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Profile of Students' Mathematical Literacy in Solving Mathematics Problems Viewed from Learning Styles

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Abstract

Mathematical literacy is mathematics that has a different context to enable one to formulate, use and interpret mathematical problems and is very important in solving mathematical problems. This study aims to describe the profile of students' mathematical literacy in solving mathematical problems in relation to students' learning styles. This study uses a qualitative descriptive method with the subject matter of SMA Negeri 2 Trenggalek. Data collection techniques through questionnaires, interviews and documentation. The collected data was then analyzed in four steps, namely data reduction, triangulation, data presentation, and drawing conclusions. The results of the study show that the profile of mathematical literacy is more complete for visual learning styles than for auditory and kinesthetic learning styles.

Keywords: Mathematical Literacy, Solving Problems, Learning Styles

INTRODUCTION

Learning mathematics is one of the knowledges that when it becomes more perfect by itself. Having mathematics can help people who have economic, social and natural problems. Mathematics grows when there is a thought process that is caused by logic itself, which is one of the foundations on which mathematics is created. In Permendiknas No. 20 According to the 2006 Mathematics Education Law, students must be able to understand concepts, apply reasoning, solve problems, communicate ideas, and have an attitude of respect for the use of mathematics in everyday life. The ability of students to apply mathematics in everyday life is now known as mathematical literacy.

Mathematical literacy is mathematics that has various contexts to enable someone to be able to formulate. Included in mathematical reasoning that has mathematical concepts and uses procedures. Reality and equipment to describe, explain, and predict phenomena (OEDC, 2013). Thus, it can be useful for mastering the context of mathematics in everyday life, both in evaluation or orally and in writing. National Curiculum Statement Grades argues that in the modern world mathematical literacy helps students' awareness and memory. Enabling students to grow actively psychologically and be able to solve their daily problems. Several factors influence the attainment of mathematical literacy in Indonesia, namely personal, instructive, and environmental factors. The personal factors studied were students' perceptions of mathematics and students' beliefs in mathematics, instructive factors related to intensity, quality, and teaching methods. Teacher characteristics and the availability of learning media in schools are environmental factors (Wati et al, 2019).

The study of mathematical literacy was carried out by one of the international institutions, namely (OECD) with the PISA project. The results of the 2018 PISA survey for Indonesia are in 74th place, ranking six. The lack of attention to reading in Indonesia. Likewise, mathematics attention with a result of 379 is located at 73, and scientific attention

skills with a result of 396 is located at sequence 71. Aspects that affect student learning achievement according to Slameto (2010) are: internal and external. Internal factors have aspects that originate from within the learner. And external has aspects of sources from outside students. One of the supporting factors related to literacy skills is learning style.

Education in the teaching and learning process is written in Nasution's book (2009: 94), namely learning style is a form that is still carried out by a student in finding information by remembering, thinking and solving problems. One type of learning style proposed by (Deporter and Hernacki) is visual, auditory, and kinesthetic learning styles. According to (Priyatna) learning style is the way in which students receive new information and the process they will use to learn. The learning styles used in this study are visual, auditory, and kinesthetic learning styles. It is this difference in learning style that underlies the researcher to obtain an overview of the mathematical literacy skills of class X high school students.

LITERATURE REVIEW

Definition of Mathematical Literacy

One opinion from an expert is (Suryaningsih & Susanah, 2021) saying that literacy is a module, which means that literacy is a way of teaching and learning activities that have control over an individual by means of inferiority, this is understandable. Because of that, the alibi (Hidayah, Hakiki, 'Afwi, & Fiangga, 2020) has a basic view of literacy, which means that everyone can have skills through assuming, writing and reading.

Ojose, Bobby in the Journal of Mathematics Education in 2011 For Ojose it means that litesai is a person's knowledge of the basis of mathematics in everyday life. In this interpretation, students who have good mathematical literacy have a sensibility which mathematical concepts are relevant to the events or problems they are experiencing. From this sensibility, it was followed by solving the problem using a mathematical design (Azizah & Agusriyanti Puspitorini, 2019).

