



ANALYSIS OF MATHEMATICAL CONNECTION ABILITY ON GENDER DIFFERENCES OF JUNIOR HIGH SCHOOL STUDENTS

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Abstract

Mathematical connection ability is one of the mathematical abilities that students need to master. The mathematical ability of each student can be different. One of these differences comes from the gender factor. The purpose of this study is to analyze the ability of mathematical connections to gender differences. A total of 92 grade VII students of SMP N 3 Bantul became the subject of this study. This type of research is descriptive quantitative research. The research instrument uses mathematical connection ability test questions with three indicators, namely connecting concepts between mathematics, connecting mathematical concepts with other fields of science and connecting mathematical concepts with everyday life. The data collection technique is using a test technique. The data obtained was then given a score and then analyzed and conclusions were drawn. The results of the study showed that there were differences in the mathematical connection abilities between male and female students where the female students' mathematical connection abilities were superior to male students.

INTRODUCTION

One aspect that has a major contribution in human life is education (Alpian et al., 2019). Humans will find it difficult to develop if there is no education. Education as a learning experience is not limited to space, time and form (Noor, 2018). Education must be guided in order to produce a generation that is of high quality and able to compete. Basically, the purpose of education is to improve human dignity and degree (Rosyana & Effendi, 2021). In the field of education, mathematics is one of the sciences that must be studied. The purpose of math classes is to prepare students to solve problems that arise in real life. Mathematics lessons are taught from elementary school to university (Aledya, 2019; Anggraeni et al., 2022).

Mathematics is a science taught at school conceptually and thematically that is interconnected with other knowledge in everyday life (Muslihat et al., 2019). Learning mathematics is the formation of a way of thinking in interpreting understanding and reasoning a connection between certain values (Azhari et al., 2020; Julaeha et al., 2020). The knowledge in mathematics is universal (Tuankotta & Jana, 2021). This results in the knowledge in mathematics must continue to be developed so that students' problem solving skills increase. By linking problems with existing principles in mathematics and using mathematical skills as a communication tool, mathematics education encourages students to be ready to face problems that arise in the future (Khoadah et al., 2019).

The disciplines covered in mathematics can develop mathematical thinking skills in students which result in students being able to develop these abilities to solve problems that arise in life. Mathematics is considered a very helpful instrument for solving problems in other branches of research because of its significant contribution to the advancement of technology and science. Learning mathematics requires students to harmonize each concept and there are also relationships in each concept that cannot be solved (Abidin et al., 2020). The National Council of Teachers of Mathematics or NCTM has set five standards for students' mathematical communication skills including proof and reasoning, problem solving, mathematical communication, mathematical connections and necessary representation (NCTM, 2000). Students need to develop mathematical connection skills because they can communicate concepts that occur in mathematics when they have this ability (Noviyana et al., 2018).

Mathematical connection is a skill that requires students to be able to show mathematical relationships both internally and externally (Aliyah et al., 2019). According to NCTM, students must understand mathematical relationships because it will help them understand the subject matter and solve difficulties. Students who master mathematical connection skills can explore the material taught by the teacher so that they do not forget quickly, on the other hand, students who do not master mathematical connection skills tend to only memorize the concepts so that they will forget quickly (NCTM, 2000). Making mathematical connections is a skill that, in addition to this point of view, according to Pamila and Luvy, helps students in connecting one mathematical idea with another, recognizing how mathematical concepts relate to concepts from other disciplines, and applying these concepts in practical settings (Malinda & Sylviana Zanthly, 2017).

Mathematical connection skills need to be developed in students as an ability to solve problems (Salmina & Nisa, 2018). There are several markers of mathematical connection ability that can be used as a standard to select children with the right abilities. Indicators of mathematical connection ability evaluated by NCTM are as follows: (1) connecting mathematical ideas; (2) connecting mathematical ideas with other insights; and (3) connecting mathematical ideas with actual circumstances (NCTM, 2000). When students are able to connect all markers of mathematical connection ability, their mathematical connection ability is considered good (Shohibah et al., 2022). From these indicators, mathematics can be said to be a broad science. This means that the knowledge in mathematics is not only useful for mathematics itself, but also other sciences in everyday life (Isnaeni et al., 2018).

This mathematical connection ability needs to be owned by each individual student. With mathematical connection skills, students can understand a concept concretely and can

help students to improve students' understanding of concepts both in mathematics and outside mathematics (Widiyawati et al., 2020). When students realize the importance of mathematical connection skills and have mastered them, students can build their own knowledge with the material they have obtained. Students who have good mathematical connections can solve problems well and well (Baiduri, 2020).

