e-ISSN: 2986-8076
DOI: 10.57254/tess.v1i1.7

International Journal of Geometry and Applied Mathematics
TESSERACT
Vol. 1, No. 1, March 2023 hal. 9-20
Journal Page is available to http://ekalaya.nindikayla.com/index.php/home

STUDENTS' MATHEMATICAL COMMUNICATION SKILLS REVIEWED FROM SELF-CONFIDENCE THROUGH APPROACH PROBLEM-BASED LEARNING (PBL)

Risa Nursamsih Lubis[1], Lukman El Hakim[2], Tian Abdul Aziz[3]
[1,2,3]Universitas Negeri Jakarta, Indonesia
Email: risalubis21@gmail.com[1], lukmanunj7@gmail.com[2], tian_aziz@unj.ac.id[3]

ABSTRACT

One of the abilities that is very important to pay attention to in learning mathematics is students' mathematical communication skills. In addition to mathematical communication abilities, other aspects must be considered and support students' success in mathematics, including self-confidence. Students with high self-confidence can understand and express their ideas or ideas in language and mathematical symbols to convey information or opinions through speech or writing. This study aims to provide an overview of students' Mathematical Communication Ability in terms of Self-confidence through a Problem Based Learning (PBL) Approach. The method used is descriptive, describing the results of a literature review of at least 25 relevant articles. The results of this study are that there is a positive relationship between students' self-confidence and mathematical communication abilities and the Problem Based Learning Approach is effective in improving students' mathematical communication skills and self-confidence.

Keywords: *mathematical communication ability, self-confidence, Problem Based Learning Approach*

INTRODUCTION

Education is one part of the life process that must be carried out properly. Through education, it is expected to produce superior, quality, independent human resources and be able to collaborate with science and technology in order to be able to compete in the world of work. Science and information technology development cannot be separated from the development of various disciplines. One such discipline is mathematics. Syamsudin, Afrilianto, &; Rohaeti (2018) revealed that mathematics is a means of logical, analytical, systematic, critical and creative thinking, mathematics is a scientific discipline that helps develop thinking power and potential possessed by every human being. Mathematics is a short and clear means of communication, besides that mathematics can improve logical thinking skills, accuracy and good perseverance so that it can lead us to solve problems in everyday life. There are other opinions about mathematics, namely Haerudin (2013) who states that one of the characteristics of mathematics is deductive reasoning, which is the truth of a statement or concept obtained as a logical result of pre-existing truth where the truth value is true or false.

According to NCTM (2000), there are five basic mathematical abilities that are standard processes, namely problem solving, reasoning, communication, connection and representation. Of the several abilities above, one of the abilities that is very important to pay attention to in learning mathematics is the mathematical communication ability of students. This is in line with Turmudi (2008) who states that communication is essential to mathematics and mathematics education. It is

understood that it is very difficult to develop mathematics without good communication as the learning objectives have been set. This is because the communication process will help students build meaning, convey ideas correctly, and make it easier to explain these ideas to others so that the information is easy to understand and understand. In addition to mathematical communication skills, there are other aspects that must be considered and support student success in learning mathematics, one of which is self-confidence, commonly also called student confidence. *Self confidence* according to Dewi and Minarti (2018) is defined as the trust individuals have in achieving success and competence, trusting in their abilities about themselves and dealing with situations around them. In line with that, Hendriana, Slamet & Sumarmo (2014) stated that self-confidence is related to students' perceptions of themselves to learn mathematics, communicate with others, and their perceptions in using mathematics in everyday life.

