
Analysis of Students' Mathematical Communication Skills In Terms of Self-Confidence**Novianti Fay¹⁾, Urni Babys^{2)*}, Netty Julinda Marlin Gella³⁾**¹⁾ SMP Negeri Kie, Indonesia^{2,3)} Mathematics Education Study Program, STKIP Soe, Indonesia

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Abstract

Mathematical communication skills are the ability to convey mathematical ideas or ideas orally or in writing, and to understand and accept other people's ideas or ideas carefully, analytically, critically, and evaluative to sharpen the understanding. The purpose of this study is to analyze students' mathematical communication skills in terms of self-confidence. The study was conducted in SMP Negeri 3 Soe with the subject of research being VIII grade students as many as 22 students. This study uses the qualitative descriptive method. Data collection techniques in the form of tests, questionnaires, and interviews. The data analysis follows the Miles and Huberman model. The results showed that students' mathematical communication skills are seen from different levels of confidence. Students who have a high level of confidence can meet 4 indicators of mathematical communication skills, namely connecting real objects, images, and diagrams into mathematical ideas; able to present ideas in the form of images; able to use terms, mathematical symbols, and structures to present ideas, describe relationships and model making; able to understand, interpret and evaluate mathematical ideas. Students who have a moderate level of confidence can meet three indicators, namely connecting real objects, images, and diagrams into mathematical ideas; being able to present ideas in the form of images; able to use terms, mathematical symbols, and structures to present ideas, describe relationships and model making. Students with a low level of confidence are only able to meet one indicator, namely in using terms, mathematical symbols, and structures to present ideas, describe relationships, and model making

Keywords: Mathematics Communication, Self-Confidence

INTRODUCTION

Mathematics is knowledge universal that underlies the development of technology, has an important role in various disciplines, and advances the power to think a man (Ministry of National Education, 2006). *National Council of Teachers of Mathematics* (NCTM, 2000) formulate objective learning mathematics that is: (1) mathematical problem solving; (2) mathematical reasoning and proof; (3) mathematical communication; (4) mathematical connection; (5) mathematical representation. Mathematics is generally identical to the calculation of numbers and formulas, so the assumption arises that communication skills cannot be built on learning mathematics (Babys, 2020). Meanwhile, Rohid, Suryaman, and Rusmawati (2019) stated that communication skills are important in mathematics learning. Process learning mathematics which occurs need ability communication, where ability communication is a step beginning to guide the student in solving problem (Bien, 2015).

The ability to communicate mathematics in learning mathematics is not only just a tool to help think, a tool for finding patterns or problem solving, but communication is also a social activity in mathematics learning, such as communication between students and communication between students teachers, and student (Arifin, Trapsilasili, and Fatahillah, 2016). Ability communication mathematics is the ability to convey idea or idea mathematics, both orally and in writing as well as the ability to understand and accept other people's mathematical ideas or ideas carefully, analytically, critically and evaluative for sharpening understanding (Lestari, and Yudhanegara, 2017:83).

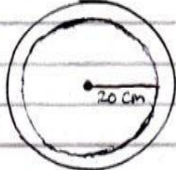
Mathematical communication skills itself can provide rational reasons in solving problems, able to change the form of descriptions in mathematical models, and able to illustrate ideas or mathematical ideas in the form of relevant descriptions (Hendriana and Kadarisma, 2019).

Lestari, and Yudhanegara (2017:83) also identify indicators of communication mathematics, that is; (1) connecting objects real, pictures and diagrams, into mathematical ideas; (2) explaining ideas, situations, and relation mathematics, by oral and writing with object real, chart and algebra; (3) expressing everyday events in mathematical language or symbols; (4) listening, discussing, and writing about mathematics; (5) reading with an understanding of a mathematical presentation; (6) composing math questions which relevant to situation problems; (7) compile conjecture, compile argument, formulate definitions and generalizations.

The ability communication the mathematics that will be used in this research are; (1) connect real objects, pictures, and diagrams, into mathematical ideas; (2) explain the idea, mathematical situations, and relations, orally and in writing with real objects, graphs and algebra; (3) ability to understand, interpret and evaluate mathematical ideas; (4) the ability to use terms, symbols, symbol mathematics, and structures for serve ideas, describe relationships and making model; (5) state daily events in language or math symbols.