Student readiness is one of the factors that need to be observed when studying mathematics (Amsari, 2018). One part of student readiness is student psychology, student learning psychology is influenced by student readiness (Nugraha & Pujiastuti, 2019). Gender differences can affect student psychology and how to learn math. These differences also affect students' mathematical thinking skills. Gender differences not only have an impact on skills in mathematics but how to gain an understanding of mathematics itself and gender differences also have an impact on differences in attitudes towards learning (Aliyah et al., 2019). Given that each individual has different uniqueness, each individual also has their own strengths and weaknesses (Umaroh & Pujiastuti, 2020).

Gender can be interpreted as a concept related to the position of men and women (Arianti, 2020). According to Alifiulahtin Utaminingsih, gender is a social structure or form that is not innate, so that in practice it can be built or varied according to the region or place, time, customs, social position, religious beliefs, state ideology, politics, law and economy (Utaminingsih, 2017). Gender is the difference between men and women in the fields of function, position and personality in line with the rules that apply in society (Arianti, 2020). Gender is not a provision from God, so gender relates to the position of men and women in actions that are in line with established norms. It can be underlined that gender is something that distinguishes between men and women in various ways.

Gender differences not only affect their social status, but also have an impact on the learning process. In line with what Shohibah et al. revealed that gender differences affect the learning process and students' mathematical communication skills (Shohibah et al., 2022). Ita Mafajatul et al. also revealed that gender, social, culture have an impact on the learning process of mathematics (Aliyah et al., 2019). As a result of differences in men's thinking methods, daily activities, and differences in brain capacity, gender differences also affect the emotions, behavior, mindset, and IQ of men and women (Aliyah et al., 2019).

Junior high school students are students with a transition age from the child phase to the adult phase (Agustiawan & Puspitasari, 2019; Junengsih et al., 2022). This phase is often referred to as the adolescent phase. The age range of junior high school students is between 12 years and 15 years (Kamal & Rochmiyati, 2022). In this phase students have a tendency to seek their identity by showing bad behavior (Agustiawan & Puspitasari, 2019).

The impact of the important role of mathematics is seen in other subjects and in life (Aledya, 2019). Mathematics learning is needed to foster embedded concepts in mathematics (Widiyawati et al., 2020). In reality, there are still many people who do not realize the benefits of mathematics education in life. Many people think that math is knowledge that is difficult to understand so they are reluctant to learn math (Manalu et al., 2020). Even though almost every problem that exists in everyday life is closely related to mathematics (Arianti, 2020). In people's minds, math is synonymous with formulas and calculations (Gulo et al., 2022). In fact, there are many things that can be obtained by studying mathematics. Studying mathematics can develop various skills, one of which is mathematical connection ability.

Research conducted by Tonnie Hari and Heni Pujiastuti showed that there were differences between the abilities of female students and male students (Nugraha & Pujiastuti, 2019). In this study, female students outperformed male students in mathematical connection skills, while Sari et al's research also proved that female and male students differ in their capacity to make mathematical connections (Sari, 2020). However, in this study, male students' mathematical connections performed better than female students' mathematical connections. Dewi Krisnawati's investigation found a disparity in mathematical connection capacity against gender differences on the topic of flat shapes, agreeing with the findings of the previous two studies (Krisnawati, 2021).

Due to the importance of mathematical connection skills, every student, both male and female, needs to have mathematical connection skills. This prompted the researcher to conduct a study in one junior high school located in Yogyakarta province. In this study, the question will arise whether there are differences in mathematical connection skills towards gender differences. Thus, the main objective of the study is to identify gender gaps in students' skills of connecting mathematical concepts with triangles and quadrilaterals.

Research Methods

Type of Research

This study uses a quantitative descriptive method with the aim of examining how gender differences affect mathematical connection skills.

Time and Place of Research

This research was conducted at SMP N 3 Bantul from March 10 to May 14, 2022.

Research Subjects

All seventh grade students of SMP N 3 Bantul became the population in this study, and the research sample amounted to 92 people consisting of 54 female students and 38 male students. Cluster random sampling was the method used for sampling.

Procedure

The learning tool includes five essay questions on the topic of triangles and quadrangles divided into three markers of mathematical connection ability: bringing together ideas from different fields, including mathematics, with ideas from everyday life. Indicators for relating mathematical designs to other disciplines can be found in questions 1, 3 and 5, while those for connecting them to applications in other fields can be found in questions 2 and 4, respectively.

Data Sources, Instruments and Data Collection Techniques

The test technique was used in this study to collect data. Mathematical connection ability test questions were used as instruments in the study. The test instrument is tested with 80 minutes, after completion students can send answers through collecting their answers. The steps in this study are 1) preparation activities, 2) making test questions of mathematical connection skills, 3) validating the test, 4) analyzing the validation results data, 5) collecting test data, 6) analyzing test data, 7) writing conclusions.

