the results of the research in terms of *fluency*, female subjects with *self-efficacy* are classified as *fluency*, it can be seen that the subject is able to complete and explain ideas for solving TPMM correctly and appropriately. In terms of *flexibility*, the subject is able to explain and solve TPMM with different ideas correctly. In terms of *originality*, the subject is not classified as *originality* because the subject is unable to find new ideas to solve the problem.

3. Profile of Student Mathematics Problem Solving Category Male Low *Self-Efficacy*

a. Creativity in terms of process

In formulating the problem, the subject understands the problem as a whole because it can correctly explain what is known and what is being asked in its own words. develop different and appropriate ways of solving problems by involving the knowledge and experience gained. Subjects can give a clear response orally. This shows that the subject can observe some of the information contained in the problem. Then the subject makes an initial guess about the answer to the problem by remembering the formulas that have been given previously. In responding to the problem, the subject initially felt a little confused because the problem had to be solved in more than one different way, but mathematical problem solving could still be controlled. This can be seen at the time of the interview, LSER students believe that they are able to complete the TPMM-01 and TPMM-02 correctly and correctly.

In planning problem solving, LSER is able to plan overall problem solving because the subject explains different methods and ideas or methods (routine formulas and calculations) that will be used to answer the problem, from the first step to the final step. but there is a plan of ideas used by the subject is not right, the subject is not sure of his ability to write down what formula is used in planning to solve the problem. The subject is not able to find new ideas to complete the TPMM. The subject assumes that there is no other way to solve the problem.

In producing, the subject is able to work on the questions given and perform calculations correctly to obtain the correct final result. LSER subjects can perform calculations according to the plan, but from some of the answers produced there are wrong answers because the initial plan used by the subject is also not correct. When solving problems the subject is not sure of the answers produced in solving the questions even though LSER applies and writes down ideas or ways of solving according to the plan.

From the results of this study, when male students with low *self-efficacy* are faced with math problems and students find problems with these questions, students have the desire to be able to

solve the problems in the questions but students easily give up when they find difficult things. Students will prefer to avoid and give up on existing problems than having to try it first. The subject is no longer able to think of other ways to solve the problems faced by him.

b. Creativity in terms of products

Creativity in terms of products in the form of answers given by students shows that male *gender* students with low *self-efficacy* are less creative in providing alternative answers in solving problems given by paying attention to ideas or ways that are applied both from terms of *fluency*, *flexibility*, and *originality*. From the results of the study in terms of *fluency*, male subjects with low *self-efficacy* are classified as lacking *fluency*, it appears that the subject is only able to provide two alternative solutions for TPMM-01 and three alternative solutions for TPMM-02, but of the three alternatives given to TPMM-02 only one alternative is correct. In terms of *flexibility*, the subject is categorized as less *flexible* because the subject is only able to apply the idea in two ways correctly. In terms of *originality*, the subject is not classified as *originality* because the subject is unable to find new ideas to solve the problem.

4. Profile of Students' Mathematics Problem Solving Category Female Low *Self-Efficacy*

a. Creativity in terms of process

In formulating the problem, the subject did not understand the problem as a whole because he only quoted the information written on the question. The subject is very slow when revealing things that are known on the problem, the subject feels dizzy, confused and there is a sense of laziness to work on / complete the given math problem solving problem. This is in accordance with the characteristics of low *self-efficacy* subjects who do not want to solve difficult problems found. In planning problem solving, PSER is able to plan problem solving. The subject is not sure about the plans used because the plans were found haphazardly. The subject considers that the important thing is that there is more than one solution.

In producing, the subject completes the problem-solving plan that is not according to the plan, meaning that the subject is unable to perform calculations as planned even though he has tried to do it. So it can be said that the PSER subject will stop or give up if it can no longer do it.

From the results of this study, when female students with low *self-efficacy* are faced with math problems and students find problems with these questions, students do not have the confidence to be able to solve the problems in the questions. Students will prefer to give up on the problem at hand rather than having to try it first. Students are careless in solving the problem. Students at the stage of understanding the problem, namely only citing information directly on the problem without adding other information obtained through experience and knowledge possessed. Therefore, PSER cannot continue at the stage of making a completion plan correctly because the data or information obtained from the questions is incomplete.

b. Creativity in terms of products

Creativity in terms of products in the form of answers given by students shows that female *gender* students with low *self-efficacy* are not creative in providing alternative answers in solving problems given by paying attention to ideas or ways that are applied both in terms of *fluency*, *flexibility*, and *originality*. From the results of the study in terms of *fluency*, female subjects with low *self-efficacy* are classified as not *fluency*, it can be seen from the alternative solutions for TPMM-01 given are all wrong and the three alternative solutions for TPMM-02 are also wrong. In terms of *flexibility*, the subject is categorized as not *flexible* because

the subject is not able to apply the correct ideas. Subjects are only able to apply different things that are wrong. In terms of *originality*, the subject is not classified as *originality* because the subject is unable to find new ideas to solve the problem.

CONCLUSION AND SUGGESTION

Conclusion

Based on the results of research and discussion, it can be concluded that the profile of creativity in solving math problems of male students with high self-efficacy in terms of the process to produce creativity products in terms of Products Male students with high self-efficacy are categorized as very creative because they meet aspects of fluency with the existence of alternatives or various ways that are correctly applied to the subject, Creativity in terms of Process. At the stage of formulating high self-efficacy male students understand the problem very clearly. At the generating stage, male students with high self-efficacy are able to apply ideas or methods according to the plan by doing the correct calculations through formulas. While the profile of creativity in solving mathematical problems of female students with high self-efficacy and creativity in solving mathematical problems of male students with low self-efficacy. Profile of creativity in solving mathematical problems of female students with low self-efficacy in terms of the process to produce products. Product terms

Suggestions

Referring to the description of the discussion of the research results and conclusions above, the following suggestions will be made, including:

- a. For students, apart from knowing the creativity of each student, students are expected to be able to develop their creative abilities by working on both open-ended and closed-ended questions. For students in general, it is hoped that it can be a source of information for students that they must have a sense of never giving up and confidence in their abilities in learning mathematics, so as to produce students who never give up in solving problems.
- b. For teachers, by paying attention to the creativity of each student, teachers are advised to develop models, approaches, methods, or learning strategies that support the creation of the process. In addition, teachers are also advised not to get hung up on closed-ended questions, thus opening up opportunities for students to apply and develop their creativity by giving open-ended questions.
- c. For other studies, in order to re-examine the profile of mathematical problem-solving creativity in terms of self-efficacy and gender, it is necessary to verify it by connecting several materials and making better self-efficacy instruments so that they can accurately and accurately determine the category of self. -efficacy of each student. And examine more deeply about students' mathematical abilities that are associated with self-efficacy.

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Makassar: pustaka Refleksi.

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