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Literature Study: Analysis of Mathematical Literacy in Mathematics Learning

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ABSTRACT This research is a literature study with a descriptive qualitative research type with a literature review that describes student literacy in mathematics learning. In this study, the authors used various written sources such as articles, journals, and documents relevant to the study in this study. Data collection techniques by collecting several previous studies to answer about mathematical literacy in mathematics learning. Previous research that has been collected is then compiled, analyzed, and concluded so as to get a conclusion about students' mathematical literacy skills. It turns out that students' mathematical literacy skills are still relatively low, especially in the components of mathematization, representation, and using mathematical tools.
Keywords: math literacy

Introduction

Over time, the world of education, especially Indonesia, has also developed to adjust the skills needed to produce the desired graduates. The skills needed in the 21st century can be categorized into four categories: mindset, work style, work tools, and survival skills in the world (Zubaidah, 2016). Mindsets include creativity, innovation, critical thinking, problem solving, and decision making. Ways of working include communication, collaboration and cooperation skills. Tools for work include citizenship, life and career development, and personal and social responsibility. World citizen skills are skills based on information literacy, mastery

of new information and communication technologies, and the ability to learn and work through digital social networks.

These skills are expected to be nurtured through mathematics education that is more than just counting. The emphasis on the ability to think logically and critically when solving problems, including everyday problems, is known as mathematical literacy (Sari, 2015). In addition, NCTM emphasizes that mathematics learning should enable students to understand concepts, solve problems, make mathematical connections, and express mathematical ideas (Atsnan et al., 2018). These mathematical representation skills are important because they allow students to deepen their understanding of how to face mathematical challenges in everyday life.

Students' mathematical skills are very important because they allow them to generate ideas, develop mathematical concepts, think critically and communicate ideas effectively in a mathematical context. However, the results of the PISA survey show that students' math skills are still low, even though it aims to assess the ability to learn mathematics (Purwanti & Alfarisi, 2021). According to PISA research, Indonesia's ranking has declined in all areas of the test, including reading, math, and science, over the past four years. Based on the PISA report, Indonesia ranks 72 out of 77 countries in reading, 72 out of 78 countries in math, and 70 out of 78 countries in science. Suryatun et al. (2018) identified seven main components of mathematical competence, including communication skills, mathematization, representation, reasoning, strategic planning, use of symbolic language, and use of mathematical tools. However, according to Pulungan's research (2014), the implementation of math skills in the learning process is still limited due to the lack of teacher understanding of math skills.

From another perspective, mathematical ability is the ability to formulate, apply, and interpret mathematical concepts effectively in a variety of daily life situations. This definition covers all aspects of mathematics, including mathematical concepts, procedures, facts and tools related to calculation, numbers and space. Mathematical literacy includes not only numeracy, but also the ability to

communicate mathematical ideas, reasoning, and other mathematical thinking processes. This whole process is called mathematization (Sari, 2015).

Specifically, math skills include a range of skills developed in earlier math classes, such as working with numbers, working with money, and the ability to think and work with math. It includes the ability to model everyday problems into mathematical concepts and solve them mathematically. Today, the skills to deal with real-world problems in math are becoming increasingly important. Although it is now possible to perform mathematical calculations quickly and accurately using calculators and computers, the ability to connect mathematical ideas with modern life situations remains the main focus of modern mathematics education (Rifai & Wutsqa, 2017).

This is an important foundation for exploring literacy in mathematics learning. Understanding these can improve understanding of mathematical literacy and give an idea of how capable students are in mathematical literacy.

Research Method

The method used in this research is systematic literature review (SLR). SLR is a method for identifying, analyzing, evaluating, and interpreting all relevant research results to answer a given research question. According to Triandini et al. (2019) in the SLR method, researchers systematically review and identify journals or articles at each step following a predetermined procedure. In general, the SLR process consists of three major stages. The first stage is planning. This stage involves defining the research question (RQ) as the first step in the literature review process. The second stage is implementation, where the researcher searches for papers using keywords related to the research topic, such as mathematical literacy, problem-based learning and traditional approaches.

As part of this research, the authors collected articles and journals through a search on Google Scholar. The search focused on research papers published during the last six years (2016-2021) related to mathematical literacy in mathematics learning. The data collected will be documented by identifying all papers and journals related to this research topic. Each paper or journal is then analyzed and

summarized, and a comprehensive discussion is prepared. The final stage is the report, where the results of the SLR are compiled and summarized in a research paper.