Data Analysis Techniques

The data that has been collected is then scored, given a value and then analyzed. The degree of students' mathematical connection ability is determined by categorizing the scores after the results of the students' mathematical connection ability test are received.

The categorization of this test is based on a five scale by Suharsimi Arikunto (Arikuntoro, 2018) which is explained in the following table:

Table 1

Categories of Mathematical Connection Ability Test Scores

Mathematical Connection Ability Test Score Range	Categories
$85 \leq \text{score} \leq 100$	Very Good
$70 \leq \text{score} \leq 84$	Good
$60 \leq \text{score} \leq 69$	Fair
$45 \leq \text{score} \leq 59$	Less
$0 \leq \text{score} \leq 44$	Very Poor

RESEARCH RESULTS AND DISCUSSION

Research Results

1. Test Instrument Analysis Results

The research instrument in the form of test questions on the subject of triangles and rectangles consists of five items with three indications of mathematical connection. The following are the results of the item analysis of the test instrument:

Table 2
Item Analysis

Analysis	Question Number 1	Question Number 2	Question Number 3	Question Number 4	Question Number 5
Difficulty Level	0,99 (Easy)	0,77 (Medium)	1,25 (Easy)	0,94 (Easy)	0,89 (Medium)
Reliability	0,94 (Very high)				
Distinguishing Power	0,39 (Medium)	0,54 (Good)	0,37 (Medium)	0,43 (Good)	0,26 (Medium)
Validity	Valid	Valid	Valid	Valid	Valid
Maximum Score	10	10	10	10	10

Indicators of mathematical connection ability are evenly distributed in five problem numbers, where the first indicator, namely connecting concepts between mathematics, is found in problem numbers 1, 3 and 5. The second indication that connects mathematical concepts with other insights is found in problem number 2, and the third indication that connects mathematical ideas with everyday life is found in problem number 5. The difficulty level of each number is different, as shown in Table 2. With a difficulty score of 0.99, problem number 1 is classified as simple. With a difficulty level of 0.77, question number 2 is classified as having a medium difficulty level. With a difficulty level of 1.25, question number 3 can be said to have an easy level of difficulty. With a difficulty level of

0.94, question number 4 is classified as simple, while for number 5 the difficulty level is 0.89 which can be categorized as a question with a medium difficulty threshold. Reliability for questions number 1 to 5 is 0.94 which is classified in a very high category. This indicates that the error in measurement is very small. Table 2 also shows that the differentiating power for each question is different. Question number 1 has a differentiating power of 0.39, which means that the differentiating power is in the medium category. Problem number 2 has a differentiating power of 0.54, which means that the differentiating power is in the good category. Problem number 3 has a differentiating power of 0.37, which means that the differentiating power is in the moderate category. Problem number 4 has a differentiating power of 0.43 which means that the differentiating power is in the good category, while for number 5 the differentiating power is 0.36 which means that the differentiating power is in the moderate category. Furthermore, table 2 also shows that all items are declared valid. The maximum score for each item is 10.

2. Test Result Analysis of Students' Mathematical Connection Skills Based on Gender

Three indicators of mathematical connection ability for gender differences were tested on 92 seventh grade students of SMP N 3 Bantul, with 38 male and 54 female students as follows:

Tabel 3
Mathematical Connection Ability Test Results

No.	Indicator of Mathematical Connection Ability	Max Score	Average score of male students	Categories	Average score of female students	Categories
1	Connecting mathematical ideas	10	74	Good	78	Good
2	Relate math concepts to other insights	10	81	Good	87	Good
3	Relating math concepts to life	10	73	Good	76	Good
Total		10	76		80	

Table 3 shows that in the first indication, that is the ability to connect mathematical ideas, female students outperform male students. This is shown from the average score of female students which is 78, while the average score of male students is 74. The difference between the average score of female students and male students is 4.

In the second indicator, that is connecting mathematics with other sciences, female students also outperform male students. This is shown from the average score of female students which is 87, while the average score of male students is 81. The difference in the average score between female students and male students is 6.

In the third marker, that is linking mathematical designs in every day life, female students outperform male students. This is shown from the average score of female students which is 76, while the average score of male students is 73. The difference in the average score between female students and male students is 3.

The results of the analysis of the three indicators of mathematical connection ability show that the average score of male students is 76, while the average score of female students is 80. The difference between the average score of male students and female students is 4.

