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How Self-Efficacy in Mathematic Based on Gender Perspective?

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Abstract
This study aims to determine whether there are differences in self-efficacy between MTs male and female students in Mathematics. This research is a quantitative study to determine the level of self-efficacy in 108 male students and 118 female students of class VIII MTs An-Nur Bululawang, using a self-efficacy questionnaire consisting of reasoned statement items with a reliability value of 0.844. The analysis showed that the average self-efficacy in mathematics learning for male students was 92.77 and for female 90.27 of the maximum value of 120, was in the high category. This shows that most male and female students have great confidence in solving mathematical problems. Therefore, it can be said that there is no significant difference in mathematical self-efficacy between male and female students.

Keywords: *Self-efficacy, Mathematic, Gender*

INTRODUCTION

During this time, the field of study that is quite the focus of students is mathematics. Mathematics has a role that greatly contributes to science and technology. Mathematics becomes the right tool for problem solving in science (Rahayu & Hidayati, 2018). Although most students have difficulty in understanding complex mathematical concepts. Students tend not to think critically in completing learning tasks because it is too abstract and many symbols that must be understood. The abstract mathematical nature is in line with the opinion (Lestari et al., 2019) suggesting the mathematical characteristics, which are abstract, based on agreement and deductive thinking. Students also often experience difficulties in problem solving skills. Teachers' lack of creativity in teaching makes mathematics seem difficult, one of which is the lack of trust in their abilities. Students are not sure that they can solve the questions given by the teacher. Lack of confidence in one's abilities can reduce self-efficacy to affect how students deal with a problem. This is important because mathematics is a fundamental subject that benefits everyday life (Qolbi et al., 2019).

The importance of knowing the characteristics of students by educators of what needs are needed in learning. This is because, every human being has different learning ins and outs (Thaariq et al., 2020). Self-efficacy is typical of learners. One of them is the decrease in students' self-efficacy in understanding mathematical concepts causing low student learning outcomes. Research related to self-efficacy is a major focus in science, Technology, Economics and Mathematics (Sheu et al., 2018).

Furthermore, in studies published to date, the most influential and applicable source of self-efficacy is self-efficacy in mathematics (Zientek et al., 2019; Sandilos et al., 2020;

Regier & Savic, 2020). Self-efficacy believes that someone can master the situation and give positive results (Santrock, 2018). It is important to assess how high a person's mathematical self-efficacy is towards a particular task.

Math self-efficacy can be categorized as low which is indicated by the achievement of low learning outcomes. Self-efficacy in mathematics largely determines student learning outcomes. Knowing the level of mathematical self-efficacy makes it easy to determine student learning outcomes (Concannon & Barrow, 2009). The low learning outcomes because students feel the difficulty of learning mathematics are serious problems that must be addressed immediately. By most students, mathematics is a scourge and feel mathematics is difficult (Fuchs et al., 2019). Difficulties in learning mathematics perceived by students include the arising of worries, anxiety and fear resulting from a lack of trust in his efforts to complete the task (Sunaryo, 2017). These feelings cause low mathematics learning outcomes (Mashudi, 2016). Therefore, learning mathematics must be learned with the correct understanding to solve the learning problems they face (Lestari et al., 2019).

Four factors influence the level of self-efficacy that supports one's learning outcomes. These factors from social cognitive theory by (Bandura, 1995; Bandura, 1977) namely achievement, learning experience, verbal persuasion, and physiological conditions are four factors that determine individual self-efficacy and influence individual choices about whether to engage in certain tasks and persevere in certain tasks. Learning achievement is the most significant determinant of one's self-efficacy. In addition to learning achievement, learning experiences also influence learning outcomes and how students deal with existing challenges. When students know a particular domain, they can encode with specific information more efficiently than less knowledgeable students ". Thus, working memory integrates skills, knowledge, and procedures to meet the demands of learning tasks in a particular domain (Peng et al. , 2016) The learning experience factor greatly influences self-efficacy and constructs students' achievement motivation.

