



The Ability of Communication Mathematics Student Based On Differences of Gender

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The Ability of Communication Mathematics Student Based On Differences of Gender

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Abstract. This study aims to determine students' written mathematical communication skills in terms of students' gender differences. This type of research is descriptive qualitative. The research sample was determined through purposive sampling and based on several criteria. The research sample consisted of 10 students consisting of 5 males and 5 females. Data collection techniques were carried out with in-depth interviews after students finished working on the mathematics communication tests that students had done. Based on the results of the study it was found that the mathematical communication skills of male and female students in solving mathematical problems showed differences, namely the ability of written mathematical communication in male students was only able to identify the purpose of the problem and less able to solve problems in the problem. Whereas the ability of written mathematical communication to female students is able to identify the purpose of the problem and be able to solve the problem correctly. So it can be concluded that the mathematical communication skills of female students are better than male students..

1. Introduction

Mathematics is a science that is obtained by reasoning, using terms that are defined carefully, clearly, accurately, its representation uses symbols or symbols and has meaning and can be used in solving problems related to numbers. Mathematical conditions will be symbols and symbols which require high mathematical understanding to understand it. [1] argues that to improve mathematical conceptual understanding, is to express mathematical ideas to others. By expressing mathematical ideas to others, students can add and build knowledge and thoughts, express ideas, strategies, accuracy, and logic.

Besides that, in learning mathematics, students are also required to be able to think and reason about mathematics and express the results of their thoughts verbally and in written form. [2] The ability to express mathematical ideas to others both verbally and in writing is called mathematical communication skills.

Mathematical communication is also a way to clarify the understanding and concepts they have gained. In opinion [3] through communication, students can explain and expand

their knowledge by understanding mathematical relationships and making mathematical arguments. Students learn to be involved in making mathematical reasons, learn how to criticize themselves and ideas from others and find the right mathematical solutions. So the teacher needs to plan the teaching process appropriately, so that it can give time for students to practice conveying ideas in their own language, and hold students accountable in giving reasons, to create dynamic classes and support students who participate.

Some findings from research [4] show that students' mathematical communication abilities are considered to be still low, especially their skill and accuracy in observing or recognizing a mathematical problem. [5] in their research states that there are three aspects to knowing the process of mathematical communication of students in solving problems, which are seen from the aspects of symbolic, logical, and verbal communication of students. Meanwhile, research conducted [6] states that communication in mathematics can see various difficulties, responses, and images in connecting tasks that have different forms of communication in a visual context. These tasks focus on seeing information directly or listening to information without seeing it. The results of the study revealed that many students responded positively to the assignments given even though some students had difficulty expressing in the form of communication. Next, to know students' mathematical communication skills students need an indicator.

Mathematical communication indicators according to [7] state that indicators of written and verbal mathematical communication abilities include 1) the ability to use mathematical language (notation and terms) to express mathematical information, 2) use mathematical representations (formulas, images, diagrams, tables, graphs) to express mathematical information, and 3) change and interpret mathematical information in mathematical representation. according to [8] mathematical communication indicators, including 1) stating situations, images, diagrams into language, symbols, or mathematical models, 2) constructing and explaining ideas, situations, and mathematical relationships or representing in visual form, 3) expressing everyday circumstances or problems as mathematical representations (images, graphics, languages, symbols), 4) choose and use mathematical representations to solve problems and interpret them. Based on the above indicators, communication skills can be measured by several indicators, namely 1) the ability to express mathematical ideas through written and spoken language, 2) the ability to draw mathematical, 3) the ability to use mathematical symbols, and 4) the ability to solve problems in mathematics 5) make conclusions in writing using their own language.

Many factors need to be considered in students' mathematical communication skills, including the student readiness factor. Student psychology is part of student readiness, and student learning psychology is influenced by student psychology itself. Differences in student gender (gender) can result in differences in student psychology in learning. So that male and female students naturally have many differences in learning mathematics. According to [9] gender differences not only result in differences in abilities in mathematics, but ways of gaining mathematical knowledge.

Based on the above, mathematical communication skills are important abilities that must be developed and possessed by students while gender differences can also affect students' mathematical abilities. For this reason, it needs to be investigated more deeply about how students' mathematical communication skills are based on gender differences. In accordance with the research question, the objective to be achieved in this study is to describe the students' mathematical communication skills which are reviewed based on gender differences.

2. Metode

This research was conducted at high school in the province of Lampung, Indonesia. This type of research is a qualitative descriptive study [11] to illustrate the mathematical communication skills of students in solving mathematical problems in terms of differences in student gender. The selection of research subjects using a purposive sampling technique with the initial procedure of selecting research subjects, choosing male and female students based on gender. Then a written test and an in-depth interview are carried out on each subject, then the results of the test are analyzed. From the process of selecting the subjects, 10 subjects were obtained, namely 5 male students and 5 female students. Data collection techniques were carried out with mathematical problem solving tests, documentation and in-depth interviews.