Discussion

From the results of student work that has been collected, some random answers are selected which will be examined and researched where the misconceptions of student work are located to represent the results of students' mathematical connection skills based on gender as follows:

$$\begin{aligned} \text{Luas layang} &= \frac{1}{2} \times D1 \times D2 \times D3 \\ &= \frac{1}{2} \times 6 \times 6 \times 10 \\ &= 180 \text{ cm} \end{aligned}$$

Figure 1
Student Answer (1)

$$\begin{aligned} \text{L Persegi Panjang} &= P \times l \\ &= 12 \times 16 \\ &= 192 \text{ cm} \\ \text{L layang-layang} &= \frac{1}{2} \times \text{diagonal 1} \times \text{diagonal 2} \\ &= \frac{1}{2} \times 16 \times 12 = 96 \text{ cm} \\ \text{L Arsiran} &= \text{L Persegi Panjang} - \text{L Layang-layang} \\ &= 192 \text{ cm} - 96 \text{ cm} \\ &= 96 \text{ cm} \end{aligned}$$

Figure 2
Student Answer (2)

In problem number 1, students are asked to determine the area of the shaded area, namely the kite, inside a flat shape, namely a rectangle. The answers given above show how well students understand the first indicator, connecting ideas in different areas of mathematics, when responding to test questions. One of the male students' responses is shown in Figure 1. As can be seen, student (1)'s response only considers the area that is not colored, and the calculations used are not accurate. This shows that student (1) has not been able to connect ideas from different areas of mathematics. Figure 2 represents the response of a female student. Student (2)'s response was appropriate and correct. Student (2) can calculate the area of the rectangle and kite accurately, and the formula written is also accurate. After obtaining the areas of the two figures, student (2) then calculated the area of the shaded figure by subtracting the area of the rectangle from the area of the kite. This indicates that student (2) has been able to connect concepts between mathematics. Based on the findings of data analysis and examination of student responses that have been carried out in number 1, it can be concluded that the mathematical connection skills of students at the marker of linking designs with mathematics are categorized as good, but the mathematical connection skills possessed by female students exceed the mathematical connection skills possessed by male students.

$$\begin{aligned} 90 + 70 + 120 &= 280 \\ 280 : 2 &= 140 + 140 = 282 \text{ meter} \end{aligned}$$

Picture 4
Student Answer (3)

Selamat = merupakan jarak lilit
 Kuning = 90 m + 90 + 120 m = 280 m
 280 : 2 = 140 m + 140 m = 280 m

Picture 3
Student Answer (4)

Students must determine the diameter of a shape whose sides are known to calculate the time needed to make two turns of the field in question number two. The answer above is an indication of student understanding when answering test questions on the second indicator, namely connecting mathematical ideas with other aspects of science. Mathematical ideas are linked to various fields in this problem, especially in the subject of physical science. Figure 3 is the answer from one of the male students. Student (3)'s steps in finding the perimeter of the triangle were correct, but student (3) was not correct in finding the travel time. Students (3) have not been able to find the travel time needed to circle the field twice. Students (3) instead halve the perimeter of the field and then add the distance that can be traveled in two minutes. This proves that learner (3) lacks the skills to link mathematical ideas in a complete way with other sciences, especially physics. One female learner's response is shown in Figure 4. Learner (4)'s answer is correct. Learner (4)'s steps in finding the range and duration of travel were correct. Student (4) first finds the perimeter of the field. Furthermore, students (4) find twice the circumference of the circle, then divide by the distance that can be traveled for two minutes. After student (4) found the answer, student (4) then multiplied the answer by the time it took to travel 112 meters. This indicates that student (4) has been able to link mathematical ideas with other sciences, especially physics. Based on data analysis and review of student responses from number 3, it can be said that students' expertise in linking mathematical ideas with other sciences is classified in the good category, but the ability of female students in linking mathematics with other sciences is superior to male students.

$$L = a \times l$$

$$= 7 \times 11 = 77 \text{ cm}^2$$

•

$$k = (2 \times a) + (2 \times b)$$

$$= (2 \times 7) + (2 \times 20)$$

$$= 14 + 40$$

$$= \underline{54} \text{ cm}$$

Picture 5
Student Answer (5)

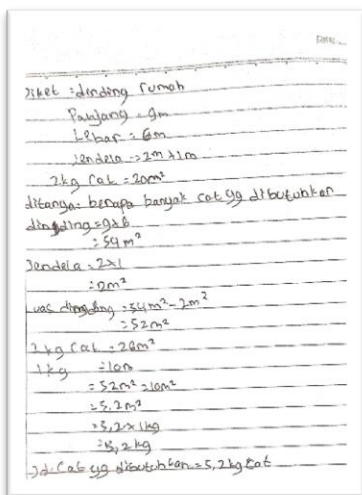
$$\begin{array}{l|l} 5x - 16 : 5x + 3 & \text{dikas: } 5x - 16 \\ 5x - 3x = 4 \times 16 & = 5 - 10 - 16 \\ 2x = 26 & = 50 - 16 \\ x = \frac{26}{2} & = 34 \text{ cm} \\ x = 10 & \end{array}$$