According to (Bandura, 1977) states there are three dimensions of self-efficacy: magnitude level, strength level and generality level. The success of individual beliefs in different dimensions has important performance implications, more clearly can be described include: 1) Magnitude level is the ability of a person to complete a task that has different levels of difficulty; 2) Strength level, is a belief in the amount of stability an individual will have in his beliefs as well as the expectations he makes; and 3) Generality level, which is related to the broad scope of an individual's belief in his ability. Self-efficacy affects how individuals think, act and motivate themselves. Self-efficacy is an individual's trust in competence in managing and completing a task to achieve certain results. The dimension of self-efficacy is used as an instrument of students' confidence in facing certain tasks. Students need high self-efficacy to understand concepts and solve mathematical problems to achieve success by the expected goals.

Self-efficacy is divided into high efficacy and low self-efficacy (Kurniawati, 2014). Individuals with high self-efficacy can reduce anxiety about failure and improve cognitive abilities. The higher the individual's self-efficacy, the greater the effort spent to face the challenges. students who have high self effiacy can do what is needed to achieve certain results and tend to put more effort in activities than students with low self-efficacy, students also show more perseverance and endurance when engaging in challenging activities. It is important to understand students' characteristics by educators in learning so that students' self-efficacy is not low (Zientek et al., 2019). Low self-efficacy generally makes students less successful and less likely to do difficult tasks also consider when getting challenging assignments (Schöber et al., 2018). High or low self-efficacy is influenced by gender (Lishinski et al., 2016).

Male and female have different levels of self-efficacy, seen from how students respond to a problem at hand. Female tend to use

feelings in dealing with a problem, whereas male are more logical minded. Rational thinking tends to be in men while female are identical using feelings (Banes et al., 1992). These differences will affect male and female students' ability in mathematics (Zeldin et al., 2008). Several previous studies related to the importance of students' mathematical self-efficacy, showed that gender did not affect individual beliefs about a problem.

Some studies suggest differences of opinion on mathematical self-efficacy between male and female students. As opinion (Riani & Rozali, 2014) states that female's self-efficacy is higher than male. Also, in completing certain tasks, female students' self-efficacy is higher than that of male (Yuliani et al., 2018). Inversely with the opinion (Liu et al., 2017), self-efficacy in female is lower than male, because female need stronger confidence in their ability to manage all tasks than male. Furthermore, male and female students have unequal self-efficacy that causes different learning outcomes (Santrock, 2018).

Furthermore, there are differences between male and female students (O'brien et al., 1999; Pajares, 2002; Schyns & Sanders, 2005; Britner & Pajares, 2006). Research (Concannon & Barrow, 2009) states there is no significant difference in self-efficacy in gender. Some of these differences of opinion indicate that self-efficacy in mathematics between male and female students is important to study. Knowing how much students believe in learning will make it easier for educators to determine strategies or approaches to achieve maximum goals. This study was present to determine whether there were differences in students' mathematical self-efficacy in terms of gender.

METHOD

This research is a quantitative study to determine the differences in mathematical self-efficacy of male and female students. The sample of this study was 226 VIII grade MTs An-Nur Bululawang students. Sampling uses a purposive sampling technique in which this technique is determined based on the population's characteristics and nature. The purposive sampling technique was divided into two categories, namely male and female students (Ethics, 2016). Sampling was 108 male students with 118 female students from the total population. Class VIII at MTs Annur Bululawang consists of six classes, each class having relatively different abilities so that all classes used in this study can represent the existing population.

The type of research data in the form of quantitative data obtained from students self-efficacy questionnaire mathematics. The mathematics self-efficacy questionnaire consisted of 30 statement items with a reliability of 0.844. The self-efficacy questionnaire used in this study developed a self-efficacy scale based on Bandura's theory. Tori Bandura's self-efficacy scale consists of three dimensions, namely Magnitude, Strength, and Generality. The data obtained from the mathematics self-efficacy questionnaire were analyzed using the Independent Sample t Test to determine whether there were any differences between the mathematical self-efficacy of male and female students.