Results and Discussion

Mathematical Literacy

Literacy comes from the Latin word "littera" which means "letters" and refers to the mastery of the writing system and its associated rules. However, literacy basically refers to a person's ability to use a language and how the language is applied, while the writing system is a secondary aspect. According to PISA (Indah et al., 2016), literacy is defined as the knowledge and skills needed for adult life. According to Dinni (2018), mathematical competence is the ability to use mathematical concepts in various situations, including mathematical thinking skills and the use of mathematical concepts, procedures, facts, and tools to explain, describe, and predict events the ability to formulate, use, and explain.

Mathematical competence is an understanding of the basics of mathematics applied in everyday life (Indah et al., 2016). The concept of mathematical ability does not refer to in-depth knowledge of topics such as analysis, differential equations, topology, calculus, linear algebra, abstract algebra, or complex mathematical expressions. Rather, mathematical literacy involves a more general understanding and comprehension of mathematics that can be acquired and applied in a variety of contexts.

According to Wahyudin (Larasaty et al., 2018), mathematical ability is the ability to investigate logically, conclude, think, and effectively use various mathematical techniques to solve problems. Mathematical knowledge is considered as important as reading and writing skills. These skills enable individuals to work on their mathematical knowledge. It includes the ability to predict and interpret information, solve everyday problems, reason in numerical, graphical, and geometric contexts, and communicate using mathematical language. Reading mathematics involves understanding mathematical language and texts that use symbols, algebraic equations, diagrams, and graphs that require interpretation.

Writing in the context of mathematics, on the other hand, relates to the ability to convey mathematical understanding and ideas in writing as well as explain the results of the process of reading, interpreting, and interpreting real-world situations in a mathematical context. Therefore, if someone is able to communicate mathematics orally or in writing, and has the ability to read, understand, and write mathematics, this shows that they make good use of their basic mathematical knowledge.

Improving Mathematical Literacy Skills in Mathematics Learning

Mathematical skills refer to the ability to formulate problems, analyze mathematics, and apply mathematics in various situations. In addition, these skills include the ability to think systematically and use related concepts and procedures to explain events and situations. In line with that, based on the results of research (ahmadmuzaki, 2019) This research highlights that students' mathematical skills requirements are not limited to computational skills, but also require the ability to apply mathematics in solving everyday problems. The research subjects amounted to 6 people from 26 students in one class, and the element of students' initial mathematical ability (KAM) was taken into consideration in this study. The research showed that 19% of students in the high early mathematical ability category were able to solve everyday problems, interpret problems, use mathematical formulas, follow procedures correctly, and deal with complex situations and use logical thinking to solve problems and work effectively in mathematics. Students in the category of students' initial mathematical ability (KAM) Intermediate (66%) were able to solve routine problems, interpret problems, use formulas, and successfully carry out procedures (Level 3). While students in the category of students' initial mathematical ability (KAM) low (15%) were only able to solve routine problems (level 1). This indicates that mathematical literacy in learning mathematics students are in the intermediate category where students are able to solve routine problems, interpret problems, use formulas and successfully carry out procedures. The results of this study are also supported by research (Erdy Poernomo, et al., 2021) Basic mathematics education and computational skills are closely related in scope, ability,

and content. Contextually, mathematical and computational literacy includes personal, professional, social, and scientific aspects. Regarding skills, all arithmetic skills also count as math skills. However, mathematical literacy has three additional skills that mathematical literacy does not have. These are communication strategy development, mathematization and problem solving. In terms of content, everything that is included in math competencies is also included in math competencies. However, mathematical literacy has seven additional contents that mathematical literacy does not have: functions, algebraic expressions, equations and inequalities, coordinate systems, calculation principles, data changes and their description, and samples and sampling.

The results of the study (Risma and ekasatya, 2021) This study aims to analyze the mathematical abilities of junior high school students in class VIII Kp. Panawan Rt.02 / RW.10 using a qualitative description method. The research subjects were four people who were randomly selected. The results showed that although the questions asked were included in standard or routine questions and only covered levels 1 and 2, all research participants were able to interpret the formulas they already knew. The conclusion of this study is that the mathematical ability of students in this sample is still relatively low, especially when working on PISA Level 1 and 2 questions.

Conclusions

Based on the results of the research conducted, it can be concluded that students' literacy skills are still classified as moderate, especially in the components of mathematization, representation, and using mathematical tools. Then students have been able to communicate mathematics orally or in writing, and have the ability to read, understand, and write mathematics, this shows that they utilize their basic mathematical knowledge well.

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