

# Mathematical Literacy Capabilities through the Marsudirini Elementary School Problem Based Learning Method, Matraman, Jakarta Timur 2019

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**Abstract:-** The purpose of this study is to describe the process of applying problem solving methods to improve mathematics literacy skills in Marsudirini elementary school. Classroom action research using Kemmis and Mc. Taggart. The subjects of this study were first grade students with a total of twenty children . The steps in this research are: 1) Planning; 2) Implementation; 3) Observations; 4) Reflection. Analysis of the data used is qualitative and quantitative. The qualitative data uses the Miles and Hubberman model. The results of this study are that the average value of mathematics literacy in class I SDS Marsudirini is 35.13%, in Cycle II 57.44% and Cycle II by 82%. In the pre cycle to cycle I there was an increase of 22 , 31 while in the first cycle to Cycle II there was an increase of 24.56% .

**Keywords:-** Mathematics Literacy, Problem Solving Method and Action Research.

## I. INTRODUCTION

Mathematics is not considered easy to teach by most teachers and many people may feel that they need more support to teach mathematics than literacy, perhaps because they themselves do not like mathematics in school. However, developing cross-curriculum mathematics provides opportunities for children to improve their accuracy and learn how to interpret information. Learn how to present information quantitatively and develop children's problem solving and thinking skills beyond just mathematics (Unicef, nd) .

K Capacity of students in the mathematics do not merely have numeracy course, will but the ability of logical reasoning and critical in solving problems. Solving this problem is not merely a matter of form routine matter will but rather the problems faced everyday. Such mathematical abilities are known as mathematical literacy abilities. A person who is *literate* (literate) is not just a mathematical understanding of mathematics will but also able to use it in solving everyday problems.

S ISWA should be able to resolve the real problem (*real world problem*) that requires them to use the skills and competencies they have acquired through experience in schools and day-to-day. The basic process of

this is "mathematical". This process brings students to change from context problems from the real world to the world of mathematics needed to solve these problems. Mathematics brings students in interpreting and evaluating problems and reflecting on their solutions to ensure that the solutions that have been found are in accordance with the real situation that caused the problem .

According to PISA (Program for International Student Assessment, OECD 2003) in Burkhardt Mathematical Literacy is the ability of individuals to identify and understand the role of mathematical drama in the world, to make reasonable judgments and to use and engage with mathematics in ways that meet the needs of the individual's life. as a constructive, caring and reflective citizen (Hugh Burkhardt, 2011) . In this context mathematics teaches children to learn about the real world through existing paths in metematics.

Mathematical Literacy provides students with awareness and understanding of the role mathematics plays in the modern world. Mathematical literacy is a subject driven by applications related to mathematical life . This enables students to develop the ability and confidence to think numerically and spatially in order to interpret and analyze critically everyday situations and to solve problems (Department of Education (DOE), 2003)

M engasah the literacy skills required math learning methods such as *problem based learning* designed problems requires students gain important knowledge, making them adept in solving the problem, and it has its own learning strategies and skills to participate in the team . The learning process uses a systemic approach to solving problems or challenges needed in daily life.

S Strategy solving the problem is a fundamental aspect of mathematical thinking a positively associated with performance on tests of problem solving, but the effect is only marginal evidence for the use of heuristic strategies as a means to improve troubleshooting. In particular, the ability of problem solvers to try to approach solutions that are possible and to assess the likelihood that each outcome has been found to play an important role for their efficiency in decision making and successful problem solving by trainees, the strategies used have a dominant and decisive role in determining the success of a masala h (Kolovou, 2011) .

The problem found in mathematics literacy ability in SDS Marsudirini in class I is still lower than 26 children, only 8 or 30.77% of children have good mathematical literacy skills, the remaining 18 or 0.69%. This is caused by several factors including the first, in conveying the mathematics material the teacher still uses methods that are *teacher centered learning* so that children are less interested when learning, there are those who are engrossed in their own activities, not listening to the teacher carefully, and the desire to learn is low, then from that to improve the ability of mathematical literacy in this study *problem based learning* will be used as a solution to overcome the low mathematical literacy ability because *problem based learning* is a child centered method (*student centered learning*) so that children can be actively involved while learning.

## II. DISCUSSION

Literacy is closely related to the demands of reading skills. Literacy includes how someone is able to understand information analytically, critically and reflectively including encouraging the ability to identify, determine, find, evaluate and create effectively and organized including the ability to communicate.

Literacy can be interpreted as the ability of students to read not only textbooks, but various phenomena in daily life as an analytical, critical and reflective learning environment. Thus, literacy is very important for students to bridge learning activities in schools with their applications in everyday life.