For Stacey and Turner (no years) literacy in mathematical situations is having the ability and using mathematical thinking to solve everyday problems. Steen, Turner, Burkhard (without years) think that mathematical literacy is someone who has the ability to interpret mathematical conditions to solve problems more accurately. (Nilasari & Anggreini, 2019).

Understanding Learning Styles

Often the learning style is a significant value that is desired by all teaching students to receive information. Learning styles will also change. It is very helpful for teachers where in the way of teaching and learning activities (KBM) can work well according to school methods.

For (Learning & Pinrang, 2015), learning styles are a person's choice for mastering experiences and ways of changing. For ('Aisyah, Sutrisno, & Pramasdyahsari, 2021), learning styles are the easiest way for someone to assimilate, organize, and cook the data obtained. (Aliudin, 2021) theorizes that student learning styles consist of visual, auditory, and kinesthetic learning styles, and that all students generally have one of the three learning

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styles. To improve the quality of teaching and learning activities, teachers need to know the learning styles of students so that they can determine the method of teaching and learning activities that suit the learning styles of students. There are several research findings regarding learning styles related to mathematics learning outcomes. Research (Simamora & Tilaar, 2021) proves that learning styles affect students' abilities. Students who study for tests with a dominant learning style achieve better scores than study with a method that is opposite to their learning style (Fazzilah & Effendi, 2020). Research results (Yuliyani & Setyaningsih, 2022) prove that the learning outcomes of students with auditory learning styles are better than those of students with visual and kinesthetic learning styles, whereas the learning outcomes of students with visual and kinesthetic learning styles are similar.

The meaning above, someone can understand how to end up learning with an efficient capacity. So, regarding this proves that each student has a certain learning style. Early description of learning styles is quite meaningful. Teachers should be able to understand the learning styles of each student. So, the teacher must be able to implement good strategies and methods in the way of educating people or groups. If practiced in an efficient and efficient way, the value of change continues to be seen as successful.

METHOD

This research is a qualitative descriptive study. The subjects in this study were students of SMAN 2 Trenggalek. Subjects were taken using a purposive sampling technique. This technique is used to get one student with a visual learning style, one student with an auditory learning style, and one student with a kinesthetic learning style. The data in this study were collected using 3 data collection techniques, namely questionnaires, interviews, and documentation. The research instrument consisted of a learning style questionnaire, tests of mathematical literacy skills, and interviews. Data analysis was carried out through three stages, namely data reduction, triangulation, data presentation, and concluding the subject's mathematical literacy abilities based on learning styles.

RESULTS AND DISCUSSION

From a total population of 33 students who are students of SMAN 2 Trenggalek, researchers took three subjects with each group of visual, auditory and kinesthetic learning styles. The researcher chose a purposive sampling of one student in each group, then they were given a written test and a test. Interview as subject by researcher. This selection is also based on teacher considerations by paying attention to students who express opinions. The subjects selected in this study are as follows:

Table 1. List of research subjects (tests and interviews)

No	Name				Learning Style
		Visual	Auditory	Kinesthetic	
1	Kusuma Wardani	36	32	34	Visual
2	Early Ekawati Styaputri	30	35	32	Auditory
3	Naufal Juliandra R	31	28	35	Kinesthetic

To measure students' mathematical literacy skills when answering PISA questions. In this study the researcher conducted a subjective test in the form of a descriptive test which aimed to measure students' mathematical abilities based on student responses. Students' ability in mathematical literacy is shown not only from the results of student calculations that are right or wrong, but also from students' ability to present and convey their answers. The math culture test questions have been validated by experts who are experts in their fields, namely:

Based on the results of the analysis of answers to written test questions and the results of interviews conducted by SV which were then analyzed using the triangle technique, test students were able to answer 4 questions. Problem 1 researchers can function to correctly measure Level 1 ability in mathematics. The subject is able to show actions that are consistent with the given stimulus. This is in line with Johar's Level 1 Mathematical Literacy Indicator (2012).

