

# ANALYSIS OF STUDENT MATHEMATICAL PROBLEM SOLVING SKILLS AT BUDI SATRYA OF JUNIOR HIGH SCHOOL

Neni Fauziah Batubara<sup>1</sup>, Mukhtar<sup>2</sup>, Edy Surya<sup>3</sup>, Edi Syahputra<sup>4</sup>

<sup>1</sup>College student, Graduate Program School in Mathematics Education, State University of Medan, Indonesia

<sup>2</sup>Lecturer, Graduate Program School in Mathematics Education, State University of Medan, Indonesia

<sup>3</sup>Lecturer, Graduate Program School in Mathematics Education, State University of Medan, Indonesia

<sup>4</sup>Head, Graduate Program School in Mathematics Education, State University of Medan, Indonesia

## ABSTRACT

This study aimed to describe the mathematical problem solving abilities of students at grade IX Budisatrya Junior High School of Medan on with curved side. This research is qualitative descriptive. The subjects were 30 students of class IX-2 in 2015/2016 academic year. The data used is the result of the test. The results showed that in understanding the problem, the percentage of students belonging to the capabilities of both ie 80.83%, in planning for problem solving, the percentage of students classified in the ability of 67.5% is good enough, to solve the problems, the percentage of students classified as in very poor ability ie 51.6% and in checking back, the percentage of students classified as severely lacking in ability is 35.83%.

**Keywords:** *Problem solving abilities.*

## Preliminary

Mathematics learning should be an emphasis on math problem solving ability of students. Holmes (1995) basically stated that:

“Background or reason someone needs to learn to solve math problems is the fact in the twenty-first century is that people are able to solve problems with a productive life. According to Holmes, a skilled person will be able to solve problems in pace with the needs of life, become more productive workers, and understand the complex issues related to the global community”.

NCTM (2000) suggested that problem solving is a process of applying knowledge previously obtained in new and different situations. Similarly, as expressed by Eysenck (Novotna, J. et al, 2014) are:

"Problem solving skills develop fast if the solver gets new and new experience with the activity. Pupils' performance in problem solving improves repeatedly if they meet the same type of problem or if they can the make use of Reviews their previous experience."

Mathematical problem solving ability of students is important owned by students, according to the proposed Branca (Wahyuni: 2014) as follows:

- 1) The ability to finish is a general purpose of teaching mathematics, even as the heart of mathematics,
- 2) Completion of the problem include methods, procedures and strategies are core processes and major in mathematics curriculum, and
- 3) Completion of basic skills in mathematics is the study of mathematics.

The importance of problem solving ability was well advanced by Hudoyo (Hoiriyah: 2014) which states that solving the problem is something that is essential in the learning of mathematics in schools, due to, among other things: (1) Students become skilled at selecting relevant information, then analyze it and then examined results; (2) intellectual satisfaction will come from within, which is an intrinsic problem; (3) The intellectual potential of students increased; (4) Students learn how to perform the invention through the process of performing the invention. Thus it was natural that this workaround should receive special attention, given the very strategic role in developing a student's intellectual potential.

According Sumarno (Wahyuni: 2014) basically problem-solving abilities, is among the learning outcomes to be achieved in mathematics learning in any school level. Learning mathematics should

always intended for the realization of problem-solving abilities, so that in addition to mathematics well and perform optimally. Thus, learning mathematics is not only done by transferring knowledge to students, but also help students form their own knowledge as well as empowering students to be able to solve the problems that it faces.

## Discussion

On problem solving, one of the models that can be used is a model Polya. Step known mathematical problem solving proposed by G. Polya (1973), in his book *"How to Solve It"*. Four steps mathematical problem solving by G. Polya are: " (1) Understanding the problem, (2) Devising plan, (3) Carrying out the plan, (4) Looking Back".

Problem solving ability is a business or the way students in solving problems by using systematic measures. Steps to resolve the problem that is used in this study is the Polya problem solving is understanding the problems, plan solutions, perform calculations and check results.

The following indicators can be described by the stages of problem solving problem-solving by Polya (1973) are as follows:

**Table 1. Indicators of Problem Solving**

Step of Problem Solving	Indicator
Understanding the problem	Students are able to describe the information that is given to the question
Devising plan	Students have a problem-solving plan which will be used to solve the problem
Carrying out the plan	Students are able to solve problems with the correct results
Looking Back	Re-examine the step of problem solving

The guidelines for the assessment of mathematical problem solving ability of students are:

**Table 2. Guidelines for Assessment of Problem Solving Ability**

Rated Aspect	Score	Information
Understanding the problem	0	No answer
	1	One wrote a note and asked
	2	Write a note and asked correctly
Devising plan	0	No plans of problem solving
	1	Make the wrong plans of problem solving
	2	Make the correct plans of problem solving
Carrying out the plan	0	No problem solving
	1	Working procedures and calculations with the wrong results
	2	Working procedures and calculations with the results of one part.
	3	Working procedure with the correct result but not finished
	4	Working procedures and calculations are correct
Looking Back	0	No write the conclusion
	1	About writing an incomplete
	2	About writing properly

This research is qualitative descriptive. The subjects were 30 students of class IX-2 of Budisatrya Junior High School in 2015/2016 academic year. The data used is the result of the test. Tests are given a math test with the subject with curved side. Number of questions in the test are given as two questions.