1405 = 1405 x 112
= 34 cm x 70
= 6080 cm²

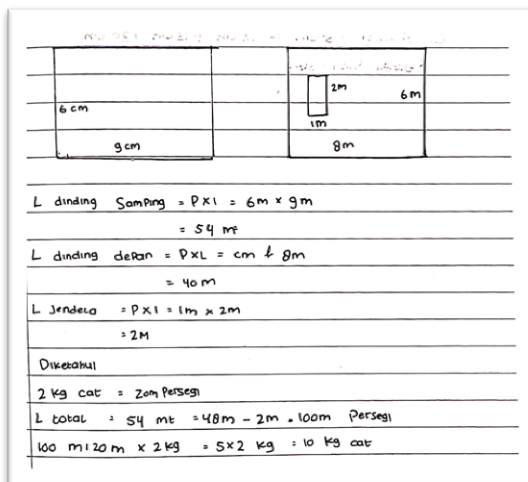
Picture 6
Student Answer (6)

Students are asked to find the base of the length and calculate the area of the rectangle in question number 3. The answers submitted above prove how well students understand the first indicator of connecting designs between mathematics when answering exam questions. One male student's response is shown in Figure 1. It is obvious that student (5)'s response is lacking. Student 5 really understood the formula for the perimeter and area of a jajargenjang as shown in the figure above, but the numbers written by student (5) were not in sync with the numbers written in the problem provided. In problem number 3 only asked to determine the area of the parallelogram, but student (5) also looked for the perimeter of the parallelogram even though the answer written by student (5) was wrong. Students (5) also have not been able to find the value of a variable. This indicates that student (5) has not been able to connect concepts between mathematics. Figure 6 is the answer of one of the female students. The answer of student (6) is correct. The working steps taken by student (6) are also correct. The first step taken by student (6)

to find the area of the parallelogram is to find the area by finding the value of the variable x by eliminating the two equations in the problem. Furthermore, after the value of the x variable is found, student (5) then looks for the length of the base of the parallelogram by substituting the x value into the equation. After that student (6) then looked for the area of the parallelogram. This indicates that student (6) has been able to connect concepts between mathematics. Based on the results of data analysis and review of student responses from question number 4, it can be said that the indicator of mathematical concept pairing places students' ability to make mathematical connections in the good category. However, female students outperform male students in this area.



Picture 7
Student Answer (7)



Picture 8
Student Answer (8)

Students are asked to determine the area of the combined quadrilateral flat in problem number 4 to determine how many cats are needed to paint a wall with a window in the middle. The answers given above show how well students understand the third indicator, which involves applying mathematical ideas to real-world situations. One of the male students' solutions is shown in Figure 7. Student (7) has not been precise in answering the question, but the steps written by student (7) to find the area of the unpainted building are correct. To find the area of the unpainted part, student (7) subtracted the area of the wall from the area of the window. After getting the result, student (7) should have added the area of the front wall and the area of the side wall to get the whole part of the wall to be painted. This resulted in student (7)'s answer in determining the amount of paint needed to paint the wall being wrong. This proves that student (7) has been able to relate mathematical ideas to real world situations, but the wrong response was caused by student (7) not being careful when answering the question. One of the female student responses is shown in Figure 8. Student (8)'s response was appropriate and correct. Student (8) has been able to find which areas should be painted and calculate the amount of paint needed. When finding the area to be painted, student (8) first found the area of the front wall and then subtracted it from the window area. After finding the answer, student (8) then added the area of the front wall with the area of the side wall. Student (8) then calculated and entered everything that was found and known in

the problem of determining the number of cats needed to paint the walls. This proves that student (8) can connect mathematical ideas with everyday life. Based on data analysis and review of student responses from question number 4, it can be concluded that mathematical connection skills on indicators of linking mathematical ideas with real world situations are categorized as good, female students outperform male students regarding these skills.

$a. K_{\Delta} = a + b + c$
 $= 5 + 3 + 11$
 $= 19 \text{ cm (segitiga sembarang)}$
 $\therefore K_{\Delta} = a + b + c$
 $= 8 + 8 + 6$
 $= 22 \text{ cm (segitiga samakaki)}$
 $\therefore K_{\Delta} = a + b + c$
 $= 5 + 12 + 15$
 $= 32 \text{ cm (segitiga sembarang)}$

Picture 9
Student Answer (9)