Based on the observation in SMP Negeri 3 Soe found that students' mathematical communication skills in learning are still low. low ability communication mathematics showed when students had difficulty in communicating with others and were unable to understand and express the situation in language or mathematical symbols. Students too difficulty in writing, explaining, and serving ideas mathematics for description as well as making model mathematics in process classroom learning. In addition, learning activities in the classroom are dominated by teachers and less actively involve students in the learning process. This matter by student work in Figure 1 and Figure 2.

Perhatikan gambar roda dibawah ini!



Panjang jari-jari roda 20 cm dan tebal ban 2 cm. Apabila roda itu menggelinding lurus 42 kali putaran dan $\pi = \frac{22}{7}$, maka panjang lintasan ban adalah ...

Jawab

Dik = $r = 20$
 $\pi = \frac{22}{7}$
 $K = 2 \pi \cdot r$
 $K = 2 \cdot \frac{22}{7} \cdot 20$
 $K = \frac{880}{7} = 125,7$
 berputar 42 kali berarti : $42 \times 125,7$
 $= 5279,9$
 jadi panjang lintasan ban adalah 5279,9

Figure 1. Results Work Student A

Figure 1 shows that students have difficulty understanding and explaining the idea of the questions given and students have not been able to understand write and explain idea

mathematics in the problem. Students too still have difficulty in the completion process, where students write down what they are known in the problem but the student does not write down the value of the thickness of the tire that must be added up by the radius, so that in the process of finding the circumference it is still wrong and results which solved no by the answer which actually.

Diketahui dua buah lingkaran yang berpusat di M dan N.
 Panjang garis singgung persekutuan dalam 12 cm. Jika jari-jari lingkaran
 M = 5 cm dan jarak kedua pusat lingkaran = 15 cm
 Hitunglah jari-jari lingkaran N!

Jawaban.

dik = $CD = 12$ cm
 $PA = 5$ cm
 $PN = 15$ cm

dit = ?
 Jawab = $CD^2 = PN^2 - (r_2 + r_1)^2$
 $12^2 = 15^2 - (5 + r_1)^2$
 $144 = 225 - (5 + r_1)^2$
 $-81 = -(5 + r_1)^2$
 $81 = (5 + r_1)^2$
 $\sqrt{81} = 5 + r_1$
 $9 - 5 = r_1$
 $r_1 = 4$ cm.

Figure 2. Results work student B

Figure 2 shows that students have difficulty in the process of understanding questions and expressing language in symbols. Student errors are seen in the process solve problems where the center point is known using M and N, but in the solution, students use PQ so it is not consistent in writing by using symbols. Students have difficulty in writing ideas in writing without looking at the questions to complete and students have not capable conclude process solution questions.

The results of an interview with one of the mathematics teachers at SMP Negeri 3 Soe also showed that the mathematical communication skills of students are still low. This happens because students have difficulty communicating in process of learning take place. Students also do not enough believe themselves if requested to disclose return something description or do it inboard write. Students do brave disclose answers which already are known if there is a classmate who has more academic ability or who is more active in the learning process. Because of that, some students prefer for no write the answer on sheet work because feel no confidence in their answers. Judging from the existing problems, then it can be said that mathematical communication skills and self-confidence are very important in learning mathematics.

Lestari, and Yudhanegara (2017:95) suggest that self-confidence is an attitude of confidence in one's abilities as a person who is intact concerning the concept of self. Sudrajat stated that the truest self is believed to ability self to unite and drive motivation, the resources needed, and generate it in action by what which should solve or by demands duty (Sritresna, 2017). Rizqi, Suyitno, and Sudarmin (2016) state that students who have high self-confidence can communicate their ideas to clarify ideas in solving the problems they pose. The higher the confidence student will the more tall also ability to communicate mathematics which has because students' mathematical communication has a positive relationship with self-confidence (Sidik, Ramlah, and Utami, 2017)

RESEARCH METHODS

The method used in a study is the descriptive qualitative method. Study this implemented in SMP Negeri 3 Soe. An instrument used in the study is the form of question test communication skills in the form of descriptions, self-confidence questionnaires, and guidelines interviews. Source data in a study this is class VIII as much 22 students. Technique collection data used is a test, questionnaire, and interview. The data analysis technique used in this study follows the model of Miles and Huberman. Technique triangulation method is used to test the validity of the data.

