

ANALYSIS MATHEMATICAL COMMUNICATION SKILLS STUDENT AT THE GRADE IX JUNIOR HIGH SCHOOL

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ABSTRACT

This research is a qualitative descriptive study aimed to analyze the mathematical communication skills junior high school students using written tests. The subjects were students of class IX-1 state of junior high school 3 Bilah Hulu Labuhan Batu as many as 30 students. From the analysis of data obtained for indicators of development results in this study that the student is able to connect the pictures, diagrams, tables mathematical idea into as many as 21 (70%) students of class VII-1. The second indicator in this study that the student is able to explain mathematical ideas in writing with drawings, diagrams, tables or algebra 4 (13.33%) students of class IX-1. The third indicator in this study that the student is able to express the situation into the language or math symbol as much as 8 (26.76%) students of class IX-1. Mathematical communication skills of students in classes IX-1 SMP Negeri 3 Bilah Hulu Labuhan Batu is still low so it needs to be made in consideration for further research.

Keywords: *Mathematical Communication Skills*

Introduction

Mathematics is a field of study which is studied by all students from elementary to high school and even in college. One of the goals of mathematics learning in school, that communicate ideas with symbols, tables, diagrams, or other media to explain the situation or problem (Depdiknas, 2007). Based on these objectives, the ability of mathematical communication should be a focus of attention in the study of mathematics, because through communication, students can organize and consolidate think math and students can explore mathematical ideas (NCTM, 2000). Therefore, students need to get used in learning to provide arguments against every answer and provide feedback on the answers given by others, so that what is learned becomes meaningful for him. This means that teachers must try to encourage students to be able to communicate.

Mathematical communication skills is the ability of students to use mathematics as a tool of communication (language of mathematics), and the student's ability to communicate mathematics is learned as the content of the message should be delivered (NCTM, 2000).

Reality on the ground shows that the mathematics learning outcomes in Indonesia in aspects of mathematical communication is still low. Low ability mathematical communication shown in studies Rohaeti (2003) that the average students' mathematical communication skills are in less qualification. Therefore, researchers are searching for: " Analysis Mathematical Communication Skills Junior High School Students"

Mathematical Communication Skills

Communication is at the heart of learning in mathematics. Zevenbergen et al. (2004, in Thérèse Dooley, Elizabeth Dunphy and Gerry Shiel) describing communication in mathematics from the perspective of multi-literacy: In terms multiliteracies, mathematics in the classroom is the text from which

students will make the interpretation (or reading). When teaching is seen in this way, it becomes possible to understand the learner as a more active participant in the classroom and in so In the Netherlands, the trajectory of learning known as TALs (ie, Tussendoelen Annex Leerlijnen). Publishers of textbooks make the claim that their material align with NCTM Standards. although these materials are aligned with the mathematics content, standardized process may not receive explicit attention. Recent data indicate that only 10-28% of K - 12 textbooks engage students in explaining the strategy of using multiple representations with 30% of K - 8 and 55% of 9-12 text never asked students to write reflections (Horizon Research Center , Inc., in 2000 in David K. Pugalee et al). Nartani, at al (2015) improving the communication skills of mathematics indicated by, (1) Students are able to express ideas or ideas with mathematics verbally sentence, (2) Students are actively involved in discussions about math, (3) Students can formulate definitions and generalizations about the math,(4) Students can formulate a definition of mathematics by using its own wordsThe various needs of our gratitude to the various parties.

By Polya (1973), communication is one of the factors that are important in the learning process mathematical inside or outside the classroom. Communication plays an important role in mathematics. NCTM (2000) states that communication is an essential part of mathematics and mathematics education. Without good communication, the development of mathematics will be hampered. Communication to be something major in teaching, assessing, and in learning mathematics.

Mathematical communication skills include: (1) the use of mathematical language that is realized in the form of oral, written, or visual; (2) the use of mathematical representations are realized in the form of written or visual; and (3) clarity of presentation, namely interpreting mathematical ideas, use the term mathematics or mathematical notation to represent mathematical ideas, as well as describe the relationships or mathematical approach (Kennedy & Tipps, 1994).

