

ANALYSIS OF MATHEMATICS LITERATURE PROBLEMS IN MATHEMATICS TEXTBOOK CLASS V ELEMENTARY SCHOOL

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ABSTRACT

PISA results show that the mathematical literacy ability of Indonesian students is still quite low. The use of textbooks by teachers in learning is still found in the field. Mathematical literacy can be improved by maximizing the use of textbooks that match the literacy aspect. This study aims to analyze the problems in mathematics textbooks that are in accordance with the literacy aspect. Specifically, this study will describe the questions according to six levels of mathematical literacy. The research method uses a descriptive method with a qualitative approach. The study describes such a situation using the method of content analysis. The sample used is an evaluation question at the end of each chapter. Data collection in this study was carried out by reviewing documents with the help of instruments that contained three components of mathematical literacy and six levels of questions according to aspects of the PISA assessment. Stages of analysis include data reduction, data presentation, and drawing conclusions. Based on the results of the study, it was concluded that the mathematics textbook used as the subject of the study contained every level of mathematical literacy according to PISA. The development of questions at level 3 is mostly found with 44% or as Man as 34 questions from a total of 77 questions that contain aspects of mathematical literacy.

INTRODUCTION

Indonesia is working hard to improve literacy in all parts of the country to prepare future generations better. The following is an excerpt from an article published on the Ministry of Education and Culture's website on December 3, 2019, about the 2018 Indonesian PISA results. As the current Minister of Education, Nadiem Makarim, stated, "The literacy problem is a common concern." To respond to the issue, he urged schools to increase student involvement in reading and to encourage kids to read in their leisure time. Students must also be able to summarize the findings of their reading in their own words (Nugrahanto & Zuchdi, 2019). Literacy exercises are not only about reading and writing, and they are not just about Indonesian language classes. Reading is not restricted to one subject (Smith et al., 2021); converting a series or a story sentence into a number requires a reading text comprehension skill (Engel & Ehri, 2021). The advancement of the age also aids the advancement of science. According to Nadelson et al., literacy is the capacity to read, write, listen, convey information, communicate with others, and express meaning using words and visuals in many ways (Nadelson et al., 2022). Literacy may be found in certain disciplines, such as mathematics. According to Shure, mathematical literacy refers to a person's capacity to formulate, apply, and comprehend mathematics in a variety of situations (Shure et al., 2022). Furthermore, according to Niss et al., mathematical literacy is defined as the mastery of reasoning, ideas, facts, and mathematical tools for problem-solving in everyday life, in addition to knowledge of the content (Niss & Jablonka, 2020). Students' logical and mathematical thinking abilities can be improved through literacy skills. Sakinah feels that a person can reflect on mathematical reasoning in his life if he has mathematical literacy (Sakinah, 2021). However, this vital capacity is not well-positioned in Indonesia.

The mathematical literacy capacity of Indonesian pupils falls below the international average, according to the results of a study conducted by the Program for International Student Assessment (Schleicher, 2019). The importance of textbooks in this regard cannot be overstated. To aid learning, textbooks are required. Many teachers and other professionals still use textbooks. The instructor still prepares questions and analyzes lessons using textbooks in the classroom (van den Ham & Heinze, 2018). Therefore, textbooks with mathematical literacy questions are required to assist students in improving their mathematical literacy. This study aims to examine and characterize the questions in fifth-grade primary school mathematics textbooks that incorporate mathematical literacy. Furthermore, the analysis is carried out by looking at the PISA-compliant mathematical literacy components, namely content, context, and process components, as well as translating the outcomes of the study into six levels of math competency questions.

RESEARCH METHODS

A descriptive method was employed in conjunction with a qualitative approach in this investigation. Using language and content analysis methodologies, this research presents a scenario as it is. The research focuses on the 2013 curricular mathematics textbook *Exploration of Mathematics at SD/MI Class V*, second edition, third printing, published by Yudhistira and written by Madhavi et al. The research sample was collected from the end-of-chapter evaluation questions. Data was gathered by evaluating papers using an instrument with three components of mathematical literacy and six questions based on the PISA assessment's elements. The stages of analysis include data reduction, data presentation, and drawing conclusions.

RESULTS AND DISCUSSION

Yudhistira's 2013 curriculum mathematics textbook was chosen as a study sample. Students can examine the book's seven chapters. There are assessment questions at the conclusion of each chapter, after the explanation of the content and some exercises. Table I shows the mapping of each chapter's evaluation questions.

Table I. Mapping of question indicators

Chapter	Page	Competence	Number of Questions	Type of Question
1	21	Addition and Subtraction of Fractions, Decimals and Percentages	15	10 PG questions, 5 essay questions
2	52	Multiplication and Division of Fractions, Decimals and Percentages	15	10 PG questions, 5 essay questions
3	73	Comparison of Two Objects and Quantities	15	10 PG questions, 5 essay questions
4	91	Scale	16	10 PG questions, 6 essay questions
5	112	Solid Figure Volume	16	10 PG questions, 6 essay questions
6	135	Solid Figure Net	15	10 PG questions, 5 essay questions
7	169	Data Collection and Presentation	15	10 PG questions, 5 essay questions

According to table I, each assessment question in each of the seven extant chapters comprises 15 questions on average, including ten multiple-choice questions and five description questions. After analyzing the outcomes of mapping questions from each chapter, questions that incorporate components of mathematical literacy, namely content, process, and context, are chosen. The process is regarded as steps to complete a given context with the assistance of mathematics, and the context implies that the problem at hand is connected to mathematics, relevant and appropriate knowledge and abilities (Polman et al., 2021). Table 2 shows the questions that incorporate mathematical literacy components.