RESULTS AND DISCUSSION

Results analysis questionnaire self-confidence student show level students' self-confidence varies. Confidence level category result data students served on Table 1.

Table 1. Data Results Category Level Self-Confidence

Level Self-Confidence	interval	Amount Student	Percentage
Tall	112-115	3	14%
Currently	90-111	15	68%
Low	73-89	4	18%

Table 1 shows that the level of self-confidence of most students is in the medium category. This means that during mathematics learning average student's attitude which enough to convince with ability herself/himself as a complete person.

Results analysis ability communication mathematics student in every category is the average student who has a high level of self-confidence able to achieve four indicators of mathematical communication skills. This matter could be indicated by student work in Figure 3.

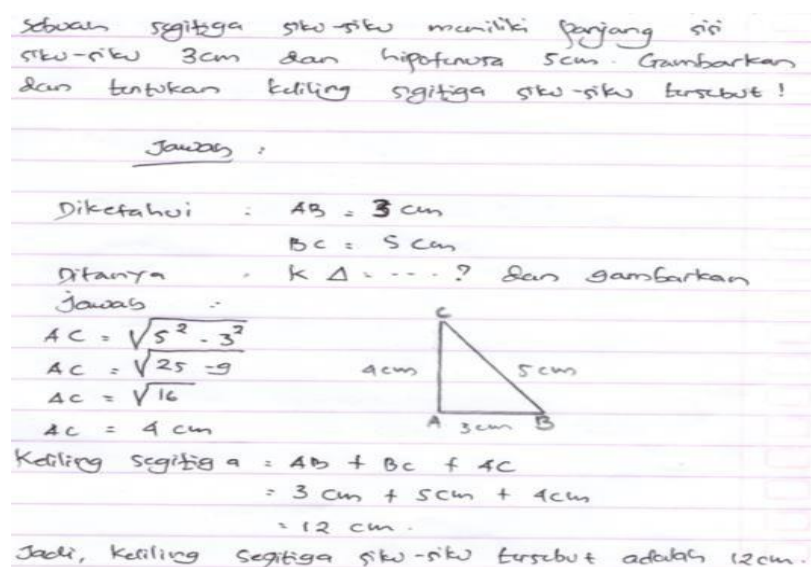


Figure 3. Results Subject work S-1 for Question Number 2

Based on Figure 3, it can be seen that the subject of S-1 did not write a formula when solving problems in fulfilling indicators using terms, mathematical symbols, and structures to present ideas, describe relationships, and model. That matter can be seen from the results of the interview that the subject admits his mistake in writing, namely initially writing down the test results on scratch paper but the subject forgot to write back on the answer paper. In addition, the subject of S-1 with enthusiasm answers confidently for every written answer and feels happy when seeing good work. This is as stated by Lauster that self-confidence is an attitude or feeling of confidence in one's ability so that the person concerned does not need to be anxious in his actions and feel free to do the things he likes and be responsible for his deed, warm and polite in interact with people other, own encouragement for achievers as well as could know excess and the drawbacks (Sritresna, 2017).

Results analysis also shows average students with a level of moderate self-confidence can achieve three indicators of communication skills in mathematics, such that shown in Figure 4.

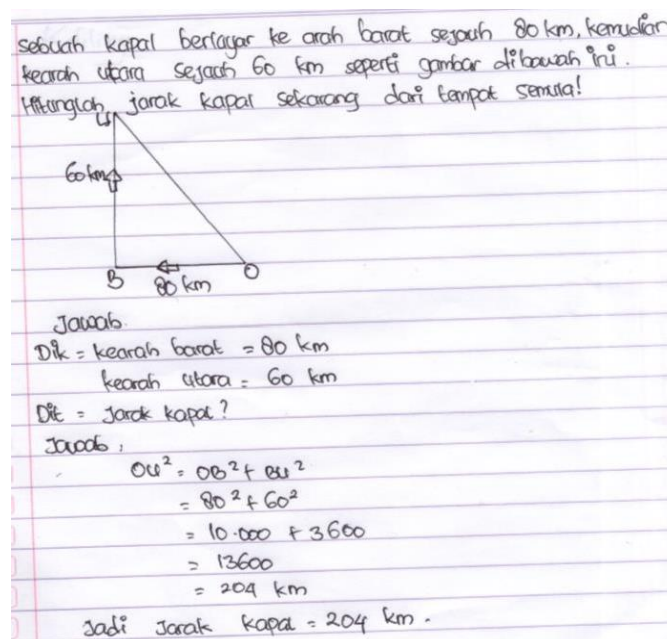


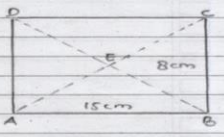
Figure 4. Results Subject work S-15 on Question Number 5