RESULT

Self-efficacy variable will be tested hypothesis, the process of the stage of data analysis is done prerequisite test data of research results. Statistical analysis states that the data are normally distributed, so the data normality test and homogeneity test are performed to determine whether the sample studied is from a normally distributed population or not. Following are the results of the normality of research data in Table 1.

Table 1 Test Normality Outcomes Data

Group	Score	*Kolmogorov-Smirnov*	*Sig.*	Information
Male	Self-efficacy	0,873	0,431	Normal distribution
Female	Self-efficacy	0,989	0,282	Normal distribution

The basis for decision making from the Kolmogorov-Smirnov test uses a significance value (p-value). The test results' significance value greater than alpha of 5% indicates that the data used are normally distributed. In

the self-efficacy value, from the assumption of normality using the Kolmogorov-Smirnov method, a significance value (p-value) greater than 0.05 was obtained in both groups to conclude that the self-efficacy data was normally distributed. The following results of homogeneity test research data in Table 2.

Table 2 Homogeneity Test Variety of Learning Outcomes Data

Variable	Group	*Levene Statistics*	*Sig.*	Information
Self-efficacy	Male Female	0,103	0,748	Ragam Homogen

Based on the table above, the significance value (p-value) of the Levene test in the Self-efficacy comparison between male and female is greater than 0.05 so it can be concluded that the results of research have homogeneous range of values between groups to be compared. Whereas in the Problem Solving Ability data, the significance value (p-value) of the Levene test is smaller than 0.05 so it is concluded that the results of the study have a variety of values that are not homogeneous between groups to be compared. This study, to determine whether there are differences in male and female mathematical self-efficacy, students were given a questionnaire of 30 statement items. The average results of the mathematics self-efficacy questionnaire for male students can be seen in Table 3.

Table 3. Average mathematical self-efficacy of male students

Number	Interval self efficay	Number of students (%)	Information
1	0-40	7,0 %	Low
2	41-80	26,9%	Middle
3	81-120	66,1 %	High
Average	-	-	92,77

Table 3 shows that the mean score of male students' self-efficacy mathematics is 92.77 from the maximum value of 120. This shows that many students have self-efficacy which can be categorized high in mathematics learning. Table 3 shows that 7.0% of students scored less than 40, 26.9% of students scored between 41 and 80, and 66.1% of students scored above 81, so it can be said that students have grades above the average. This shows that many students have high self-efficacy in mathematics learning. The following is an interpretation of the female mathematical self-efficacy questionnaire results, which can be seen in Table 4.

Table 4. Average mathematical self-efficacy of female students

Number	Interval self efficay	Number of students (%)	Information
1	0-40	13,7 %	Low
2	41-80	22,1%	Middle
3	81-120	64,2 %	High
Average	-	-	90,27

Table 4 shows that the average score of female students' self-efficacy mathematics is 90.27 from the maximum value of 120. This shows the similarity with Table 3 that many students have self-efficacy which can be categorized high in mathematics learning. Table 4 shows that 13.7% students obtained grades less than 40 as many as 22.1% of students scored between 41 and 80 and as many as 64.2% of students scored above 81, so it can be said that students have grades above the average. This shows that many female students have high self-efficacy in learning mathematics. The following are interpretations of the statistical description of research data in Table 5.

Table 5. Descriptive Statistics of Research Result Data

Descriptive Statistics	Male Group Self-efficacy	Famale Group Self Efficay
N	108	118
Minimum Value	51	57
Maximum Value	120	119
Mean	92,77	90,27
SD	17,00	17,70

Furthermore, the data were analyzed using the Independent Sample t Test. The unpaired t Test is used to test whether there is an average difference

between the two independent groups. The basis for making this test decision is by using t-value and significance value (p-value). T-values greater than the t-table or significance value (p-value) smaller than alpha of 5% indicate that there are significant mean differences between the two groups being compared. Interpretation of the Independent Sample t Test results in Table 6.