$a. K = 5 \text{ cm} + 3 \text{ cm} + 11 \text{ cm}$
 $= 19 \text{ cm}$
 $\text{Jenis } \Delta = 11^2 > 5^2 + 3^2$
 $121 > 25 + 9$
 $121 > 34$
 $\text{Segitiga tumpul dan sembarang.}$
 $b. K = 8 \text{ cm} + 8 \text{ cm} + 6 \text{ cm}$
 $= 22 \text{ cm}$
 $\text{Jenis } \Delta = 8^2 < 8^2 + 6^2$
 $64 < 64 + 36$
 $64 < 100$
 $\text{Segitiga lancip dan sama kaki.}$
 $\therefore K = 5 \text{ cm} + 12 \text{ cm} + 13 \text{ cm}$
 $= 30$
 $\text{Jenis } \Delta = 13^2 = 12^2 + 5^2$
 $169 = 144 + 25$
 $169 = 169$
 $\text{Segitiga siku-siku dan sembarang.}$

Picture 10
Student Answer (10)

Students were asked to identify the perimeter of the triangle and type in question 5 if they knew the sides. Figure 9 is the answer of one of the male students. Student (9)'s answer is still incorrect. Students (9) have been able to find the perimeter of each triangle but students (9) have not been able to determine several types of triangles. The type of triangle written by student (9) in points a and c is not correct while for point b it is correct, but student (9) does not write how to determine the type of triangle. The pythagorean formula can be used to determine the types of triangles. Based on the answers above, student (9) has not used the pythagorean formula to find the types of triangles. This proves that learner (9) has not been able to relate ideas from different areas of mathematics. One female learner's response is shown in Figure 10. Learner (10)'s response included some incorrect ones. Student (10) was able to find the circumference of the circle correctly. Student (10) has also used the pythagorean formula to determine the types of triangles. The types of triangles written by student (10) are almost all correct but the writing should use the word "or" instead of "and". The answers of students (10) that are less precise are found in point c, where students (10) write the types of triangles, namely right-angled and arbitrary triangles. The correct type of triangle for point c is a right triangle. This indicates that student (10) has been able to connect concepts between mathematics. Based on data analysis and review of student responses from number 5, it can be said that the ability to connect concepts between mathematics of students, is included in the good category where female students are better in mathematical connection skills than male students.

Based on the explanation above, the results of data analysis and review of student answers indicate that gender differences have an impact on students' mathematical connection skills. The research findings that corroborate Tonnie and Heni's investigation are entitled "Analysis of Students' Mathematical Communication Ability Based on Gender Differences". The findings of this study show a gap between mathematical connection skills and gender differences (Nugraha & Pujiastuti, 2019). In the study, female students

outperformed male students in all measures of their capacity to make connections between quadrilaterals and triangles. However, it does not rule out the possibility that in other sciences or other materials in mathematics male students are superior to female students. Firmanti suggests that the verbal abilities of female students are superior to male students, but male students are better than female students in the spatial field (Rahmawati et al., 2022). Siti and Nuriana revealed that boys have superior mathematical connection skills compared to female students, but female students are better in affective aspects such as persistent, careful and thorough so it is possible that female students will also have better mathematical connection skills compared to male students (Rahmawati et al., 2022).

Another study that agrees with this study is a study conducted by Sudirman (2018) entitled "Analysis of Mathematical Connection Ability of Coastal Junior High School Students in View of Gender Differences". The findings of the research conducted by Sudirman show that there are differences in students' mathematical connection abilities where the mathematical connection abilities of female students outperform the mathematical connection abilities of male students. Male students and female students in this study only have moderate mathematical connection skills. This is due to several circumstances, including inadequate prior knowledge, lack of conceptual understanding of each item given, lack of student memory, lack of understanding of material in related fields of science, inability to convert problems involving mathematics into mathematical models, and so on. (Sudirman & Cahyono, 2018). In addition, the thing that causes mathematical connection ability to have a difference in the study is the provision of CTL learning models in the study so that it results in different students' mathematical connection abilities.

Other research that becomes a reference in this study, for example, research conducted by Dewi Krisnawati (2021) entitled "Mathematical Connection Ability in View of Gender" indicates that the mathematical connection ability of male students is superior to female students. This is because the research was conducted during the Covid-19 pandemic which resulted in the absence of offline learning so that female students tended to be passive during learning. This can affect students' mathematical connection skills.

CONCLUSION

Based on the description above, it can be concluded that gender differences affect students' mathematical connection skills. The mathematical connection skills possessed by male and female students are classified as good. This is indicated by the average value of mathematical connection ability of male students of 76 and female students equivalent to 80. According to categorization using a five scale if the average value of mathematical connection ability is in the range of $70 \leq \text{value} \leq 8$, then it is included in the good category. When dealing with problems involving rectangles and triangles, students' mathematical connection ability changes depending on their gender. In this study, the mathematical connection ability of female students was superior to male students, with an average difference of 4. The average value of female students was also higher than male students for each marker of mathematical connection ability.

