ANALYSIS OF STUDENT'S MATHEMATICS LITERACY SKILL THROUGH THE LEARNING APPROACH OF SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) AT SMA NEGERI 1 MEUREUBO

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ABSTRACT

This study aims to determine students' mathematical literacy skills through the science, technology, engineering, and mathematics (STEM) learning approach at SMA Negeri 1 Meureubo. This research used qualitative research. The subjects in this study were students of class X with a total of 27 students from SMA Negeri 1 Meureubo. Data collection techniques in this study were observation, interviews, tests, and validation. From the results of the study towards the analysis of students' mathematical literacy skills through the science, technology, engineering, and mathematics (STEM) learning approach at SMA Negeri 1 Meureubo, students' mathematical literacy skills were at level 2 which was in the medium category (2.15%) with 12 students, while at the level 1 in the low category were included as many as 5 students.

1. INTRODUCTION

Mathematics education has an important role for each individual because with mathematics each individual can improve the ability to reason, think critically, logically, systematically, and creatively. Therefore, mathematics is always existed at every level of education starting from elementary school, junior high school, high school, and up to college (Winardi, 2018: 162).

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines, and develops the power of human thought. The rapid development in the field of information and communication technology today is based on the development of mathematics in the fields of number theory, algebra, analysis, probability theory, and discrete mathematics. In order to master and create technology in the future requires a strong mastery of mathematics from an early age (Nur, 2016: 199).

Mathematics has an important meaning in helping humans to solve problems in everyday life. The concepts in mathematics can be applied to solve the problems at hand. Therefore, mathematics learning in the classroom should not only focus on mastering the material to solve problems mathematically, but also make students better understand the

concepts in mathematics itself and make students more familiar with problems in everyday life that can be solved with mathematics knowledge obtained by students at school (Buyung, 2017: 113).

Mathematical literacy is one of the high-level abilities. This is in accordance with the main studies of PISA which are reading literacy, mathematical literacy, and scientific literacy (OECD, 2015). In the demands of modern times like today, students in the world are required to have high mathematical literacy skills to be able to compete with other countries. According to the 2015 PISA draft mathematics framework, mathematical literacy skill is the ability of students to formulate, apply, and interpret mathematics in various contexts which includes mathematical reasoning and also uses mathematical concepts, procedures, and facts (Ratni, 2018: 68).

According to PISA results in 2015 showed that the level of mathematical literacy of Indonesian students was only ranked 69th out of 76 countries. PISA results in the study of mathematical literacy of Indonesian students have not reached the PISA average standard. Mathematical literacy in the PISA study consists of 6 levels, level 1 is a group of questions with a low scale and level 6 is a group of questions with a high scale. According to Widodo, Sunardi, & Nurcholis (2015), PISA sets the international average score at level 3 or at a score of 500 and Indonesia has not yet reached the international average score. According to PISA results, Indonesian students have been able to occupy levels 1 and 2 of mathematical literacy, which means Indonesian students have been able to answer routine math questions and have been able to use formulas to solve problems (Jufri, 2015). Mathematical literacy skills levels 3 and 4 are a group of questions with a medium scale and Indonesian students have not been able to solve them because, at this level, non-routine math problems started to appear. Therefore, this study will test the mathematical literacy skills of high school students at levels 3 and level 4 (Ratni, 2018: 68).

Mathematical literacy skill is very important because mathematics is closely related to everyday life (Sari, 2015). Mathematical literacy skills can improve human resources (Masjaya & Wardono, 2018). Mathematical literacy can help someone to understand the role or use of mathematics in everyday life. In addition, mathematical literacy emphasizes the ability of students to analyze, reason, and communicate ideas effectively in solving mathematical problems they encounter (Ahmad, 2019: 495).

Based on the results of observations at SMA Negeri 1 Meureubo showed that the average mathematical literacy results of students at that school were low. Of the 27 students in each natural science class, approximately only 10 students were able to identify problems from the questions given. The problem-solving abilities that could be done by students only revolve around questions that were commonly used, while for problem-based questions only a few students could solve them and the number was less than 10 students, while other students still needed to be assisted or given a stimulus to remind the material that has been studied previously. There were also many students who have difficulty converting story problems into mathematical sentences and only a third of the students were able to do. Most of the students answered the questions given without mentioning what is asked and what is known. There are only students who

really understood the material which included what was known and what was asked. Students also still have difficulty in giving reasons and reflecting on the results of solving the problems given. There was only 1 student out of the number of students who wanted to give reasons, and this must be appointed by the teacher, not because of the awareness that comes from within the student.