Table 6 Independent Sample t Test

Outcomes learning	Group	tCont	Sig.	Information
Self-efficacy	Male famale	1,080	0,281	No significant difference

Information: $t_{table\ (5\%;\ 224)} = 1{,}971$

Based on the table above, in comparing Self-Efficacy values between female and male, the tcount value is 1.080 with a significance value of 0.281. Because the value of tcount <ttable or the significance value is greater than the real level of 5%, it is concluded that there is no difference in the value of Self-Efficacy between female and male.

DISCUSSION

Based on the reearch results that have been done, students have high self-efficacy categories both male and female. The analysis showed that there were no significant differences between male and female. The study results explained that 226 students among 118 male and 108 female students had a mean of 90.27 while male students with a mean of 92.77 meant that male self-efficacy outperformed female students. Male have the advantage of self-efficacy in mathematics, computers and social sciences while female have high self-efficacy in the field of Language Arts (Huang, 2013). Although male mathematical self-efficacy outperforms female, but in this study based on the results of the analysis there is no difference in the value of self-efficacy between male and female.

The results of mathematical self-efficacy values by giving a questionnaire can describe male students' level of belief in learning mathematics. As shown in table 3, the student's mathematical self-efficacy level is not lower than 7.0%. This shows that a small proportion of students have low self-efficacy. It seems that some students depend on their peers because they are not sure of their abilities. Students feel less confident in doing assignments compared to their peers (King-Sears & Strogilos, 2020). The medium category with 26.9% mathematical self-efficacy shows that some students have low confidence, while 66.1% have mathematical self-efficacy in the high category. Many students feel confident and capable in solving mathematical problems they face. Students are confident that studying hard and also focusing on learning can improve student learning outcomes in mathematics. Self-efficacy learning outcomes correlate with academic achievement: Students feel more competent when they do well and highly value their assignments (Denissen et al., 2007; Zientek et al., 2019). While female students the results of the self-efficacy questionnaire were in the low category of 13.7%.

Furthermore, students in the medium category were 22.1% and students in the high category were 64.2%. This shows that most female students have a good level of self-efficacy. When faced with certain tasks female complete well. A good task if students can complete it confidently (Officials & Hamdan, 2019). High or low self-efficacy of an assignment also affects student learning behavior and learning outcomes (Joo et al., 2013).

Self-efficacy is a person's belief in separately doing something to achieve the goal. Students with high self-efficacy will be better able to withstand the problems they face and fail to solve mathematical problems due to lack of effort or learning. Conversely students who have low self-efficacy more easily give up facing mathematical problems. Students who have difficulty in solving tasks and failures are considered due to low confidence in ability. Someone who has high self-efficacy can reduce the fear of failure and improve cognitive abilities, so that the higher the self-efficacy perceived by someone, the more effort will be expended to face the challenges (Davis et al., 2011; Kurniawati, 2014).

Self-efficacy is one important factor in determining student mathematics learning

outcomes, especially in carrying out tasks in problem solving problems. Students who have high self-efficacy will have good mathematical problem solving skills. Seen when students fill in the self-efficacy questionnaire, both male and female students tend to match the confidence level according to their respective conditions. In line with the opinion (Imro'ah et al., 2019) states that if viewed according to the results of the questionnaire calculation, the significance of self-efficacy of 0.488 can be concluded there is no significant difference in self-efficacy between male and female.