According to research conducted by Purnomo & Wahyudi (2021) regarding the role of self-confidence for students' mathematical communication skills, he stated that students who have less confidence tend to find it difficult to convey their ideas or ideas. Students with high self-confidence can understand and express ideas or ideas owned in language or mathematical symbols. Although mathematical communication skills and self-confidence are important, students' mastery of this ability is still low. A fundamental change is needed to improve communication skills and self-confidence, especially in learning strategies. Several learning models and approaches can be used in mathematics learning, namely the Problem Based Learning (PBL) Approach. The PBL approach is a student-centered approach by confronting problems related to real life. In addition, in problem-based learning, students learn through problems that must be solved through discussions in small groups, making students more active in learning to increase student self-confidence. Based on the explanation above, this study examines the Problem Based Learning (PBL) approach in improving students' Mathematical Communication Skills in terms of student self-confidence.

METHODS

The method used in this paper is *Systematic Literature Review* (SLR). In Indonesian is called systematic literature review. This method identifies, reviews, evaluates, and interprets all available research.

Research Questions

The research question in this article is whether the Problem Based Learning (PBL) approach effectively improves students' Mathematical Communication Skills in terms of student self-confidence.

Selection Criteria

The criteria for selecting data in this study are shown in table 1.

Table 1. *Selection Criteria*

Accepted/Rejected	Criterion
Inklus (Accepted)	1. The article results from research in Indonesian, International journals or proceedings. 2. Discussion of articles according to the research topic 3. The scope of schools is only in Indonesia 4. Education level of elementary / equivalent, junior high / equivalent, high school / equivalent and university.

	5. Publications 2012 - 2022
Exclusion (Rejected)	1. The article is not the result of research in Indonesian, International or Proceedings journals 2. Discussion of articles outside the research topic 3. The scope of schools outside Indonesia 4. Education level below elementary level and above university level 5. Publications under 2012

Data Search Strategy

The strategy carried out in the research is to collect articles from digital learning-based mathematics learning research in Indonesia from electronic databases, such as *Google Scholar, Research Gate, Science Direct,* and *DOAJ.* The search keywords are:

a. Mathematical Communication Skills
b. Self confidence
c. Problem Based Learning (PBL)

Data Selection Process

In this study, the author made a selection in two stages, where the author checked the title and abstract of the journal to determine whether the research was relevant or not to the topic studied.

RESULTS AND DISCUSSION

Mathematical communication skills are students' ability to express their mathematical ideas to others in oral and written form. Mathematical communication skills are important for students. Because when students have mathematical communication skills, students have also grown their confidence. This is because of students' positive views about themselves and their abilities, so that students do not feel afraid of being wrong or anxious when solving a math problem and can be proven through behavior in their daily lives.

Of course, this is very interesting to study so that it becomes one of the pioneers of the emergence of research related to teaching and learning activities to improve students' mathematical communication skills in terms of *Self-confidence* through the Problem Based Learning (PBL) Approach. The results of the research data included in this article are summary analysis of documented articles related to the effectiveness of the Problem Based Learning (PBL) approach in improving students' Mathematical Communication Skills in terms of student Self-confidence, which is presented in the following table:

Table 2. Students' mathematical communication skills are reviewed from Self–confidence melalui Pendekatan Problem Based Learning (PBL)

No	Author & Year	Publisher	Data
1	Andini, Mulyani,	Journal of	• The achievement of mathematical

	Wijaya and Supriyati Year: 2018	Derivat : Mathematics &; Mathematics Education	communication skills and Self Confidence of students whose learning uses Problem Based Learning is better than ordinary learning.
2	Ranti Santika Dewi, Rostina Sundayana, and Reni Nuraeni Year: 2020	Mosharafa: Journal of Mathematics Education	• Problem Based Learning can be recommended as learning teachers use to improve students' mathematical communication skills and self-confidence.
3	Mukaromah, Pentatito Gunowibowo, M. Coesamin Year: 2018	Unila Journal of Mathematics Education	• The mathematical communication ability & self confidence of students who follow problem-based learning is higher than the mathematical communication skills of students who follow conventional learning
4	F. Theo Year: 2013	Journal of Education and Learning. (Online), Vol.2	• The mathematical communication skills of students who follow problem-based learning are higher than those who follow conventional learning.
5	Arismawati Year: 2017	Journal of Mathematics Education. (On-line), Vol.6,	• The self-confidence of students who follow problem-based learning is higher than those who follow conventional learning.
6	Rianti Rahmalia, Hajidin, and BI. Ansari Year: 2020	Jurnal Numeracy	• Improving the mathematical communication skills of students who obtain problem-based learning is better than improving the communication skills of students who obtain conventional learning
7	Noviyana Year: 2019	PRISMA, Proceedings of the National Seminar on Mathematics	• There is a positive relationship between self-confidence and mathematical communication skills. The better the student's self-confidence, the better his mathematical communication skills.
8	Anwar Sidik Year: 2017	National Seminar on Mathematics and Mathematics Education, 222–226	• There is a positive relationship between students' self-confidence and mathematical communication skills. The higher the student's Self Confidence, the higher the mathematical communication skills possessed, conversely, the lower the student's Self Confidence, the lower the student's mathematical communication ability