3. Results and Discussion

3.1 Results

The results of tests of mathematical communication skills conducted on 5 male students and 5 female students, based on indicators of mathematical communication skills and gender differences obtained written mathematical communication skills on male students with the ability to show that male students only meet 2 indicators of 5 an indicator of mathematical communication skills in writing that is able to write what is known to the problem completely and be able to write what is asked in the problem. However, in question number 2, 4 out of 5 male students did not write what was asked of the problem but were able to write answers according to the problem and were able to draw pictures according to the problem. However, in question number 3, 3 out of 2 male students were mistaken in making a reflection picture. The average score of mathematical communication tests obtained by male students is 61.11. Male students do not meet the indicators of the ability to use mathematical symbols because the average student is wrong in using symbols in the transformation matrix in problem number 1, where the shape of the symbol used in problem number 1 is less precise and does not match the shape of the reflection image in the y -axis = x , which makes the picture of answer number 1 wrong. In addition, the subject also did not meet the indicator of the ability to write reasons for answering questions because students did not use the reasons for each step in solving math problems number 1, 2 and 3. Students only wrote how to solve mathematical problems in general and there was no reason why the

results can be like that. Male students do not meet the last mathematical communication ability indicator, namely the ability to make conclusions in writing using their own language because in answers number 1, 2, and 3, students do not make and do not write written conclusions using their own language. students finish on the final answer from solving the problem, there are no written conclusions whatsoever on the answer sheet.

Mathematical communication skills written to female students indicate that female students meet all indicators of mathematical communication skills, namely the ability to write what is known and asked according to the problem, namely 4 out of 5 students write in full what is known and asked about the problem, the ability to write answers according to the purpose of the problem namely the answers written by students in accordance with the intended purpose of the problem, the ability to make pictures relevant to the problem ie the pictures made by students in accordance with the problem but in question number 3, 3 out of 5 students are wrong in making pictures where students are wrong in determine the translational points on the x-axis and the y-axis, the ability to make mathematical symbols, that is, students are able to use symbols on transformation in questions number 1, 2, and 3. The ability to make reasons in answering questions, namely students write reasons reasons in each step of completion math problems so that the answers from students are easy to understand, and the ability to make conclusions in writing using their own language, namely students write written conclusions in their own language when they finish writing the final answer to the problem being worked on. The score obtained by the female students is 85.18. This shows that the written mathematical communication skills of female students are good.

3.2 Discussion

For each aspect of mathematical communication skills it is found that the aspect of writing is higher in average compared with aspects of drawing and mathematical expressions for male students while the aspect of drawing is higher in average value compared with aspects of mathematical expression and aspects of writing for students women.

This result is in line with research conducted by Rohmah & Khabibah [10] which states that the written mathematical communication profile of male students with the cognitive style of Field Independence in solving mathematical problems, at the stage of understanding the problem, he writes the things that are known and asked accurately but incomplete. Then the written mathematical term / notation is accurate but incomplete. Meanwhile, the land drawings he made are accurate and complete. While the written mathematical communication profile of female students with Field Independence cognitive style in solving mathematical problems, at the stage of planning problem solving, it uses an accurate and complete resolution strategy. However, the mathematical term / notation that is written is inaccurate and incomplete.

Whereas [11] in his research stated that at the level of creative thinking male students who have a moderate level of motivation in solving mathematical problems, students can mention and write what is known and what is asked in understanding the

problem. But students cannot make problem solving plans. While at the level of creative thinking women students who have a high level of motivation in solving mathematical problems, at the stage of planning problem solving, students are able to carry out plans that have been made and also students can use more than one way. In addition, in re-examining the results of solving, students are able to check the steps and calculations of the results obtained. Highly motivated female students can demonstrate fluency, flexibility and novelty.

Likewise the results of research conducted by [12] that male students tend to give two to three representations, while women tend to give three to four representations in solving open problems related to number material. So the multi representation is more raised by female students than male students. The representations raised by students in solving open problems with material numbers, in their research are representations of tables, graphs, pictures, equations, and verbal. But the results of research conducted by [13] states that the mathematical communication skills of students who have a Field Dependence cognitive style with different genders do not have much difference and the mathematical communication abilities of students who have a Field Independence cognitive style with different genders also do not have many differences. This is possible because the difference in students' communication skills in this study is only around 9%, so that even though there are differences but not too large.

4. Conclusion

Based on the results of research and discussion in this study, the researcher can draw the conclusion that students' mathematical communication skills are not good. Because the communication skills of writing to male students are only able to identify the purpose of the problem and are unable to solve the problem in the problem. While the written mathematical communication skills of female students are very good. Because writing communication skills in female students are able to identify the purpose of the problem and able to solve problems in the problem correctly. In this case, the mathematical communication ability of female students is better than that of male students because the cognitive abilities of female students are higher than that of male students.

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