Figure 4 shows that the subject of S-15 has not been able to present ideas in the form of roots so the final result does not meet the indicators correctly using terms, symbols mathematics and structures to present ideas, describe relationships and make models and has not been able to solve problems related to life daily. This can be seen from the results of interviews with the subject S-15 who stated that he did not understand the problem at the time of presenting the idea in the form of roots and was confused with the addition operation so that the result of The ending written does not match the actual answer. S-15 subject too state no convinced with an answer which already written because feel.

there are still many mistakes. This is under Heider's opinion that the ability somebody including the ability to communicate, is not only determined by physical problems and skills only but also influenced by trust in self (Sidik, Ramlah, and Utami, 2017). Analysis results work student also shows there is a student with self-confidence currently which capable reach four indicator ability communication mathematics which showed on

Figure 5

Perhatikan gambar persegi panjang ABCD, disamping. Diketahui ukuran panjang dan lebar persegi panjang tersebut berturut-turut adalah 15 cm dan 8 cm. Tentukan luas persegi panjang ABCD dan panjang diagonal BD.



Jawaban:

1). Diketahui : P = 15 cm
L = 8 cm
Ditanya = Luas persegi panjang ABCD
Jawab = L = P x L
= 15 x 8
= 120
Jadi, Luas persegi panjang adalah 120 cm²

2). Diketahui : P = 15 cm
L = 8 cm
Ditanya = Panjang diagonal BD
Jawab = $BD^2 = \sqrt{AB^2 + AD^2}$
 $BD^2 = \sqrt{15^2 + 8^2}$
 $BD^2 = \sqrt{225 + 64}$
 $BD^2 = \sqrt{289}$
 $BD^2 = 17$
Jadi, Panjang diagonal BD adalah 17 cm.

Figure 5. Results Subject work S-16 for Question Number 3

Figure 5 shows that subject S-16 is not capable write structure and symbol mathematics in fulfilling indicator use term-term, symbols mathematics and structures serve ideas, describe relationships and making model. The thing that saw from subject S-16 which still wrong to write rank unit on conclusion. The reason can be known from the interview results that the subject of S-16 was confused with the meaning of the question and he put forward that moment writing the conclusions of the results are not appropriate because he was wrong with the results of his work. Results analysis ability communication mathematics student on level trust self low that is average student only capable reach one indicator ability communication mathematics. Results profession students could shown in Figure 6.

Sebuah segitiga siku-siku memiliki panjang sisi, siku-siku 3 cm dan hipotenusa 5 cm. Gambarkan dan tentukan keliling segitiga siku-siku tersebut!

Jawab:

$$AC = \sqrt{CB^2 - AB^2}$$

$$AC = \sqrt{5^2 - 3^2}$$

$$AC = \sqrt{25 - 9}$$

$$AC = \sqrt{16}$$

$$AC = 4$$

Jadi =

Figure 6. Results Work Subject S-4 for question 2

Figure 6 shows that the subject of S-4 has not been able to complete the problem if you already know the value of each side of a right triangle but if only one side is known, students have difficulty finding the other side. unable to write down what is known and asked from the question and not capable of the complete question until the results end. Subject S-4 does not understand the meaning of a question, is not capable of interesting conclusion, and is not capable solve problems related to everyday life, the cause can be seen from the results of interviews where the subject of S-4 stated that he doesn't understand the meaning of the problem, don't know how to solve it, no seriously working on the problems and in a hurry to

get out of the classroom with answer questions as they are because they feel lazy. This is to the results of research by Sidik, Ramlah, and Utami (2017) that students' self-confidence has less impact on students' ability to communicate ideas and the result of thoughts they to people other by oral or writing.

CONCLUSION

Based on the results of research and discussion, it can be concluded that students' mathematical communication skills seen from the level of self-confidence vary. Students with a high level of self-confidence can fulfill four of five indicators of ability to communicate mathematics. Students whose level of self-confidence is being able to meet the three indicators and students whose level of trust herself low only fulfill one indicator of ability in mathematical communication.

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