e-ISSN: 2986-8076
DOI: 10.57254/tess.v1i1.7

9	Fathani Year: 2012	Jogjakarta: Ar-ruzz Media.	• Mathematics is an organized structure ranging from axioms / postulates, basic / primitive notions, and postulates / theorems, mathematics is also a tool used to find solutions related to everyday life,
10	Ramdani Year: 2012	*Journal of Educational Research*	• Mathematical communication is the ability to communicate, including writing, listening, studying, interpreting, and evaluating ideas, symbols, terms, and mathematical information observed through listening, presenting, and discussion.
11	Ramadhan &; Minarti Year: 2018	*Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*	• Students' mathematical communication skills still do not achieve satisfactory results, one of the reasons is that students think that writing down what is known in the problem and what is asked in the question is not important, and many of these students still do not understand the basic concept material of doing the calculation process
12	Ritonga Year: 2018	Journal of State Islamic University of Medan	• The indicators of mathematical communication ability are: (1) Skills to combine real objects into mathematical ideas. (2) Can express mathematical thoughts in writing and everyday events with mathematical symbols. (3) The ability to use images to present ideas, daily conditions, and mathematical relationships in written form. (4) Skills in digesting and reviewing mathematical ideas when solving everyday cases with writing. (5) Able to convey conclusions on answers to simple questions based on the results of the questions.

13	Ansari Year: 2012	Banda Aceh: Pena Foundation	• The indicators of mathematical communication skills that students should master are: 1) expressing mathematical ideas by speaking, writing, demonstrating and describing them in visual form, 2) understanding, interpreting, and assessing mathematical ideas presented in written, oral or visual form, 3) using language, notation and mathematical structures to express ideas, draw relationships and make models.
14	ANGGRAINI ASTUTI &; LEONARD Year: 2015	Formative Journal 2(2)	• A positive and significant influence exists between mathematical communication skills and students' mathematics learning achievement. The higher the student's mathematical communication skills, the higher the achievement of learning mathematics
15	Delina, Afrilianto & Rohaeti Year: 2018	Journal of Innovative Mathematics Learning	• *Self-confidence* is a sense of having good mathematics, being able to learn mathematics quickly and never giving up, showing confidence in his mathematical abilities, and being able to think realistically
16	Ika Nurhaqiqi Noviyana, Nuriana Rachmani Dewi, Rochmad Year: 2019	PRISMA, Proceedings of the National Seminar on Mathematics	• An indication that students' self-confidence is still lacking is that students seem to lack self-confidence when asked to express their opinions, students are not confident in their abilities. • A student's mathematical communication skills will be good if the student has good self-confidence. This is due to the positive view of students about themselves and their abilities. When students already have good self-confidence, they will be brave in expressing their opinions and encouraged to improve their achievements. Mathematical communication skills and self-confidence can be grown through the learning process, of course, with the participation of teachers as facilitators and motivators for students.
17	Mars	Unila Journal	• Self-confidence is one's confidence