From the research data showed the test results of mathematical problem solving ability of students are presented in Table 3 as follows:

**Table 3. Analysis Students Problem Solving Ability**

Number	Number of question	Indicator			
		1	2	3	4
1	1	2	1	1	1
	2	2	2	4	1
2	1	1	1	1	1
	2	2	2	4	1
3	1	2	1	1	1
	2	2	2	4	2
4	1	2	1	1	1
	2	2	2	4	2

5	1	2	1	1	1
	2	2	2	2	2
6	1	2	1	1	1
	2	0	0	0	0
7	1	2	0	1	1
	2	1	2	3	0
8	1	2	2	4	0
	2	2	2	3	0
9	1	2	0	1	1
	2	0	0	0	0
10	1	2	2	2	0
	2	0	2	1	0
11	1	2	1	2	0
	2	0	0	0	0
12	1	2	2	4	1
	2	2	2	4	1
13	1	2	0	1	0
	2	2	2	1	0
14	1	2	2	4	0
	2	0	0	0	0
15	1	2	0	1	0
	2	2	2	1	0
16	1	2	1	1	1
	2	2	2	4	2
17	1	2	2	3	1
	2	2	2	4	1
18	1	2	2	3	0
	2	3	2	2	0
19	1	2	2	3	0
	2	2	2	3	0
20	1	2	2	3	2
	2	2	2	2	2
21	1	2	0	0	0
	2	0	0	0	0
22	1	2	2	3	0
	2	0	0	0	0
23	1	2	2	3	0
	2	0	0	0	0
24	1	2	2	4	2
	2	2	2	3	1
25	1	0	1	1	1
	2	0	2	0	0
26	1	2	2	3	1
	2	2	2	3	1
27	1	2	2	4	1
	2	2	2	3	1
28	1	2	2	2	1
	2	2	2	2	1
29	1	2	0	3	2
	2	2	2	3	1
30	1	2	0	1	2
	2	0	0	1	1

Values obtained are categorized according to the level of student ability. In this study, the level of ability of students defined as follows :

**Table 4. Qualification Percentage Indicator of Problem solving**

Percentage	Qualification
$85 \leq P_k \leq 100$	Very good
$70 \leq P_k \leq 84,99$	Good
$55 \leq P_k \leq 69,99$	Good Enough
$40 \leq P_k \leq 54,99$	Not good
$0 \leq P_k \leq 39,99$	Very less

Arikunto (2011)

As for the percentage of students' mathematical problem solving ability in this study are as shown in Table 5 below:

**Table 5. Percentage of Mathematical Problem Solving Ability Students Based Indicators Troubleshooting**

Number	Indicator of problem	Score of Student	Total Score	Percentage	Category
1	Understanding the problem	97	120	80,83%	Good
2	Devising plan	81	120	67,5%	Good enough
3	Carrying out the plan	124	240	51,6%	Very less
4	Looking Back	43	120	35,83%	Poorly

At this stage of understanding the problem, highest percentages of students in proficiency levels relatively high at 80.83%. This demonstrates the ability of students to understand the problem better. In making the settlement plan, students in good enough capability that is equal to 67.5%. This shows that students still have difficulty in writing a plan that will be used to solve problems. In solving the problem, students in poor capability that is equal to 51.6%, the students are still difficult to solve the problems with the settlement plan that was created earlier. And in re-examine the results obtained, the ability of students in very less in the amount of 35.83% which is that in the final stages of completion are very few students who complete the answer with the conclusions made at the end of the settlement.

## Conclusion

Based on the analysis that has been done, the conclusion regarding the percentage of students at the level of problem-solving abilities in subjects with curved side by Polya models are:

1. To understand the problem, the percentage of students belonging to the capabilities of both ie 80.83%
  2. The planning problem solving, the percentage of students classified in capability good enough that 67.5%
  3. In solving the problem, the percentage of students classified as poor in capability that is equal to 51.6%
- In check, the percentage of students classified as severely lacking in capability that is equal to 35.83%.

## REFERENCES

1. Arikunto, Suharsimi. (2011). *Dasar-Dasar Evaluasi Pendidikan*. Jakarta; Bumi Aksara.
2. Hoiriyah, Diyah. (2014). *Peningkatan Kemampuan Pemecahan Masalah Matematik dan Self-Efficacy Siswa Melalui Pembelajaran Berbasis Masalah Di MAN 1 Padangsidempuan*. Paradikma Jurnal Pendidikan Matematika, Vol. 7 No. 2, pp. 1-11, ISSN 1978-8002.
3. Holmes, E. (1995). *New Directions in Elementary School Mathematics-Interactive Teaching and Learning*. New Jersey: A Simon and Schuster Company.
4. National Council of Teachers of Mathematics. (2000). *Principles and Standards for School*. Reston, VA: NCTM
5. Novotná, J. et al. (2014). "Problem Solving in School Mathematics Based on Heuristic Strategies", Journal on Efficiency and Responsibility in Education and Science, Vol. 7, No. 1, pp. 1-6, online ISSN 1803-1617, printed ISSN 2336-2375, doi: 10.7160/eriesj.2013.070101.
6. Polya, G. (1973). *How to Solve It, A New Aspect of Mathematical Method*. New Jersey: Princeton University Press.
7. Wahyuni. (2014). *Perbedaan Peningkatan Kemampuan Pemecahan Masalah dan Komunikasi Matematis antara Siswa Kelas Heterogen Gender dengan Kelas Homogen Gender Melalui Model Pembelajaran Berbasis Masalah Di Mts Kota Langsa*. Langsa: Paradikma Jurnal Pendidikan Matematika, Vol. 7 No. 1, pp. 1-11, ISSN 1978-8002