Table 2. Mapping questions containing literacy components

Chapter	Competence	Number of Questions	Percentage
1	Addition and Subtraction of Fractions, Decimals and Percentages	7	47%
2	Multiplication and Division of Fractions, Decimals and Percentages	9	60%
3	Comparison of Two Quantities	15	100%
4	Scale	16	100%
5	Solid Figure Volume	10	63%
6	Solid Figure Net	5	33%
7	Data Collection and Presentation	15	100%
Total		77	72%

Table 2 shows that assessment questions with a literacy component account for as much as 77 out of 107 questions or 72 per cent of the total evaluation questions in each chapter. The three chapters with the greatest percentage are the comparison of two parameters (discharge and speed), scale, and data gathering and presentation. Chapter 6, space-building nets, contains the lowest component of mathematical literacy, with up to 5 out of 15 questions requiring mathematical literacy. One of the questions with a literacy component is shown in Figure I.

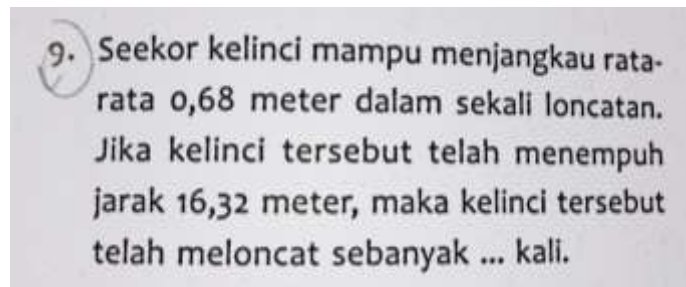


Figure I. One of the questions with mathematical literacy components

Judging from Figure I, a rabbit jumps 0.68 meters in one jump. The rabbit jumps up to a long-distance of 16.32 meters. Furthermore, you want to know how many bunnies can leap that far. It is clear from the format of the questions that they employ the idea of decimal division. The components of the question, as can be seen, fall within the quantity group (numbers). According to Schnieders et al., the quantity category is associated with numerical patterns in daily life, such as counting and measuring (Schnieders & Schuh, 2022). Table 3 shows how to map the level of questions.

Table 3. Mapping of mathematical literacy levels

Chapter	Competence	Question Levels						Total
		1	2	3	4	5	6	
1	Addition and Subtraction of Fractions, Decimals and Percentages	-	2	3	1	-	1	7
2	Multiplication and Division of Fractions, Decimals and Percentages	-	2	6	-	-	1	9
3	Comparison of Two Quantities	2	1	6	2	2	2	15
4	Scale	1	-	11	3	-	1	16
5	Solid Figure Volume	-	4	3	3	-	-	10
6	Solid Figure Net	-	-	3	1	1	-	5
7	Data Collection and Presentation	8	4	2	1	-	-	15
Total		11	13	34	11	3	5	77
Percentase		14%	17%	44%	14%	4%	6%	100%

The question's context is a rabbit jumping with a 0.68 average reachability. As a result, it is clear that the setting of this inquiry falls under the category of science because it concerns ecology. Questions about the weather or climate, ecology, medicine, space science, genetics, and mathematics itself fall within the category of scientific contexts (Furberg & Silseth, 2021). Students will recognize the

mathematical structure as the first step in addressing issues and then apply it to the notion of division. Next, apply the problem-solving outcomes to the current situation. After selecting questions with a literacy component, an analysis is conducted using the six levels of mathematical literacy questions. According to table 3, the textbook's evaluation questions cover all levels (levels) of mathematical literacy. Level 3 has the most mathematical literacy questions, accounting for 44% of all assessment questions. Moreover, for questions produced utilizing levels 1 and 4, up to 14 per cent, level 2 up to 17 per cent, five up to 4 per cent, and six up to 6 per cent were used. Level 3 ability is more dominant, and if it is in the bloom taxonomy level, it is in the implementation stage. According to Bahri et., al, a person's capacity to apply concepts, processes, techniques, theories, formulae, and principles in everyday life is at the application level (Bahri et al., 2021).

When compared to Bloom's taxonomy, the development of level 3 inquiries is still categorized as LOTS (Low Order Thinking Skill). In accordance with this, Sagala indicated in his study findings that testing pupils' higher-order thinking skills requires the development of mathematical literacy at levels 4-6 (Sagala & Andriani, 2019). Pupils are required to not only know the subject but also to be able to evaluate and solve issues linked to concepts or materials with the ability to think at the level of students (Woods, 2018). This corresponds to the definition of mathematical literacy, which connects content, context, and finishing process. Every level of mathematical literacy skill level is covered in Yudhistira's 2013 curriculum mathematics textbook. Literacy skills are required to train the next generation to compete with other countries. According to Siahaan et al. findings, mathematics literacy directly influences the quality of Indonesian human resources (Siahaan & Siagian, 2021). Mathematics textbooks that are aligned with the components of mathematical literacy can help students improve their mathematical literacy. Everything that can be utilized ideally is simple to grasp and meets its users' demands qualifies as a good learning tool (Hernandez-de-Menendez et al., 2020).

CONCLUSION

Students utilize textbooks as a learning aid that is simple to comprehend. Textbooks should be used as much as possible to develop each student's abilities, particularly their mathematical literacy skills. The mathematical literacy component of Yudhistira's publication *Exploration of Mathematics for SD/MI Class V*, second edition, comprises every level possible. There are 14 per cent or as many as 11 questions at levels 1 and 4, 17 per cent or as many as 13 questions at level 2, 44 per cent or as many as 34 questions at level 3, and 4 per cent and 6 per cent correspondingly at levels 5 and 6. A question can be said to contain a literacy component if it does have not only a solution but also has a context that will be linked to its content and mathematical solution. The development of questions at levels 4-6 must continue to be carried out in order to train students' higher-order thinking skills, which in turn make students improve their mathematical literacy skills.

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