

# An Analysis of Students' Problem Solving Ability on Opportunities Material in IX Grade SMPN 6 Langsa

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## Abstract.

The kind of this research is qualitative descriptive. The subject of this research is 23 students IX grade students of SMPN 6 Langsa. The instrument used of this research is a test on Opportunities Material. Students' percentage who knows the problem is 82,60 % and include in good category, and the students' the problem is 45,65% and include in less-good category, the students' ability to solve the problem by based on the planning is 63,77% and include in good –enough category, and the students' ability in rechecking the result gotten is 40,22% and include in less-good category, while the average percentage is 58,06% and include in good-enough category.

**Keywords:** Problem Solving Ability, Opportunity

## 1. Introduction

Basically education is an activity or interaction that is used consciously to get the maturity and presistent. As the development of the era, the mind set of the students are also able to develop by improving thye quality of high education . the interaction process also support the children to think innovative and creative. That's why, the development of education is ought to happened as the change of life culture. A change in the meaning of the education corrective in all level and on and on done as the anticipation of future importance.

Math is a subject that has important rule in education. There are many reasons about the importance of students to learn math , one of them according to Cockroft in Abdurrahman (2003:253) says that math is important to teach to the students because of: (1) always use in life, (2) all subjects need a suit math, (3) is a strong communication, (4) can be used to serve the information in all way, (5) improving the ability to think logic, accuracy, awareness, and spatial, (6) give a satisfaction to the effort to solve the challenge problem. many reasons of school necessity to teach math to the students, in the essence because of daily problem.

According to *National Council of Teachers of Mathematics* (NCTM) (in Sroyer, 2013:25), the goal of math is developing the abilkity nof: mathematical comunication, mathematical reasoning, matyhematical problem solving, mathematical conection, and mathematical representation. Further according to NCTM, one of math skill that need to master by thye students is mathematical problem solving. The standart of problem solving, *National Council of Teachers of Mathematics* (NCTM) established that the learning program from the kindergarden up to 12 grade must allow the students to; build the new math science through the *problem solving*: solve the problem in math and in another context; apply and adjust kinds of strategy to solve the problem; and monitor and reflect the problem of mathematical problem solving. The importance of problem solving is also firmid im mathematic. The *problem solving* ability is very important in math, not only for them who wants to deepen and learn math but, but also for them who wants to apply it in daily life.

Mathematic problem is described as a quasion or challenge where a students does not know how the way or particular procedure that can be used to solve the problem directly. Problem solving ability is an important

ability that must be had by all the students. Problem solving ability is a mathematic ability that must be had by all the students in curriculum achievement.

NCTM (2000) stated that problem solving is a process to apply the knowledge that had gotten before in new and different situation. Besides that, NCTM stated that generally the goals of problem solving teaching are to: (1) built the new mathematic knowledge, (2) solving the problem appeared and in another context, (3) apply and adjust many strategies to solve the problem, (4) watching over and reflect the process of mathematic problem solving.

In learning process or problem solving, the students can get the experience by using the knowledge and skill they had had. Then, this experience trains the students to be logic, analytical, systematical, critical, and creative to face the problem.

## 2. Problem Solving Ability

Generally, problem is the gap between hope and fact, between what is expected or what is aimed with what happened and the fact. Suherman, etc (2003:92) stated that “ usually, a problem content of a situation that support someone to solve but they do not know what to do to solve it directly”. That’s why if a problem is given to a student, and the student can know the right answer directly of the problem given, thus the problem is not said as a problem.

To get the knowledge in problem solving, someone must have much experience and solve many problems. A question of mathematic is said as a problem if in the finishing need a creativity, understanding and thought/imagination from everyone who faces the problem.

Usually, the mathematical problem is in recitation form, proving, creating, or find a pattern of mathematic.

There are some interpretation about problem in mathematic. One of is Polya’s opinion that’s given by the observer of mathematic. Polya defined that problem solving as an effort to find an escape from a difficulty to get a goal, that’s not directly found or achieve. Mathematic problem as a challenge if the solving needs creativity, understanding and real mindset or imagination. So, can be conclude that problem solving is an ability, someone’s knowledge that in the solving is different depend on what’s seen, observed, remember, and thought based on the event in the daily life.