Carter argues that mathematics is not just counting, but it is also a conversation. He believes that children can think math deeply if supported by a learning environment that provides a sense of comfort to ask questions and try mathematical ideas when trying to understand a mathematical concept including through conversation (Carter, 2010). Implications of opinion. Carter on learning mathematics in schools is how teachers need to create a learning environment including the topic of mathematical conversations that are in accordance with mathematical concepts as well as the level of student cognitive development.

Ojose argues that mathematics literacy is essentially that students are able to use basic knowledge and competencies in mathematics that are learned to be used confidently in solving problems in the context of everyday life (Ojose, 2011). Thus it is appropriate if mathematics literacy is developed since basic education. Therefore, it is necessary to study theoretically how mathematics literacy can be facilitated or developed through learning in elementary schools.

Steen, Turner & Burkhard add effective words in terms of mathematical literacy. Mathematical literacy is defined as the ability to use mathematical knowledge and understanding effectively in facing the challenges of everyday life. A person who is literate in mathematics is

not enough to only be able to use his knowledge and understanding but also must be able to use it effectively (Steen, L., & Turner, 2007).

Heruman said that mathematics learning in elementary schools was divided into three large groups, namely the inculcation of concepts, conceptual understanding and coaching skills (Heruman, 2013). This stage is intended to achieve the ultimate goal of learning mathematics in elementary schools, namely that students are skilled in using various mathematical concepts in everyday life. However, in its development often learning becomes memorized formula activities and not varied using the real context around students. This results in students not understanding mathematical concepts as a whole, and when given mathematical problems in different contexts students often experience difficulties.

Literacy literally comes from the word *literacy* which means literacy including *spatial literacy*, *numeracy*, and *quantitative literacy*. *Spatial literacy*, supporting the understanding of the world of living and moving, understanding the surrounding environment, the position of objects, visual perception, navigation including routes and directions of two and three dimensions. *Numeracy*, the ability to handle numbers and data to evaluate statements relating to problems and situations that stimulate mental processes and estimates in real world contexts. While *Quantitative literacy*, literacy is related to quantity, change and relationship categories, as well as opportunities. Mathematical literacy covers all three and is connected to one another. Mathematical content categories in mathematics literacy assessment by PISA (OECD, 2014). in line with the *quantitative literacy* proposed by de Lange, namely quantity, opportunity and data, change and relationships, as well as space and form.

The basic abilities of mathematical literacy involve seven basic abilities that must be possessed by students, namely: (1) *Communication*, which is able to analyze information from a given problem, then present and explain the solution; (2) *Mathematising*, which is formulating problems into mathematical models and interpreting mathematical results into initial / real world problems; (3) *Representation*, presents a problem using mathematical representation; (4) *Reasoning and Argument*, the ability to reason and provide logical arguments; (5) *Devising strategies for problem solving*, the ability to use strategies to solve problems; (6) *Using symbolic, formal and technical language and operations*, the ability to use formal and technical language symbols and operations; and (7) *Using mathematical tools*, using mathematical tools (OECD, 2014).

K Life Skills process of literacy math is meant by PISA is not only the process of mathematical using mathematical representations only, but derived from real-world context to do mathematical modeling (formulations), then apply the concepts, facts, procedures and math skills to solve problems, and the results are interpreted back to in

the initial context problem to be evaluated onwards. Based on this description, it can be said that mathematical or mathematical modeling is key and is very closely related to mathematical literacy (Stacey, 2011).

The above opinion emphasizes the same thing, namely how to use mathematical knowledge to solve everyday problems better and more effectively. In the process of solving this problem, someone who has mathematical literacy will realize or understand which mathematical concepts are relevant to the problem at hand. From this awareness then develops on how to formulate the problem into a mathematical form to then be resolved. This process includes activities of *mengorlorasi*, connecting, formulating, determining, reasoning, and other mathematical thinking processes. This thought process can be categorized into 3 main processes namely formulating, using and interpreting. Thus, the ability of mathematical literacy can be defined as the ability of a person to formulate, use and interpret mathematics in various contexts of solving everyday life problems effectively.

### III. PROBLEM SOLVING METHOD

Problem Solving Method is a method used by teachers in conveying appropriate knowledge to children during the learning process so as to produce maximum understanding by achieving competencies determined through activities chosen by children on the basis of pleasure not because of something promised, a gift or praise and without considering the final results.

