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An Analysis of Mathematical Connection Ability in Cubes and Cuboids Learning Materials Based on Gender Differences

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ABSTRACT

This study was aimed to describe the students' mathematical connection ability in cube and cuboid learning materials based on gender differences. The research method employed was descriptive-qualitative. This research involved 6 subjects consisted of 3 males and 3 females students. Based on the results and discussion, it can be concluded that the total average score of male students was 54.5% and female students were 63.3%. Based on the categories of ability, male students were in a low category, while female students were in the moderate category. Several factors might cause this to happen, one of which was the low basic mathematical knowledge.

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INTRODUCTION

Mathematics is one of the compulsory subjects in education. Mathematics is a subject taught from elementary school, high school to college. One of the goals of mathematics is to have the ability to understand mathematical concepts, explain the interconnectedness of mathematical concepts clearly, and apply their concepts flexibly, accurately, efficiently, and precisely in problem-solving (Susanty, 2018).

Based on the explanation above, students must have and develop basic mathematical abilities. The *National Council of Teachers of Mathematics/ NCTM*

(Musriliani, Marwan, & Anshari, 2015) states that there are five basic mathematical abilities, namely problem-solving, reasoning and proofing, communicating, connecting, and representing. One of the basic abilities that are very important to be possessed and developed by students is the mathematical connection ability because, in the learning process, the concepts are interrelated (Alfiyah, Rosdianti & Zanthi, 2019).

In reality, the theories do not in line with the research conducted by (Warih, Parta & Rahardjo, 2016) at MTsN Kota Probolinggo, which says that the students' mathematical connection ability in solving

Pythagorean Theorem questions was still low because they could not apply the concepts that had been previously learned with the concepts that had been listed so that the difficulty in solving problems emerged. This happened because the students were accustomed to listening and writing the teacher's presentation without understanding it first. This could affect the mathematical connection ability in the learning process. Therefore, it is necessary to develop deep and stimulating teaching processes regarding mathematical connections in the classroom.

Mathematical connections can be interpreted as expertise or ability to connect between mathematical concepts (Nursaniah, Nurhaqiqi & Yuspriyati, 2018). The mathematical connection is one of the basic mathematical abilities that need to be owned and developed by students in secondary schools (Nurafni & Pujiastuti, 2019). Mathematical connection's objectives are understanding mathematical concepts, connecting mathematical concepts and everyday life, and solving problems precisely and thoroughly.

Mathematical connection ability is the ability to show the internal and external relations of mathematics, including connections between mathematical topics, disciplines, and everyday life (Dwirahayu & Firdausi, 2016). If students can connect between concepts, it will be easier in the learning process because without any mathematical connection ability, students have to learn and remember too many mathematical concepts or procedures.

The mathematical connection indicators, namely finding relationships from various representations about mathematical concepts or procedures, understanding relationships between topics in mathematics, using mathematics in solving problems in everyday life, understanding equivalent concept representations, finding relationships

between concepts or procedures, and using the connection between mathematics and other sciences (Rohendi & Dulpaja, 2013).

Many different factors need to be considered in learning mathematics, including readiness, attitudes, thinking patterns, and intelligence between males and females. This is in line with the opinion which says that there are differences in the attitudes of male and female students towards mathematics learning (Colomeischi & Colomeischi, 2015). Therefore, the difference factor is due to the different daily activities between males and females.

Gender differences have an innate nature from birth and cultural formation (social construction) which includes differences in solving a problem (Nur & Palobo, 2018). Gender differences can also result in differences in students' learning psychology (Nugraha & Pujiastuti, 2019). Female students are generally more detailed in the learning process than male students. The fact shows that many female students are more successful in mathematics than male students (Sudia, 2015). This contradicts the opinion that male students are superior compared to female students in possessing mathematical abilities even though this difference is only apparent at a higher level (Anggraeni & Herdiman, 2018). Based on the results of these studies, the gender differences were related to several things, but none of which states the differences in mathematical connection ability.

Several previous studies tried to describe the students' mathematical connection ability (Karyanto & Mampouw, 2018; Nugraha, 2017; Rahmanti, Hobri & Oktavianingtyas, 2018). However, there were no studies described the students' mathematical connection ability in cube and cuboid learning materials in terms of gender differences. Therefore, the purpose of this study was to describe

students' mathematical connection ability on cube and cuboid learning materials based on gender differences.

METHOD

The method of this research is descriptive-qualitative. It was chosen because it can describe the students' mathematical connection ability on cube and cuboid learning material based on gender differences.

The subjects of this research were 6 students of class VIII-I of State Junior High School Keramatwatu. The six students consisted of 3 male students and 3 female students. The data collection technique used was a written test. Data analysis was performed based on the achievement of indicators to see the mathematical connection ability.