Problem solving is a process involves a task which the methods do not know first, to know the solving the students ought to put their knowledge, and through this process they are often to develop their new knowledge about mathematic, so the problem solving becomes a strong part in a whole side of mathematic learning (Turmudi, 2008). According to Pehkonen (2007), *problem solving has been one of the general overall goals in the Finnish curriculum*. While according to NCTM in Posamentier and Krulik (2009:1), problem solving is a very important part of mathematic curriculum that has had to be implied for problem solving.

According to Branca (Krulik dan Reys, 1980) stated that problem solving has 3 interpretation, they are: (1) as a main goal, (2) as a process, and (3) as a basic skill. The third things has implication in mathematic learning. First, if the problem solving is a goal thus it is regardless from a specific problem or procedure, also regardless from the mathematic material, the most important is how to solve the problem till success. In this case problem solving as a main reason to study mathematic. The second, if the problem solving is seen as a process thus the emphasis is not in the result, but in the method, procedure, strategy, and the steps are developed through

reasoning and communication to solve the problem. the third, problem solving as basic skill or life skill, because every human must be able to solve their own problem. So, problem solving is a basic skill that must be had by all students. To measure mathematical problem solving ability is need some indicators according to Sumarmo in Husna, and friends (2013:84) as: (1) indentify the known elements, asked, and the adequacy elements, (2) making mathematic model, (3) applying the strategy of problem solving in/out of mathematic, (4) define/interpretate the result, (5) finishing the mathematic model and real problem, (6) using mathematic meaningfully.

According to Polya (1973:6-14) there are 4 steps in finishing the problem, they are: (1) understanding the problem: in this activity, thing to do is formulate: what to know, what to ask, is there enough information, what requirements must be fulfilled, restate the question in more operational form. (2) planning the solving: the activity done in this step is trying to search or remembering the problem ever finished that has similarity with the solving character, searching the formula of rule, and arrange the finishing procedure. (3) doing the planning: the activity in this step is operating the done procedure in the previous step to get the finishing. (4) recheck the procedure and finishing: the activity in this step is analyzing and evaluating whether implied procedure and the result gotten is true, whether the made procedure can be used to finish the same problem, or whether the procedure can be made the generalization.

Based on the description above, in this research problem solving ability that can be measured by students' ability in finishing the problem by using problem solving steps according to Polya, namely: (1) understanding the problem, (2) arranging the problem solving planning, (3) applying problem solving planning, and (4) rechecking, with the reason the strategy is used to use.



Figure 1. Polya's Problem Solving Cycle

### 3. Method

The research done is a descriptive qualitative research. The subject of this research is 23 students of XI-1 Grade SMPN 6 Langsa. The collective data in this research is students' problem solving ability test by using instrument as a tests on Opportunity material that will be arranged, measured the validity criteria before using in collecting data, in order to get the accuracy data. This research is done by giving a question that's given to the students to answer, this is done to see the students' mathematical problem solving ability on Opportunity material for XI Grade SMPN 6 Langsa. Problem solving ability that's measured by using the indicator suits with the answers that are given by the students based on the scoring guidelines based on the table below:

Table 1. Scoring Guidelines  
 Problem Solving Ability Test

Evaluated aspect	Score	Note
Ability to understand the problem (the students write what's known and asked from the mathematic question)	0	If don't write what's known and asked from the question
	0,5	If they're wrong to write what's known and asked from the question.
	1	If write what's known and asked but one of is wrong.
	2	If right to write what's known and asked from the question.
Ability to plan the problem solving. (the students write the sketch/picture/model/formula/al ogarithm for solving the problem)	0	If do not write the sketch/picture/model/formula/al ogarithm
	0,5	If they're wrong to write sketch/picture/model/formula/al ogarithm
	1	If they're less-true to write sketch/picture/model/formula/al ogarithm
	2	If it's only a part to write sketch/picture/model/formula/al ogarithm
	3	If they're true to write sketch/picture/model/formula/al ogarithm
Ability to finish the problem based on the planning (the students can finish the problem from mathematic question)	0	.If do not write the finishing from the question.
	0,5	If they're wrong to write the finishing from the question.
	1	If do not write the finishing from the question due to the true solution.
	2	If the result is wrong a part in writing the finishing.
	3	If they're right to write the finishing from the question.
Rechecking ability (interpret the solution)	0	If do not answer what's asked or do not write the conclusion.
	0,5	Ifb they're wrong to answer what's asked or do not write the conclusion.
	1	If they're less-true to answer what's asked or do not write the conclusion.
	2	If they're right to answer what's asked or do not write the conclusion.