According to the NCTM (2000) indicators mathematical communication can be seen from: (1) the ability to express mathematical ideas through speech, writing, and demonstrate and describe it visually, (2) the ability to understand, interpret, and evaluate mathematical ideas both verbally , writing, or in other visual forms, (3) the ability to use terms, notations of mathematical and strukturstrukturnya to present ideas, describe relationships with models situation.

Based on the above, an indicator of the ability of mathematical communication that will be used in this study were (1) describe the picture or diagram into mathematical ideas, (2) draw or explain the idea and the situation in writing, (3) states the situation into the language or mathematical symbols. This study aimed to describe the ability of junior high school students' mathematical communication.

Method

This research is a qualitative descriptive study. Qualitative research according Sugiyono (2015) is the research methods used to analyze the condition of natural objects, inductive data analysis and research results further emphasize the significance qualitative. The next Murdaningsih, S and Murtiyasa B (2016) analysis result was presented in checklist table and the percentage of questions contained components was calculated, the produced data was described, *and* conclusion was withdrawn from the analysis results. The purpose of descriptive research is to describe the phenomenon and its characteristics. This study was more concerned with what is not how or why something has happened. Therefore, observations and survey tool that is often used to collect data (Gall, Gall, & Borg, 2007). Subjects in this study were students of class IX-1 SMP Negeri 3 SMP Negeri 3 Bilah Hulu many as 30 students. In this study, given the three-point essay questions test students' mathematical communication skills. Each item on the appropriate indicator of the ability of mathematical communications.

To analyze the scores students' mathematical communication skills, be able to see the guideline scores in the table below.

Table 1. Guidelines for Mathematical Communication Ability Test Scores

Indicator of communication	Aspect of Communication	Score
Explaining the picture or diagram into mathematical ideas	No answer	0
	Can explain a problem with giving arguments to the math problem but incomplete and incorrect	1
	Can explain a problem with giving arguments to the math problem completely but not good	2
	Can explain a problem with giving arguments to the math problem correctly but incomplete	3
	Can explain a problem with giving arguments to the math problem is complete and correct	4
Draw or explain mathematical ideas in writing	No answer	0
	Can paint pictures, diagrams, graphs, and tables but incomplete and incorrect	1

	Can paint pictures, diagrams, graphs, and tables to complete but not good	2
	Can paint pictures, diagrams, graphs, and tables with correct but incomplete	3
	Can paint pictures, diagrams, graphs, and tables with complete and correct	4
Mathematical expressions or express the situation into the language or mathematical symbols.	No answer	0
	Can express mathematical ideas using symbols or mathematical language in writing as a representation of an idea or ideas but incomplete and incorrect	1
	Can express mathematical ideas using symbols or mathematical language in writing as a representation of an idea or ideas with complete but not good	2
	Can express mathematical ideas using symbols or mathematical language in writing as a representation of an idea or ideas with correct but incomplete	3
	Can express mathematical ideas using symbols or mathematical language in writing as a representation of an idea or ideas with complete and correct	4

Result And Discussion

Analysis of the data obtained from the test results mathematically written communication skills. Data communications capabilities mathematical test scores obtained from the test results were distributed to students of class IX-1Bilah Hulu Labuhan Batu on October 28, 2015 as many as 30 students. The following table the score of each indicator of students' mathematical communication skills.

Table 2. Percentage of students' mathematical communication skills

Indicator	Number of students who answered correctly	Percentage
Being able to explain the picture or diagram into mathematical ideas	21 students	70 %
Draw or explain mathematical ideas in writing	4 students	13,33 %
Able to declare events of everyday language or math symbol	8 students	26, 67%

From the table above shows that the indicators of the ability of mathematical communication is able to explain the picture or diagram into mathematical ideas there are 21 students who answered correctly, the indicator draw or explain mathematical ideas in writing there are four students who answered correctly, and the indicators able to declare events of everyday language or math symbol are 8 students who answered correctly. Here are the results of the students' answers to each indicator mathematical communication skills.