The learning science, technology, engineering, and mathematics (STEM) needs to emphasize several aspects of the learning process including asking questions (science) and defining problems (engineering), developing and using models, planning and conducting investigations, analyzing and interpreting data (mathematics), using mathematics, information technology, and computers and computational thinking, building explanations (science) and designing solutions (engineering), engaging in evidence-based arguments, obtaining, evaluating, and communicating information (Jaka, 2016: 204).

In addition to learning that affects low mathematical literacy, there are other factors including the students themselves. Students have characteristics that can affect student learning activities such as background knowledge, level of knowledge, learning style, maturity level, socio-economic environment, intelligence, learning motivation, and others. Regarding intelligence, different levels of intelligence (multiple intelligences) cause differences in reasoning abilities between students in understanding a lesson, especially in mathematics. With multiple intelligences, educators are not allowed to limit a student to only one area of intelligence (Mujib, 2020: 67).

Based on the description above, the science, technology, engineering, and mathematics (STEM) learning approach in learning mathematics can improve students' literacy skills which are controlled by prior knowledge. Students' prior knowledge contributes to determining the level of students' literacy skills. To prove this conjecture, the researchers conducted a study under the research title "**Analysis of Students' Mathematical Literacy Skill through Science, Technology, Engineering and Mathematics (STEM) Learning Approaches at SMA Negeri 1 Meureubo**."

2. METHODOLOGY

This study used a qualitative approach, which sought to understand and interpret the meaning of an event, interaction, and human behavior in certain situations according to the researcher's own perspective.

This type of research was descriptive (descriptive research) or a study aimed at describing existing phenomena that are currently or in the past.

The research subjects here were students of class X SMA Negeri 1 Meureubo, West Aceh Regency. The number of students in class X SMA Negeri 1 Meureubo were 27 people.

To obtain data in this study, the techniques carried out were as follows:

1.   Observation

Observation is a systematic, logical, objective, and rational observation as well as recording process regarding various phenomena, both in actual situations and in situations of assistance to achieve certain goals.

2.   Test

A test is a number of questions, worksheets, and on. To measure the knowledge, skills, talents, and abilities of the research subject.

In this study, researchers used data analysis techniques with the stages of data collection by analyzing data. Researchers used the descriptive method which is a method that tried to describe and interpret objects as they are. In this case, the researcher tried to describe and explain the results of observations, interviews, and documentation.

After a descriptive analysis of the subject under study and the resulting data were qualitative data, the researcher used the inductive thinking method, which was the way the researcher tried to collect facts from phenomena or events that were special, then based on those the general conclusion was drawn.

3.   RESULTS AND DISCUSSION

The results showed that students achieved an average of 2.15 which could be categorized as moderate with 12 students, meaning that students were quite able to interpret situations and applied simple problem-solving strategies using a representation.

While the indicator of mathematical literacy level 1 showed that students only reached an average of 0.81 classified as low with 5 students, meaning that students have not been able to represent concrete but complex situations and students were also low in reasoning a mathematical problem.

The students' mathematical literacy ability at level 2 was sufficient or moderate. Students have difficulty in solving math problems given. This was due to the possibility that students did not understand the meaning of the questions given and most students were not willing to ask, even though they did not understand the material given. This was because students who have a sense of Great curiosity were usually seen as "troublesome" for teachers.

Students experience difficulties in solving level 2 mathematical literacy skills, such as students have not been able to interpret and represent concrete problems, students have not been able to work effectively with models in a concrete and complex situation.

4.   CONCLUSION

The conclusion that can be drawn from the results of the research and discussion is the analysis of students' mathematical literacy skills through the science, technology, engineering, and mathematics (STEM) learning approach at SMA Negeri 1 Meureubo were at level 2 in the medium category (2.15%) with 12 students, while level 1 was included in the low category (0.81%) with 5 students.

Based on the research results obtained, the following suggestions are proposed:

1. For Teachers

     a. Teachers need to apply students' mathematical literacy skills through a science, technology, engineering, and mathematics (STEM) learning approach at SMA Negeri 1 Meureubo. This science, technology, engineering, and mathematics (STEM) learning approach can also be applied to other subject matter related to everyday events so that concepts are not easily forgotten.

b. The approach to learning science, technology, engineering, and mathematics (STEM) is better so that students experience changes in self-concept

2. For Students

a. Students must always learn and dare to express their ideas to achieve the expected learning achievements

b. Students must cooperate with other students

c. Students must know that they can grow their achievement motivation to achieve the expected learning achievement

3. For School

a. The school must be able to create a comfortable learning environment and provide freedom for students to express and develop positive ideas so as to make it easier for them to achieve the expected learning achievements.

b. Schools must provide adequate facilities and infrastructure in order to achieve the expected learning achievements.

5. REFERENCES

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