



UHAMKA PRESS

p-ISSN: 2477-3859

e-ISSN: 2477-3581

JURNAL INOVASI PENDIDIKAN DASAR

The Journal of Innovation in Elementary Education

<http://jipd.uhamka.ac.id>



Volume 8 • Number 2 • June 2023 • 11 – 20

ANALYSIS OF NUMERACY LITERACY SKILLS OF GRADE V STUDENTS IN SOLVING GEOMETRY PROBLEMS

Sakinah Widiyawaty^{1,✉}, Nurafni²,

¹Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Prof. Dr. Hamka, Indonesia

Received: July 18, 2023

Accepted: September 19, 2023

Published: October 16, 2023

Abstract

This study aims to determine the numeracy literacy ability of students. This research includes descriptive analysis research with a qualitative approach. The sampling technique used is purposive sampling. Data was collected through observation, tests, and interviews. The results showed that the numeracy literacy ability of 26 grade V students of SDN Sugutamu was included in the low category with an average score of 32. There are 2 students with high category, 7 students with medium category and 17 students with low category. Students with high numeracy literacy ability can meet two to three indicators of numeracy literacy ability. Students with moderate numeracy literacy ability can meet one to two numeracy literacy indicators. Meanwhile, students with low numeracy literacy skills only meet one indicator on a particular question. The non-fulfillment of numeracy literacy indicators is caused by student errors including 1) Not describing aspects that are known and asked about in the questions, 2) Not completing the steps for solving the questions, 3) The images made are not in accordance with the question orders, 4) Errors in determining the results of the calculation operation, 5) Not stating the decisions taken based on the answers obtained.

Keywords: literacy numeracy, geometry, students

Analisis Kemampuan Literasi Numerasi Peserta Didik Kelas V dalam Menyelesaikan Soal Geometri

Abstrak

Penelitian ini bertujuan untuk mengetahui kemampuan literasi numerasi peserta didik. Penelitian ini termasuk penelitian analisis deskriptif dengan pendekatan kualitatif. Teknik pengambilan sample yang digunakan adalah *purposive sampling*. Data dikumpulkan melalui kegiatan observasi, tes, dan wawancara. Hasil penelitian menunjukkan bahwa kemampuan literasi numerasi dari 26 peserta didik kelas V SDN Sugutamu termasuk kategori rendah dengan skor rata-rata 32. Terdapat 2 peserta didik dengan kategori tinggi, 7 peserta didik dengan kategori sedang dan 17 peserta didik dengan kategori rendah. Peserta didik dengan kemampuan literasi numerasi tinggi dapat memenuhi dua hingga tiga indikator kemampuan literasi numerasi. Peserta didik dengan kemampuan literasi numerasi sedang dapat memenuhi satu hingga dua indikator literasi numerasi. Sedangkan, peserta didik dengan kemampuan literasi numerasi rendah hanya memenuhi satu indikator pada soal tertentu. Tidak terpenuhinya indikator literasi numerasi disebabkan kesalahan peserta didik diantaranya 1) Tidak menuliskan aspek yang diketahui dan ditanyakan pada soal, 2) Tidak menuliskan langkah – langkah penyelesaian soal, 3) Gambar yang dibuat tidak sesuai perintah soal, 4) Kesalahan pada menentukan hasil operasi hitung, 5) Tidak menyatakan keputusan yang diambil berdasarkan jawaban yang diperoleh.

Kata kunci: literasi numerasi, geometri, peserta didik

✉ Corresponding Author: Sakinah Widiyawaty

Affiliation Address: Universitas Muhammadiyah Prof. Dr. Hamka

E-mail: sakinah.widiyawaty03@gmail.com

INTRODUCTION

Education plays a crucial role in shaping the younger generation of a nation, especially in facing the challenges of the 21st century (Sholikah & Pertiwi, 2021, p. 96). The hallmark of the 21st century is the rapid development of information and communication technology. Therefore, education needs to equip students with 21st-century life skills. Literacy is considered one of these life skills (Suprawata & Riastini, 2022). Good literacy skills significantly impact acquiring various information related to competence in life. Literacy can influence an individual's thinking, decision-making, environmental responsiveness, and the cultivation of a critical culture that fosters intelligent and competitive societies (Nurwahid & Ashar, 2022, p. 214).