BIBLIOGRAPHY

Abidin, Z., Utomo, A. C., Pratiwi, V., & Farokhah, L. (2020). Project-based learning - literacy in improving students' mathematical reasoning abilities in elementary schools. *JMIE*

- (*Journal of Madrasah Ibtidaiyah Education*), 4(1), 39.
<https://doi.org/10.32934/jmie.v4i1.170>
- Agustiawan, H., & Puspitasari, E. D. (2019). Pembentukan karakter siswa smp melalui literasi sains. *Symposium of Biology Education (Symbion)*, 2, 273–281.
<https://doi.org/10.26555/symbion.3548>
- Aledya, V. (2019). Kemampuan pemahaman konsep matematika pada siswa. *ResearchGrate*, 0–7.
- Aliyah, I. M., Yuhana, Y., & Santosa, C. A. H. F. (2019). Kemampuan koneksi matematis siswa ditinjau dari kemampuan awal dan gender. *Jurnal Didaktik Matematika*, 6(2), 161–178. <https://doi.org/10.24815/jdm.v6i2.14104>
- Alpian, Y., Anggraeni, S. W., Wiharti, U., & Soleha, N. M. (2019). Pentingnya pendidikan bagi manusia. *Jurna Buana Pengabdian*, 1(1), 66–72.
<https://doi.org/https://doi.org/10.36805/jurnalbuanapengabdian.v1i1.581>
- Amsari, D. (2018). Implikasi teori belajar e.thorndike (behavioristik) dalam pembelajaran matematika. *Jurnal Basicedu*, 2(2), 52–60.
<https://doi.org/10.31004/basicedu.v2i2.49>
- Anggraeni, S. T., Muryaningsih, S., & Ernawati, A. (2022). Analisis faktor penyebab kesulitan belajar matematika siswa kelas v sekolah dasar. *Jurnal Curere*, 6(1), 45.
<https://doi.org/10.36764/jc.v6i1.723>
- Arianti, S. E. Y. (2020). Analisis kesalahan peserta didik dalam menyelesaikan masalah matematika berdasarkan tahapan newman ditinjau dari perbedaan gender. (*Doctoral Dissertation, Universitas Muhammadiyah Gresik*), 1(1).
<https://doi.org/http://dx.doi.org/10.30587/postulat.v1i1.1681>
- Arikuntoro, S. (2018). Dasar dasar evaluasi pendidikan. Bumi Aksara.
- Azhari, B., Yacoeb, M., & Irfan, A. (2020). Learning for Children with Special Needs of Dyscalculia. *Jurnal Ilmiah Peuradeun*, 8(3), 475-496.
- Baiduri. (2020). Mathematical connection process of students with high mathematics ability in solving PISA problems. *European Journal of Educational Research*, 9(4), 1527–1537. <https://doi.org/10.12973/EU-JER.9.4.1527>
- Gulo, F., Harefa, A. O., & Telaumbanua, Y. N. (2022). Analisis hasil belajar matematika ditinjau dari gaya kognitif berdasarkan revisi taksonomi bloom pada peserta didik di SMK negeri 1 mandrehe. *Formosa Journal of Applied Sciences*, 1(5), 625–636.
<https://doi.org/10.55927/fjas.v1i5.1365>
- Isnaeni, S., Ansori, A., Akbar, P., & Bernard, M. (2018). Analisis kemampuan koneksi matematis siswa smp pada materi persamaan dan pertidaksamaan linear satu variabel. *Journal On Education*, 01(02), 309–316.
<https://doi.org/https://doi.org/10.31004/joe.v1i2.68>
- Julaeha, S., Mustangin, M., & Fathani, A. H. (2020). Profil kemampuan koneksi matematis peserta didik dalam menyelesaikan soal cerita ditinjau dari kemampuan matematika. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 4(2), 800–810.
<https://doi.org/10.31004/cendekia.v4i2.300>
- Junengsih, Ichwan, E. Y., & Astri, H. (2022). Optimalisasi bina keluarga remaja sebagai upaya persiapan calon ibu sehat pada remaja putri. *Jurnal Pengabdian Masyarakat Fisioterapi Dan Kesehatan Indonesia*, 1(1), 13–18.
- Kamal, M., & Rochmiyati, S. (2022). Indikator kemandirian dalam profil pelajar pancasila