	Year: 2014	of Mathematics Education.	about one's ability to solve problems. Students with high self-confidence will believe themselves able to solve various problems with their abilities.
18	Agustyaningrum &; Widjajanti Year: 2013	PYTHAGORAS: Journal of Mathematics Education Vol. 8, No. 2	• Based on the questionnaire analysis results, students' average confidence in learning mathematics was 74.03%. As many as 26.47% or about 18 students still have a confidence level of less than 70%. • A confident person will then be confident in completing a job and problem.
19	Hendriana, Slamet & Sumarmo Year: 2014	International Journal of Education, Vol. 8 No. 1.	• The term self-confidence has a relationship with students' perceptions of themselves to learn mathematics, communicate with others, and their perceptions in using mathematics in everyday life
20	Purnomo &; Wahyudi Year: 2021	*EDUPEDIA, 5(2), 1–17.*	• Students with less self-confidence tend to find it difficult to convey their ideas or ideas. Students with high self-confidence can understand and express ideas or ideas owned in language or mathematical symbols.
21	Anisa Nur Aini &; Rini Setianingsih Year: 2022	*MATHEdunesa Scientific Journal of Mathematics Education*	• Four indicators determined by researchers to measure students' confidence levels, namely: (a) Believe in one's abilities, (b) Act independently in making decisions, (c) Optimistic in the face of difficulties, (d) Dare in expressing opinions. • Students with high self-confidence have high mathematical communication skills based on the results of mathematical communication skills tests. Students with high self-confidence can communicate mathematical ideas well and meet all indicators of mathematical communication, namely Mathematical Expression, Drawing, and Written Text.
22	Ningrum Year: 2016	PRISMA, Proceedings of the National Seminar on Mathematics	• PBL can be used as a learning model that can be a means to develop students' mathematical communication skills

23	Alamiah &; Afriansyah Year: 2017	Mosharafa: Journal of Mathematics Education	• As for the steps of PBL: 1) the student orientation process on the problem. 2) Organizing students. 3) Guiding individual and group investigations. 4) Develop and present results. 5) Analyze and evaluate problem-solving processes and results
24	Lutfianannisak and Sholihah Year: 2018	*Tadris Journal of Mathematics*, 1(1), 1–8	• Students with high abilities can understand the problems given and identify mathematical concepts to solve the questions presented
25	Febrinal Year: 2016	Journal of School Leadership and Management	• Students are still unable to create mathematical models of everyday situations or problems

Based on the exposure of data in Table 2. Ramdani (2012) Explaining mathematical communication is the ability to communicate, including writing, listening, studying, interpreting, and evaluating ideas, symbols, terms, and mathematical information observed through listening, presenting, and discussing. The indicators of mathematical communication ability according to Ansari (2012) state indicators of mathematical communication ability, namely: (1) Skills to combine real objects into mathematical ideas. (2) Can express mathematical thoughts in writing and everyday events with mathematical symbols. (3) The ability to use images to present ideas, daily conditions, and mathematical relationships in written form. (4) Skills in digesting and reviewing mathematical ideas when solving everyday cases with writing. (5) Able to convey conclusions on answers to simple questions based on the results of the questions. Another researcher Ritonga (2018) put forward indicators of mathematical communication skills: (1) Skills to combine real objects into mathematical ideas. (2) Can express mathematical thoughts in writing and everyday events with mathematical symbols. (3) The ability to use images to present ideas, daily conditions, and mathematical relationships in written form. (4) Skills in digesting and reviewing mathematical ideas when solving everyday cases with writing. (5) Able to convey conclusions on answers to simple questions based on the results of the questions.

Based on the description above, it can be concluded that, mathematical communication skills consist of oral and written communication. Oral mathematical communication skills are a person's ability to convey information and mathematical ideas through discussions and presentations that are delivered clearly and systematically. The ability of written mathematical communication is a person's ability to express mathematical ideas through pictures / graphs, tables, equations, in writing with students' language. More than that, mathematical communication skills are the ability to express mathematical ideas through language, notation or mathematical symbols to understand, interpret, describe relationships and solve contextual problems into mathematical models and solve problems in everyday life. We can understand that mathematical communication skills are abilities that must be trained to students from an early age considering the importance of communication skills in the learning process at school and in social activities in the community.