Test students were able to answer question number 2 correctly, which measures level 2 mathematical literacy. Based on the results of the tests and interviews, it appears that students were unable to understand and interpret the problem situations in the questions. Students also know how to select relevant information and work with basic algorithms, explaining the precise rationale for the solution. This can be seen from the student responses and interview results in Figure 4.2. According to the PISA Level 2 indicator of mathematical literacy (Johar, 2012). Students can complete the 2nd indicator.

At level 3, on question number 3 which measures students' mathematical literacy, so that students know how to answer questions correctly. According to Johar (2012), students who do not excel at level 3 can be said that these students are not at level 3 in mathematical literacy.

At level 4, for question number 4 which can measure students' mathematical literacy abilities, in order to be able to answer questions correctly. In Figure 4.4 and the results of the interviews, students can use models effectively in complex situations, students can choose and combine different expressions, students can use different abilities and reason clearly.

Can suggest and convey the results of interpretation and action. According to Johar (2012), students who perform well on each of the Level 4 indicators are at Level 4 in students' mathematical literacy.

Based on the results of the analysis of the answers to the written test questions and the results of interviews conducted by SA students which were then analyzed using the triangle technique, the test students were able to answer 4 questions. Problem 1 researchers can function to measure Mathematics Level 1 abilities correctly. The subject is able to show actions that are in accordance with the stimulus given. This is in accordance with the indicators of Level 1 mathematical literacy put forward by Johar (2012).

The subject was able to answer question number 2 correctly which measures level 2 mathematical literacy. Test and interview results showed that the subject had answered correctly. It's just that the subject could not explain the exact reasons for the results of the decision. This can be seen from the student answers and interview results in Figure 4.10

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At Level 3, in question number 3 which measures students' mathematical literacy, students know how to answer questions correctly. According to Johar (2012), students who do not excel at Level 3 can be said that these students are not at Level 3 of mathematical literacy.

At Level 4, in question number 4 which measures students' mathematical literacy, students are able to answer questions correctly. Based on Figure 4.4 and the interview results, students know how to use models effectively in complex situations, students know how to choose and combine different expressions, students know how to use different skills and reason clearly, students know how to present and transmit the results of their interpretation

Based on the results of the analysis of the answers to written test questions and the results of interviews conducted by SK students which were then analyzed using the triangulation technique, the test students were able to answer 2 questions. Problem 1 researchers can function to measure Mathematics Level 1 abilities correctly. The subject is able to show actions that are in accordance with the stimulus given. This is in accordance with the indicators of Level 1 mathematical literacy put forward by Johar (2012).

The subject was able to answer question number 2 correctly which measures level 2 mathematical literacy. The test and interview results showed that the subject forgot to explain the reasons for the decision. This can be seen from the student answers and interview results in Figure 4.10. According to the PISA Level 2 indicator of mathematical literacy (Johar, 2012). Students can fill in the 2nd indicator.

At Level 3, in question number 3 which measures students' mathematical literacy, students know how to answer questions correctly. According to Johar (2012), students who do not excel at Level 3 can be said that these students are not at Level 3 of mathematical literacy.

At Level 4, in question number 4 which measures students' mathematical literacy, students have not been able to answer questions correctly. Based on Figure 4.21 and the results of interviews, students know how to use models effectively in complex situations, but students do not know how to choose and combine models.

different expressions, students also don't know how to use different skills and reason clearly, and don't know how to present and convey the results of their interpretation. their interpretation of their actions. According to Johar (2012), students who perform poorly on each Level 4 indicator can be referred to as students who are not yet at Level 4 in mathematical literacy.

CONCLUSION

Students with a visual learning style are able to fulfill almost all indicators of mathematical literacy in this study, namely the use of formal and technical language and symbolic operations, communication, reasoning and reasoning, planning problem-solving strategies, presentations, using mathematical tools but still need guidance, so students must be more be careful.

In this study, students with an auditory learning style met almost all indicators of basic mathematics education. However, students must be careful in their work, especially in

relation to mathematical competence, the use of language and symbols in formal and technical calculations, arguments, making steps to solve problems, presenting indicators that show that students need more. concern and need guidance in the process. Students with a kinesthetic learning style still show signs of being unable to communicate basic mathematics, reasoning, and reasoning to solve problems.

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