The indicators measured in this study were (1) Item number 1, connecting known mathematical concepts or procedures, (2) Item number 2, determining the conceptual relationship of two cuboid elements and find equivalent concepts, (3) Item number 3, utilizing mathematics to solve problems in everyday life, (4) Item number 4, finding the relationship between the surface area concept of two objects presented in the problem, (5) Item number 5, connecting mathematics to their knowledge and other sciences, (6) Item number 6, solving a

problem from the field of science using mathematical methods (Primadya Anandita, 2015).

After getting the score of the written test result of mathematical connection ability, a scoring category is given to determine the level of students' mathematical connection ability. Student test score categories are categorized with a scale of five based (Arikunto, 2012: 285) can be seen in Table 1.

Table 1. Categories of Mathematical Connection Ability

Range	Categories
$85 \leq score \leq 100$	Excellent
$70 \leq score \leq 84$	High
$60 \leq score \leq 69$	Moderate
$45 \leq score \leq 59$	Low
$0 \leq score \leq 44$	Poor

In this research, the researchers only described the results of mathematical connection ability data obtained at the time of the study.

RESULTS AND DISCUSSION

The results of the mathematical connection ability test done by 6 students (3 female students and 3 male students). There were 6 questions given to students where each problem measured one indicator of mathematical connection ability. The results of the mathematical connection ability data based on gender differences can be seen in Table 2.

Table 2. The Results Mathematical Connection Ability Test Based on Gender Differences

Code	Gender	Score						Total
		1	2	3	4	5	6	
01	M	10	1	4	5	4	6	30
02	M	9	6	4	4	5	9	37
03	M	10	10	6	1	2	2	31
01	F	9	10	5	5	5	10	44
02	F	9	7	5	6	5	6	38
03	F	10	10	5	5	1	6	37

Based on Table 3, in the first indicator (finding the relationship between the surface areas of two objects) female students scored higher with an

average score of 0.34 or 3.4%. In the next indicator, (utilizing mathematics to solve problems in daily life) female students scored higher with an average score of

0.33 or 3.3%. In the third indicator (solving a problem from the field of science using mathematical methods), female students also scored higher (1.66 or 16.6%) compared to the male students. The most visible difference in the average

score is the indicator of determining the relationship between the concept of the two elements of the cuboid and the equivalent concept where female students scored higher than male students with a difference of 3.33 or 33.3%.

Table 3. Mathematical Connection Ability Score Based on Gender Differences

Indicators	Average Score		Average Score (%)	
	Male	Female	Male	Female
Connecting mathematical concepts or procedures	9.67	9.33	96.7	93.3
Determining conceptual relationships of two cuboid elements and equivalent concepts	5.67	9.00	56.7	90.0
Using mathematics to solve problems of everyday life	4.67	5.00	46.7	50.0
Finding the relationship between the surface area concepts of two objects presented	3.33	3.67	33.3	36.7
Linking mathematics with one's knowledge and other sciences	3.67	3.67	36.7	36.7
Solving a problem from the field of science using mathematical methods	5.67	7,33	56.7	73.3

There is an occurrence where male and female students obtained the same average scores which are the indicator of connecting mathematics with own knowledge and other sciences. The female students and male students obtained 3.67 or 36.7%. In the indicator of linking mathematical concepts or procedures, male students are superior compared to

female students with a score of 0.34 or 3.4%.

The overall average scores and percentages were converted into students' mathematical connection ability categories by referring to Table 1 which is presented in the research method. The result is shown in Table 4.

Table 4. Mathematical Connections Student Category Ability Based on Gender Differences

Gender	Total average (%)	Ability Category
Male	54.5	Low
Female	63.3	Moderate

The total - average score of male students was 5.45 or 54.5% and the total average score of female students was 6.33 or 63.3%. When the scores were converted into the mathematical connection ability categories, male students belonged to the low category and female students belonged to the moderate category. This might be caused by several factors, one of which is the low basic

mathematical knowledge, low conceptual understanding of the questions, and teachers rarely gave questions related to mathematical connection ability.

This is in line with research that states that the mathematical connection ability of the eighth-grade male students and female students at SMP N 2 South Tiworo are still in the low category (Sudirman, 2017).

CONCLUSIONS AND SUGGESTIONS

Based on the results and discussion, it can be concluded that the total average score of male students is 54.5% which is in the low mathematical connection ability category. The total average score of female students is 63.3% which is in the moderate mathematical connection ability category. This might be caused by several factors, namely the low basic knowledge of mathematics and the low understanding of concepts.

Based on these conclusions, it is suggested that teachers should apply mathematical connection ability in the learning process and make it a habit to pose questions based on mathematical connection ability.