In her research, Noviana (2019) stated that there is a positive relationship between self-confidence and mathematical communication skills. This is reinforced by Anwar Sidik (2017) who stated that there is a positive relationship between students' Self Confidence (confidence) and mathematical communication skills. The higher the student's Self Confidence, the higher the mathematical communication skills possessed, conversely, the lower the student's Self Confidence, the lower the student's mathematical communication skills.

Marsha (2014) suggests self-confidence is self-confidence about one's ability to solve problems. Students with high self-confidence will believe themselves able to solve various problems with their abilities. Hendriana, Slamet & Sumarmo (2014) explained that the term self-confidence has a relationship with students' perceptions of themselves to learn mathematics, communicate with others, and their perceptions in using mathematics in everyday life, besides that Delina, Afrilianto & Rohaeti (2018) stated that Self-confidence is a sense of belonging to good mathematics, being able to learn mathematics quickly and never giving up, Show confidence in his mathematical skills, and be able to think realistically. There are four indicators determined by Anisa Nur Aini &; Rini Setianingsih (2022) in their research to measure students' confidence levels, namely: (a) Believe in one's abilities, (b) Act independently in making decisions, (c) Optimistic in facing difficulties, (d) Dare to express opinions.

However, Ramadhan & Minarti (2018) revealed that students' mathematical communication skills did not achieve satisfactory results. Febrinal (2016) states that students can still not make mathematical models of everyday situations or problems. In line with that, based on the analysis of the Agustyaningrum & Widjajanti questionnaire (2013), the average confidence of students in mathematics learning was 74.03%. As many as 26.47% or about 18 students still have a confidence level of less than 70%. Indications that students' communication skills and self-confidence are still lacking are that students seem to lack self-confidence and doubt their abilities so that students are reluctant to convey information and opinions both in writing and verbally.

One learning approach that can facilitate students to learn actively and carry out writing, reading, drawing and constructing mathematical ideas is the problem-based learning approach. This approach comes by exposing students to problems related to real life, student-centered learning is a great opportunity for students to be actively involved in learning activities. Alamiah & Afriansyah (2017) explain the steps of PBL: 1) the process of student orientation to problems. 2) Organizing students. 3) Guiding individual and group investigations. 4) Develop and present results. 5) Analyze and evaluate the process and results of problem solving. In addition, previous research by Ranti Santika Dewi, Rostina Sundayana, and Reni Nuraeni (2020) revealed that Problem Based Learning can be recommended as learning used by teachers to improve students' mathematical communication skills and self-confidence.

Overall, the stages in problem-based learning are more likely for students to be mathematically motivated and have good self-confidence. Therefore, it is undeniable that the mathematical communication skills and self-confidence of students who follow problem-based learning develop better than students who follow conventional learning. This is reinforced based on previous research conducted by Andini, Mulyani, Wijaya and Supriyati which stated that achieving mathematical communication skills and Self Confidence of students whose learning uses Problem Based Learning is better than ordinary learning. Furthermore, Mukaromah, Pentatito Gunowibowo &; M. Coesamin (2018) in their research also stated that the

mathematical communication skills &; self-confidence of students who take part in problem-based learning are higher than the mathematical communication skills of students who follow conventional learning.

CONCLUSION

Based on the research and discussion results, it can be concluded that there is a positive relationship between students' Self-confidence and mathematical communication skills. The higher the student's Self Confidence, the higher the mathematical communication skills possessed, conversely, the lower the student's Self Confidence, the lower the student's mathematical communication ability and the Problem Based Learning Approach is effective in efforts to improve students' mathematical communication skills and self-confidence.

When students already have good self-confidence, they will be brave in expressing their opinions and encouraged to improve their achievements. Mathematical communication skills and self-confidence can be grown through a learning process, so there needs to be good cooperation between teachers as facilitators and students.