From the research is gotten the data of students's mathematic problem solving ability result that's serve in table 2 as follow:

Table 2. The Data of Students' Mathematical Problem Solving Ability Result of SMPN 6 Langsa

NO	STUDENTS' NAME	NUMBER OF QUESTION	INDICATOR SCORE			
			1	2	3	4
1	APS	1	2	1	2	1
2	AFN	1	2	2	3	1
3	AN	1	1	1	2	1
4	CHN	1	2	1	1	1
5	CUN	1	2	2	2	1
6	DA	1	1	1	0,5	0,5
7	ES	1	2	1	1	0,5
8	EA	1	2	1	1	1
9	FA	1	1	2	2	0,5
10	GR	1	2	1	2	1
11	GAW	1	2	2	3	0,5
12	IN	1	2	1	2	1
13	JM	1	1	2	2	1
14	JU	1	2	1	2	1
15	MA	1	1	1	2	1
16	MEB	1	2	3	3	1
17	MD	1	2	2	2	1
18	MUB	1	2	2	3	1
19	NA	1	1	1	2	0,5
20	NU	1	1	1	2	0
21	RF	1	2	1	2	1
22	SR	1	1	0,5	0,5	0,5
23	SW	1	2	1	2	0,5

To count the percentage of total score of each indicator problem solving ability with the qualification as table 3 below:

Table 3. The Indicator Percentage Qualification in Students' Mathematic 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
$40 \leq P_k \leq 54,99$	Less-good
$0 \leq P_k \leq 39,99$	Very-less

(Arikunto, 2006)

#### 4. Research Result

The data gotten is in written answer sheet that's the result of students' done result to the question given. The data of students' done result is analyzed to know the students' mathematical problem solving ability in doing the mathematic question in Opportunity material. The researcher divided the students' answer result based on the students' indicator achievement. The percentage of students' mathematical problem solving ability in each indicator is served in this following table:

Table 4. The Percentage of Students' Mathematical Problem Solving Ability Based on the Problem Solving Indicator

No	Problem Solving Indicator	Question	Students' score	Total score	Percentage	Category
1	Understanding problem ability	1	38	46	82,60%	Baik Good
2	Problem finishing planning ability	1	31,5	69	45,65%	Less-good
3	Finishing problem based on planning ability	1	44	69	63,77%	Good-enough
4	Recheck the data gotten	1	18,5	46	40,22%	Less-good

From the table above, can be made the diagram that describe the percetage of each students' problem solving indicator. The diagram can be seen in this following picture:

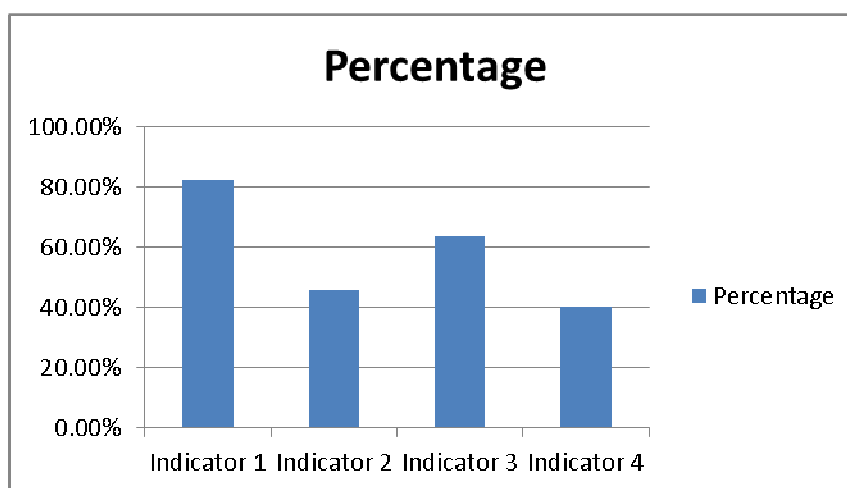


Figure 2. The Percentage of Students' Problem Solving Ability Indicator

## 5. Conclusion

The description of students' ability in solving the problem namely percentage of students' ability to solve the problem is 82,60% and involved in good category, percentage of students' ability to plan the finishing is 45,65% and involved in less-good category, percentage of students ability to solve the problem based on the plan is 63,77% and in good-enough category, percentage of students' ability to recheck the result is 40,22% and involved in less-good category, while the average percentage is 58,06% and involved in good-enough category.

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