One of these literacy skills is numeracy literacy. Numeracy literacy is an individual's ability to apply mathematical knowledge to explain events, solve problems, and make decisions in daily life (Wijaya & Dewayani, 2021, p. 2). Sullivan (2011) conceptualized numeracy literacy as involving mathematics but going beyond it, directly impacting life. The term numeracy literacy is used to encompass all practical mathematical elements.

Learning mathematics is not merely about numerical calculation (numeracy) because, in reality, more than that skill is needed in addressing everyday life problems. Therefore, understanding fundamental mathematical concepts is essential in addition to numerical abilities. With a combination of numerical proficiency and the understanding of basic mathematical concepts, individuals can effectively solve everyday life problems. This combination of numerical skills, understanding of mathematical concepts, and the ability to solve real-life problems is numeracy literacy (Journal et al., 2022, p. 342).

The Indonesian Ministry of Education addresses the importance of numeracy literacy by implementing the National Literacy Movement and Minimum Competency Assessment. The government makes these efforts to improve the quality of education in Indonesia, particularly in response to concerning results from the Program for International Student Assessment (PISA) worldwide (Nurhayati et al., 2022, p. 724). In the 2018 PISA mathematics test, Indonesian students achieved an average score of 379 with a mean score of 489 (OECD, 2018).

Numeracy literacy content can be divided into four groups: numbers, geometry, data and uncertainty, and algebra (Pusmenjar, 2017). Geometry is part of the elementary school curriculum (National Curriculum, 2006: 417). Geometry, as a topic in mathematics education, combines the use of mathematical symbols and formulas, demanding that students possess knowledge, understanding, and the application of geometric concepts and the ability to analyze information related to geometric symbols. Geometry instruction can help develop logical thinking, deductive reasoning, analytical reasoning, and problem-solving skills (Ismail & Sulfiyah, 2020, p. 2353).

Geometry in elementary school consists of plane shapes and three-dimensional shapes. In-plane shapes, there are two fundamental concepts: area and perimeter. In three-dimensional shapes, the key concept is volume (Akina, 2016). Geometry concepts are closely related to students' everyday life experiences, and students can use symbols, visual media, and concrete objects to learn geometry. As a result, students are more likely to understand geometry than other mathematics branches.

According to Sari et al. (2021), students' ability to solve geometry problems still needs to improve. The low numeracy skills of students are attributed to their lack of understanding of the problems presented in the questions, insufficient practice in answering questions that correspond to real-life issues, making it difficult for students to analyze the information in questions, leading to difficulties in using numbers and symbols to formulate, present, and solve problems (Nurhayati et al., 2022, p. 730). To measure numeracy literacy skills, clear indicators of numeracy literacy are needed. These indicators serve as a reference that provides an overview of each measured numeracy

literacy skill. According to Han et al. (2017), there are three indicators of numeracy literacy skills, as follows:

Table 1. Numeracy Skills Indicator

Numeracy Skills Indicator	
1.	Utilizing a variety of numbers and symbols associated with basic mathematics to solve problems in various everyday life contexts.
2.	Analyzing information presented in various forms (graphs, tables, charts, diagrams, and so on).
3.	Interpreting the results of this analysis to predict and make decisions.

METHODS

This study is categorized as descriptive analysis research with a qualitative approach to analyzing and describing numeracy literacy skills in solving geometry content problems related to three-dimensional shapes. In determining the research subjects, the researcher used purposive sampling technique. According to Sugiyono (2017), purposive sampling is a technique that involves certain considerations. A total of 26 fifth-grade students from SDN Sugutamu became participants in this study. Data were collected through observation, tests, and interviews. The instruments used included a numeracy literacy skills test sheet and interview guidelines. The test used consisted of five open-ended questions related to three-dimensional geometry content. After completing the test, students were interviewed. The interviews were based on the numeracy skills test that the research subjects had completed. Thus, students' numeracy literacy skills could be further examined through the interview process. These interviews aimed to validate the data obtained from the research subjects.