REFERENCES

Agustyaningrum, N & Widjajanti, DB. (2013). Pengaruh Pendekatan CTL dengan Setting Kooperatif Tipe Kancing Gemerincing terhadap Kemampuan Komunikasi Matematis, Kepercayaan Diri, dan Prestasi Belajar Matematika Siswa SMP. PYTHAGORAS: Jurnal Pendidikan Matematika Vol. 8, No. 2 (171 – 180).

Aini, A. N., & Setianingsih, R. (2022). Kemampuan Komunikasi Matematis Siswa SMA dalam Menyelesaikan Masalah Matematika Ditinjau dari Self-Confidence. MATHEdunesa, 11(3), 812-825.

Alamiah, U. S., & Afriansyah, E. A. (2017). Perbandingan kemampuan Komunikasi matematis Siswa antara yang Mendapatkan Model Pembelajaran Problem Based learning dengan Pendekatan Realistic Mathematics Education dan Open-Ended. Mosharafa: Jurnal Pendidikan Matematika, 6(2), 207-216.

Andini, A., Mulyani, N., Wijaya, T.T., & Supriyati, D.N. (2018). Meningkatkan Kemampuan Komunikasi Matematis dan Self Confidence Siswa Menggunakan Pendekatan PBL Berbantuan Geogebra. Pendidikan Matematika, IKIP Siliwangi, 5(1), 82- 93.

Ansari. (2012). Komunikasi matematika dan politik suatu perbandingan : Konsep dan aplikasi. Banda Aceh: Yayasan peNA.

Arismawati, Umi. 2017. Efektivitas Model Pembelajaran Problem Based Learning Ditinjau dari Kemampuan Pemecahan Masa- lah dan Kepercayaan Diri Sis-wa Kelas VIII SMP Negeri Sanden, Yogyakarta. Jurnal Pendidikan Matematika. (On- line), Vol.6, No.9,

Astuti, A., & Leonard, L. (2015). Peran kemampuan komunikasi matematika terhadap prestasi belajar matematika siswa. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *2*(2).

Delina, Afrilianto & Rohaeti. (2018). Kemampuan Berpikir Kritis Matematis Dan Self Confidence Siswa Smp Melalui Pendekatan Realistic Mathematic Education. Jurnal Pembelajaran Matematika Inovativ, 1(3), 281-288.

Dewi, R. S., Sundayana, R., & Nuraeni, R. (2020). Perbedaan Peningkatan Kemampuan Komunikasi Matematis dan Self-Confidence antara Siswa yang

Mendapatkan DL dan PBL. Mosharafa: Jurnal Pendidikan Matematika, 9(3), 463-474.

Dewi, S. N., & Minarti, E. D. (2018). Hubungan antara Self-Confidence terhadap Matematika dengan Kemampuan Pemecahan Masalah Matematik Siswa pada Materi Lingkaran. Mosharafa: Jurnal Pendidikan Matematika, 7(2), 189-198.

Fathani, A. H. (2012). *Matematika hakikat dan logika*. Jogjakarta: Ar-ruzz Media.

Febrinal, D. (2016). Peningkatan Kemampuan Komunikasi Matematis Melalui Contextual Teaching Learning (CTL) di Kelas VIII SMP 44 Sijunjung. Jurnal Kepemimpinan dan Pengurusan Sekolah, 1(2), 181–192. http://dx.doi.org/10.34125/kp.v1i2.10

F. Theo, Yovita. 2013. Pengaruh Model Problem Based Learn- ing Terhadap Kemampuan Ko- munikasi Matematis pada Ma- teri Himpunan Kelas VII. Jur- nal Pendidikan dan Pembela- jaran. (Online), Vol.2, No.10, Tahun 2013, (http://jurnal.un- tan.ac.id/index.php/jpdpb/articl e/view/3563/3572)

Haerudin, H. (2013). Pengaruh Pendekatan Savi Terhadap Kemampuan Komunikasi Dan Penalaran Matematikserta Kemandirian Belajar Siswa Smp. Infinity Journal, 2(2), 183. https://doi.org/10.22460/infinity.v2i2.34

Hendriana, Slamet & Sumarmo. (2014). Mathematical Connection Ability And Self-Confidence (An experiment on Junior High School students through Contextual Teaching and learning with Mathematical Manipulative). International Journal of Education, Vol. 8 No. 1.