- pada akhir fase c rentang usia 12 – 15 tahun. *Jurnal Penelitian Pendidikan Dan Pembelajaran*, 9(3), 150–171.
<https://doi.org/https://doi.org/10.21093/twt.v9i3.4734>
- Khoadah, I. S., Sari, D. E., & Zanthi, L. S. (2019). Peningkatan kemampuan komunikasi dan kemampuan koneksi matematis siswa melalui pendekatan kontekstual di smp. *Journal On Education*, 01(03), 485–497.
<https://doi.org/https://doi.org/10.31004/joe.v1i3.194>
- Krisnawati, D. (2021). Kemampuan koneksi matematis siswa smp ditinjau dari gender. *Universitas Nusantara PGRI Kediri*. <http://repository.unpkediri.ac.id/id/eprint/3088>
- Malinda, P., & Sylviana Zanthi, L. (2017). Analisis kesalahan siswa dalam menyelesaikan soal kemampuan koneksi matematis siswa mts. *Journal On Education*, 01(02), 105–109. <https://doi.org/https://doi.org/10.31004/joe.v1i2.32>
- Manalu, A. C. S., Septiahani, A., Permaganti, B., Melisari, Jumiati, Y., & Hidayat, W. (2020). Analisis kemampuan koneksi matematis siswa smk pada materi fungsi kelas xi. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 04(01), 254–260.
<https://doi.org/https://doi.org/10.31004/cendekia.v4i1.198>
- Muslihat, I., Andriani, D., & Zanthi, L. S. (2019). Analisis kemampuan koneksi matematis dan motivasi belajar siswa smk. *Journal On Education*, 1(03), 173–181.
<https://doi.org/https://doi.org/10.31004/joe.v1i3.135>
- NCTM. (2000). *Principal and Standards for School Mathematics*.
- Noor, T. (2018). Rumusan tujuan pendidikan nasional pasal 3 undang-undang sistem pendidikan nasional no 20 tahun 2003. *Universitas Singaperbangsa Karawang*, 3(1), 123–144.
- Noviyana, I. N., Dewi, N. R., & Rochmad. (2018). Analisis kemampuan komunikasi matematis siswa ditinjau dari self-confidence. *PRISMA, Prosiding Seminar Nasional Matematika*, 2, 704–709. <https://doi.org/10.30738/v6i2.2213>
- Nugraha, T. H., & Pujiastuti, H. (2019). Analisis kemampuan komunikasi matematis siswa berdasarkan perbedaan gender. *Edumatica : Jurnal Pendidikan Matematika*, 9(1), 1–7. <https://doi.org/10.22437/edumatica.v9i1.5880>
- Rahmawati, S., Rachmani, N., & Nino, D. (2022). Studi literatur: kemampuan koneksi matematis siswa pada hybrid learning ditinjau dari gender dengan model pembelajaran preprospec berbantuan tik. *Prisma, Prosiding Seminar Nasional Matematika*, 5, 423–430.
- Rosyana, S. I., & Effendi, K. N. S. (2021). Kemampuan koneksi matematis siswa smp pada materi bangun datar. *Jurnal MAJU*, 8(1), 441–447.
- Salmina, M., & Nisa, S. K. (2018). Kemampuan penalaran matematis siswa berdasarkan gender pada materi geometri. *Jurnal Numeracy*, 5(April 2018), 3264–3268.
<https://doi.org/10.1093/oseo/instance.00208803>
- Sari, D. N. O. (2020). Analysis of the ability of mathematical connections of middle school students in the field of algebra. In *Journal of Physics: Conference Series* (Vol. 1469, Issue 1). <https://doi.org/10.1088/1742-6596/1469/1/012159>
- Shohibah, Nurjamil, D., & Kurniawan, D. (2022). Analisis kemampuan komunikasi matematis peserta didik slow learner ditinjau dari perbedaan gender. *Jurnal Kongruen*, 1(2), 140–149. <https://publikasi.unsil.ac.id/index.php/kongruen>
- Sudirman, & Cahyono, E. (2018). Analisis kemampuan koneksi matematis siswa smp pesisir

- ditinjau dari perbedaan gender. *Jurnal Pembelajaran Berpikir Matematika*, 3(2), 11–22.
- Tuankotta, L. N., & Jana, P. (2021). Respon guru matematika terhadap penghapusan ujian nasional. *Wahana Matematika Dan Sains: Jurnal Matematika, Sains, Dan Pembelajarannya*, 15(3), 26–36.
<https://doi.org/https://doi.org/10.23887/wms.v15i3.34124>
- Umaroh, U., & Pujiastuti, H. (2020). Analisis kemampuan representasi matematis siswa dalam mengerjakan soal pisa ditinjau dari perbedaan gender. *Jurnal Pendidikan Matematika Rafflesia*, 5(2), 40–53.
<https://doi.org/https://doi.org/10.33369/jpmr.v5i2.11408>
- Utaminingsih, A. (2017). Gender dan wanita karir. UB Press.
- Widiyawati, Septian, A., & Inayah, S. (2020). Analisis kemampuan koneksi matematis siswa SMK pada materi fungsi kelas xi. *Jurnal Analisa*, 4(1), 254–260.
<https://doi.org/10.31004/cendekia.v4i1.198>