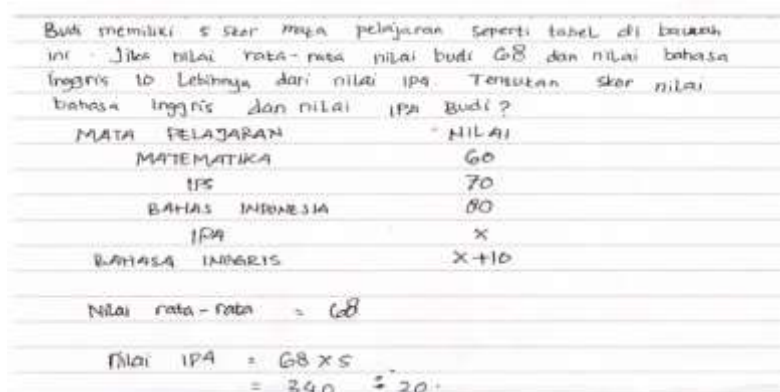


Figure 1. Answer (1)

Figure 1 above shows one of the answers of students who have not been able to explain a picture or diagram into mathematical ideas.

Jawab

a. Hari Senin	Pembale Aljabar	
pagi	$60x$	$= 60x + 40y$
	$40y$	
Sore	$50a$	$= 50a + 50b$
	$50b$	

b. Hari Selasa	Pembale Aljabar	
pagi	$80x$	$= 80x + 30y$
	$30y$	
Sore	$40a$	$= 40a + 20b$
	$20b$	

Figure 2. Answer (2)

Seen from one of the students' answers in Figure 2 was that the students one in determining the mathematical notation, and less accurate in problem solving. So that 26 students could not afford to draw or explain mathematical ideas in writing.

Ibu Nita memiliki kebun salak yang sangat bagus perawatannya buah salaknya pertahun yang berbentuk persegi dengan panjang setiap sisinya $(x + 5)$ meter.

a. Buatlah bentuk Aljabar luas kebun salak bu nita.

b. Jika panjang sisi kebun salak berkurang 2 meter.

Jawab :

$$= (x + 5) \times (x + 5)$$

$$= (x + x) + (5 + 5)$$

$$= x^2 + 5^2$$

$$= x^2 + 25$$

$$= (x^2 + 25)$$

b. $(x + 3) \times (x + 3) = x(x + 3) + 3(x + 5)$

Where there is a wall $x^2 + 3x + 3x + 15 = x^2 + 15$

Figure 3. Answer (3)

Seen that students are able to express in mathematical symbols but the student is one of the steps completed and multiplication calculations in algebra. In the third indicator, there are 22 students are not able to express in mathematical symbols.

Seen from the results of tests given, mathematical communication abilities of students of SMP Negeri 3 Bilah Hulu Labuhan Batu still low, since only the first indicator that describes the image or diagram into mathematical ideas that can be achieved. Many factors underlying why communication skills are low, one of which in the researchers found that at the time of the interview turned out to students feel scared when learning mathematics, and mathematics is said to be a very difficult subject. Although we know that one purpose of learning mathematics in school, that communicate ideas with symbols, tables, diagrams, or other media to explain the situation or problem (Depdiknas, 2007). Communication is one of the factors that are important in the learning process mathematical inside or outside the classroom. Communication plays an important role in mathematics.

Conclusion

Mathematical communication skills of students state junior high school 3 Bilah Hulu Labuhan Batu, obtained that for indicators 1, in this research that students are able to connect the pictures, diagrams, charts into mathematical ideas as much as 70% students of class IX-1. For the second indicator, in this research that the students are able to explain mathematical ideas in writing with drawings, diagrams, tables or algebra as much as 13.33% students of class IX-1. As for the third indicator in this research that the student is able to express the events of everyday language or math symbol as much as 26.76% students of class IX-1. Thus mathematical communication ability students in class IX-1 SMP Negeri 3 Bilah Hulu Labuhan Batu is still low so it needs to be made in consideration for further research. Since only the first indicator in this study who have reached well.

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