REFERENCES

- Alfiyah, N. F., Rosdianti, I., & Zanthi, L. S. (2019). Analisis Kemampuan Koneksi Matematik dan Self Confidence Siswa SMP melalui Model Pembelajaran Think Pair Share. *Desimal: Jurnal Matematika*, 2(3), 289–295. <https://doi.org/10.24042/djm.v2i3.4469>
- Anggraeni, R., & Herdiman, I. (2018). Kemampuan Pemecahan Masalah Matematik Siswa SMP pada Materi Lingkaran Berbentuk Soal Kontekstual Ditinjau dari Gender. *Jurnal Numeracy*, 5(1), 19–28.
- Arikunto, S. (2012). *Dasar-Dasar Evaluasi Pendidikan*. Jakarta : Bumi Aksara.
- Colomeischi, A. A., & Colomeischi, T. (2015). The Students 'Emotional Life and Their Attitude toward Mathematics Learning. *Procedia - Social and Behavioral Sciences*, 180, 744–750. <https://doi.org/10.1016/j.sbspro.2015.02.192>
- Dwiraheyu, G., & Firdausi. (2016). Pengaruh gaya berpikir terhadap kemampuan koneksi matematis mahasiswa. *JPPM*, 9(2), 210–221.
- Karyanto, P. S., & Mampouw, H. L. (2018). Koneksi Matematis pada Materi Kubus dan Balok. *Jurnal Numeracy*, 5(1), 57–66.
- Musriliani, C., Marwan, & Anshari, B. I. (2015). Pengaruh Pembelajaran Contextual Teaching Learning (CTL) terhadap Kemampuan Koneksi Matematis Siswa SMP Ditinjau dari Gender. *Jurnal Didaktik Matematika*, 2(2), 49–58. <https://doi.org/10.24815/dm.v2i2.814>
- Nugraha, A. A. (2017). Karakteristik Instrumen Penilaian Hasil Belajar Matematika Ranah Kognitif yang Dikembangkan Mengacu pada Model PISA. *Suska Journal of Mathematics Education*, 4(1), 59–64. <https://doi.org/10.24014/sjme.v3i2.3897>
- Nugraha, T. H., & Pujiastuti, H. (2019). Analisis Kemampuan Komunikasi Matematis Siswa Berdasarkan Perbedaan Gender. *Edumatica : Jurnal Pendidikan Matematika*, 09(01), 1–7.
- Nur, A. S., & Palobo, M. (2018). Profil Kemampuan Pemecahan Masalah Matematika Siswa Ditinjau dari Perbedaan Gaya Kognitif dan Gender. *Kreano: Jurnal Matematika Kreatif-Inovatif*, 9(2), 139–148. <https://doi.org/http://dx.doi.org/10.15294/kreano.v9i2.15067>
- Nurafni, A., & Pujiastuti, H. (2019). Analisis Kemampuan Koneksi Matematis Ditinjau dari Self Confidence Siswa : Studi Kasus di SMKN 4 Pandeglang. *Anargya: Jurnal Ilmiah Pendidikan Matematika*, 2(1), 27–28.
- Nursaniah, L., Nurhaqiqi, & Yuspriyati, D. N. (2018). Analisis Kemampuan Koneksi Matematik Siswa SMP pada Materi Bangun Ruang Sisi Datar. *Jurnal Pembelajaran Matematika Inovatif*, 1(5), 857–862.
- Primadya Anandita, G. (2015). Analisis Kemampuan Koneksi Matematis Siswa SMP Kelas VIII pada Materi Kubus dan

- Balok. Universitas Negeri Semarang.
- Rahmanti, S. A., Hobri, & Oktavianingtyas, E. (2018). Analisis Kemampuan Koneksi Matematis pada Pokok Bahasan Statistika Berbasis Lesson Study For Learning Community. *Kadikma*, 9(1), 41–51. <https://doi.org/10.4234/jjoffamilysociology.28.250>
- Rohendi, D., & Dulpaja, J. (2013). Connected Mathematics Project (CMP) Model Based on Presentation Media to the Mathematical Connection Ability of Junior High School Student. *Journal of Education and Practice*, 4(4), 17–22.
- Sudia, M. (2015). Profil Metakognisi Siswa SMP dalam Memecahkan Masalah Terbuka Ditinjau dari Perbedaan Gender. *Jurnal Pendidikan Dan Pembelajaran*, 22(1), 17–24.
- Sudirman. (2017). Analisis Kemampuan Koneksi Matematis Siswa SMP Pesisir Ditinjau dari Perbedaan Gender. *Seminar Nasional Riset Kuantitatif Terapan 2017*, 131–139.
- Susanty, A. (2018). Analisis Kemampuan Koneksi Matematis Berdasarkan NCTM Siswa SMA Kelas X IPA pada Materi Eksponen dan Logaritma. *Jurnal Pendidikan Tambusai*, 2(4), 870–876.
- Warih, P. D., Parta, I. N., & Rahardjo, S. (2016). Analisis Kemampuan Koneksi Matematis Siswa Kelas VIII Pada Materi Teorema Pythagoras. *Prosiding Konferensi Nasional Penelitian Matematika Dan Pembelajarannya [KNPMP I]*, 377–384.