When taking data on the value of self-efficacy, students' answers varied, as well as the results of scoring the answers, showing that many students felt confident about their mathematical abilities. Although there are some questionnaire items that they don't understand, students generally answer them well. This illustrates that confidence in learning mathematics is high. Although female students outperformed male students when solving the problem test, female with an average of 76.97 met the value of the minimum completeness criteria, while male did not meet the criteria of 56.26. These results are consistent with research conducted by (Bench et al., 2015) suggesting that there is no gender difference in mathematical self-efficacy. Gender differences in mathematics do not have to be caused by female who underestimate abilities, but rather male who overestimate their abilities, and they have the same abilities when given the task. However, their way of responding to a problem is relatively unequal. Students who have high self-efficacy are not necessarily good at solving mathematical problems (Khatimah & Fatmah, 2019). In line with opinions (Salavera et al., 2017) states gender does not affect self-efficacy, social skills, and emotional intelligence.

Student self-efficacy in mathematics contributes to predicting student performance when solving mathematical problems. Self-efficacy will affect students' learning patterns and student behavior in making a decision. Research on self-efficacy from social cognitive theory highlights the flexibility of self-efficacy beliefs (Laviolette et al., 2012). Self-efficacy is a strong predictor in learning mathematics (Huang et al., 2019).

Based on several theories explain that self-efficacy is divided into three dimensions: 1) Magnitude, namely the ability of students to complete tasks with different levels of difficulty; 2) strength, namely the stability of confidence refers to the degree of confidence or expectations made; and 3) generality, namely general belief in students' abilities. The self-efficacy dimension is a scale of students' beliefs in perceiving belief in the ability of learning tasks. This is in line with (Universitas Lampung et al., 2019) the results of the study showed that there were no significant differences in self-efficacy between male and female in all dimensions of self-efficacy in VIII grade junior high school students found between male and female having self-efficacy relatively the same, both in the dimensions of Magnitude, Strength, and Generality.

According to (Bandura, 1997) in the social cognitive theory that he developed explains the factors that affect self-efficacy there are four, namely: 1) Achievement; 2) The experience of others; 3) Verbal persuasion; and 4) emotional state. Students who find it easy to complete a task have high self-efficacy for the task. The experience of failure tends to damage the self-efficacy of certain tasks. For students who lack experience, observing other students who are perceived to be better can influence their self-efficacy. Students use these strategies to assess the likelihood of them completing certain tasks. Emotional conditions are the biggest control for students controlling self-confidence in completing a task. Four factors that determine student self-efficacy, namely learning achievement, others' learning experiences, verbal persuasion, and physiological conditions, influence students to engage and persevere in completing certain tasks (Huang et al., 2019).

In general, mathematical self-efficacy for both male and female is at a high category level. Male and female each have an optimistic view of solving mathematical problems by optimistic thinking, persistent in solving mathematical problems, not feeling difficult and not feeling hopeless in solving problems. Furthermore, research conducted

by (Agustina, 2019) suggests that the results of the independent sample t-test show that there is no difference in the self-efficacy of male students and female students. Subsequent research conducted by (Sezgintürk & Sungur, 2020) states there is no gender bias in the learning environment, evidenced by the analysis results revealed that there were no statistically significant differences in self-efficacy between boys and girls . In line with several studies which state that gender does not affect one's mathematical self-efficacy (Pajares & Kranzler, 1995; O'brien et al., 1999; Durndell et al., 200; Lloyd et al., 2005; Kenney-Benson et al. , 2006; Friedel et al., 2007; Iskender, 2009; Hyde, 2014; Bench et al., 2015; Sasmita & Rustika, 2015; Bui et al., 2017; Agustina, 2019; and Sezgintürk & Sungur, 2020).

CONCLUSION

This study shows the high mathematical self-efficacy of male and female students. The high self-efficacy based on the average value of student questionnaires' results are 92.77 for male and 90.27 for female from the maximum value of 120. This shows there is no significant difference in self-efficacy between male and female. In general, the results of the answers given by students varied and the results of scoring the results of the answers, showing that many students felt confident about their mathematical abilities. Although there are some questionnaire items that they don't understand, students generally answer them well.

Mathematics self-efficacy is important to study. By examining how high students have confidence in mathematics can provide important information for educators to prepare learning strategies. Where every student has characteristics and learning needs that are not the same, both male and female.

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