Problem-based learning (PBM, *problem based learning*) is a learning model based on the problems faced by students related to KD that students learn (Kosasih, 2014). Problem-based learning challenges children to "learn how to learn" to work in groups to find solutions to world problems so that children feel curious about the intended chase. Students become skilled in solving problems both academic problems and everyday problems. The development of this model students will be able to have critical thinking skills, the ability to solve problems and actively build their own knowledge.

The problem solving method, also known as the *brainstorming* method, is a method that stimulates thinking and uses insight without seeing the quality of opinions expressed by students (Zainal Aqib and Ali Murtadlo, 2016). This method is used to stimulate students to think so that they can solve the problems they face.

Problem based learning has the following characteristics (1) Learning starts with a problem, (2) ensures that what is given is related to the real world of students, (3) organizes lessons around the problem, (4) gives great responsibility to the learner in forming, (5) using small groups, (6) requires learners to demonstrate what they learn in the form of a product or performance (Ngalimun, 2016). It is clearly stated that learning begins with problems that students have that require students to actively solve problems.

According to Pannen in Ngalimun there are eight stages of the scientific method of problem solving steps in learning, namely: (1) identifying problems, (2) collecting data, (3) analyzing data, (4) solving problems based on existing data and analysis, (5) choose a way to solve the problem, (6) plan the application of problem solving, (7) test the plans set and (8) take action to solve the problem

In this study the steps that will be applied in are as follows:

- Students identify the problem,
- Students collect data
- Students define and organize tasks related to the problem
- students to gather information accordingly, carry out experiments to get explanations and problem solving
- students plan and prepare work accordingly, or solve problems that are relevant to the material.
- students reflect or evaluate the problem solving process. Evaluation can be done through test results

From the various opinions above, it can be concluded that the *problem solving* method is a method that stimulates children's thinking power and trains children to face a problem either personal or individual problem or group problem to solve problems through metacognition teaching and has four characters, namely problem submission, interdisciplinary interdiscipline science, authentic investigation, collaborative work.

### IV. RESEARCH METHODS

The method used in this research is *classroom action research*. Action research is participatory and collaborative research. The implementation of this action research involves the researcher directly in his activities and is also collaborative because the researcher can involve other parties in his research. The research of this action is to improve literacy skills in grade I students of Marsudirini Matraman, East Jakarta through *problem based learning* methods.

In the execution will be applied *problem-based learning* so children were given *kasus* and put to work to solve the problem. The form of action research in this study is by giving an action to the subjects studied by using *problem based learning* to determine its effect on increasing the ability of mathematics literacy in grade I elementary school.

The model used in this study is action research Kemmis & Mc Taggart which includes four stages: (1) planning (*planning*), (2) the action (*action*), (3) observation (*observation*), (4) the reflection (*reflection*) (Arikunto Suharsimi, 2006). On models Kemmis & Taggart action (*acting*) and observation (*observing*) is made as a unit because they assume that these two components are the two activities that can not be separated. Where when doing an action there is an observation, so that the data obtained is valid, meaning that when carrying out the action, the observation is

immediately held, so that it can get good data and can be carried out to the next stage, namely reflection.

## V. RESEARCH RESULT

The results of the study mentioned that the average value of mathematics literacy in grade 1 students of SDS Marsudirini was 35.13% because, in Cycle I 57.44% due to the level of achievement of mathematical literacy development through *problem based learning* was still below the level of achievement of minimum development achievements so it needed to be redesigned bro, so that children can exceed the minimum level of developmental achievement, children who pay less attention to the teacher's explanation, children who do not want to explain to their peers, some children need to be reminded to listen to the teacher's explanation. In the second cycle of 82% permaina n not only in the classroom but also do outside the classroom in the garden and around the pool, make children enthusiastic and did not feel a learning to read, a boy-child is beginning to understand the activities play for they already know that in this game they must mention the new words they know, the teacher maximizes his role as a facilitator, mediator and motivator for children and the tools used vary in various forms and colors so as to make the children happy in doing this last p eneliti and kolaborator to evaluate the scores obtained child after the second cycle. The results show an increase with the results of the pre cycle to cycle I there was an increase of 22 , 31 while the first cycle to cycle II there was an increase of 24.56%.

## VI. CONCLUSION

The process in this study shows that the process of mathematical literacy is improved through the *problem solving* method which is carried out for two cycles. The results showed that the average value of mathematics literacy in the first grade students of SDS Marsudirini was 35.13%, in Cycle II 57.44% and Cycle II by 82%. In the pre cycle to cycle I there was an increase of 22 , 31 while in the first cycle to cycle II there was an increase of 24.56%

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