Lutfiananniśak, L., & Sholihah, U. (2018). Kemampuan Komunikasi Matematis Siswa dalam Menyelesaikan Soal Materi Komposisi Fungsi Ditinjau dari Kemampuan Matematika. *Jurnal Tadris Matematika*, *1*(1), 1–8. https://doi.org/10.21274/jtm.2018.1.1.1-8

Marsa, K.A. Bernando Satria. 2014. Penerapan Model Pembelajar- an Berbasis Masalah untuk Meningkatkan Kemampuan Penalaran Matematis dan Self Confidence Siswa. Jurnal Pendidikan Matematika Unila. (Online), Vol.2, No.6

Mukaromah, P. G., & Coesamin, M. (2018). Pengaruh Problem Based Learning Terhadap Kemampuan Komunikasi Matematis dan Self Confidence Siswa. JURNAL PENDIDIKAN MATEMATIKA UNIVERSITAS LAMPUNG, 6(1).

NCTM. (2000). Principle and Standards for School Mathematic. Virginia: NCTM.

Ningrum, R. K. (2017, February). Meningkatkan kemampuan komunikasi matematis siswa menggunakan problem based learning berbasis flexible mathematical thinking. In PRISMA, Prosiding Seminar Nasional Matematika

Noviyana, I. N., Dewi, N. R., & Rochmad. (2019). Analisis Kemampuan Komunikasi Matematis Siswa Ditinjau dari Self-Confidence. PRISMA, Prosiding Seminar Nasional Matematika, 2, 704–709.

Purnomo, R. W. A., & Wahyudi. (2021). Peran Self Confidence Bagi Kemampuan Komunikasi Matematis Siswa. EDUPEDIA, 5(2), 1–17.

Rahmalia, R., Hajidin, H., & Ansari, B. I. (2020). Peningkatan Kemampuan Komunikasi Matematis dan Disposisi Matematis Siswa SMP Melalui Model Problem Based Learning. *Numeracy*, *7*(1), 137-149.

Ramdani, Y. (2012). Dani Ramdani. *Jurnal Penelitian Pendidikan*, *13*(1), 49.

Ramadhan, I., & Minarti, E. D. (2018). Kajian Kemampuan Komunikasi Matematik Siswa SMP dalam Menyelesaikan Soal Lingkaran. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, *2*(2), 151–161.

Ritonga, S. N. 2018. *Analisis Kemampuan Komunikasi Matematis Siswa dalam Pembelajaran Matematika MTs Hifdzil Qur'an Medan Tahun Ajaran 2017/2018*. Medan: Universitas Islam Negeri

Siddik, A., Ramlah, & Utami, M. R. (2017). Hubungan Antara Self-Confidence dengan Kemampuan Komunikasi Matematis Siswa SMP. Seminar Nasional Matematika dan Pendidikan Matematika, 222–226.

Syamsudin, N., Afrilianto, M., & Rohaeti, E. E. (2018). Meningkatkan Kemampuan Komunikasi Matematik Siswa Kelas VIII SMP Negeri 2 Cariu pada Materi Sistem Persamaan Linier Dua Variabel dengan Pendekatan Realistic Mathematic Education (RME). JPMI (Jurnal Pembelajaran Matematika Inovatif), 1(3), 313-324.

Turmudi, (2008). Landasan Filsafat dan Teori Pembelajaran Matematika (Berparadigma Eksploratif dan Ivestigatif). Jakarta: LEUSER CITA PUSTAKA