The collected data were then analyzed. According to Miles and Huberman (1984), data analysis activities include data reduction, data presentation, and conclusion. Data reduction involves correcting the results of students' numeracy skills tests and summarizing the results of interviews. Data presentation in qualitative research can take the form of brief descriptions, charts, relationships between categories, flowcharts, and the like. Drawing conclusions or research findings can be in the form of descriptions or explanations of an object that was previously unclear or ambiguous but became clear after examination. Data validity in this research was ensured through triangulation using multiple methods. According to Patton (1987: 329), triangulation with methods involves checking the credibility of research findings through multiple data collection techniques, including observation, tests, and interviews.

Table 2. Numeration Literacy Proficiency Test Score Interval

Value Interval	Category
≤ 40	Low
$40 < \text{Rated} < 71$	Medium
≥ 71	Height

FINDINGS AND DISCUSSION

The research results indicate that the average numeracy literacy test score of the 26 participants is 32, categorized as low. The participants' numeracy literacy test results are divided into high, medium, and low. The number of participants in each category is presented in Figure 1 below.

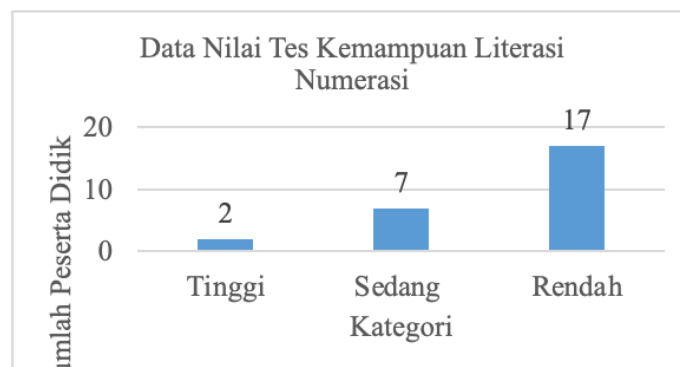


Figure 1. Data of Numeracy Literacy Test Scores

Based on the figure, it can be observed that the numeracy skills of the fifth-grade students at SDN Sugutamu are predominantly low. There are 2 out of 26 students with high numeracy literacy skills, 7 with medium numeracy literacy skills, and 17 with low numeracy literacy skills. Below is the table presenting the percentage of students who answered correctly on each numeracy literacy indicator.

Table 3. Percentage of Students Meeting Numeracy Literacy Indicator on Test Questions

No.	Numeracy Literacy Skill Indicator	Question 1	Question 2	Question 3	Question 4	Question 5
N1	Using various numbers and symbols related to geometric shapes in space.	92%	46%	54%	38%	15%
N2	Analyzing information presented in various forms (graphs, tables, charts, diagrams, etc.)	62%	15%	27%	27%	27%
N3	Interpreting the results of the information analysis to predict and make decisions	31%	12%	19%	4%	15%

The table reveals that not all students can meet all three numeracy literacy skill indicators when solving geometry-related numeracy literacy test questions. The first numeracy literacy skill indicator (N1), which involves using various numbers and symbols related to geometric shapes, obtained the highest percentage in question 1, with 92%, meaning that 24 out of 26 students met this indicator. However, as the questions progressed, the number of students meeting the first numeracy literacy skill indicator decreased, reaching the lowest percentage in question 5 at 15%, indicating that only 4 out of 26 students met this indicator.

The second numeracy literacy skill indicator (N2), which involves analyzing information presented in various forms, achieved the second-highest percentage in question 1, with 62%, indicating that 16 out of 26 students met this indicator. However, there was a significant drop in question 2, with only 15% of students meeting this indicator, meaning that only 4 students could analyze information presented in forms such as graphs, tables, charts, diagrams, etc.

The third numeracy literacy skill indicator (N3), which involves interpreting the results of the information analysis to predict and make decisions, had the lowest percentage in question 4, with 4%, indicating that only 1 out of 26 students met this indicator. The highest percentage was in question 1, with 31%, meaning that 8 out of 26 students met this indicator.

The fulfillment or non-fulfillment of each numeracy literacy skill indicator is independent of the other numeracy literacy indicators. Meeting the first numeracy literacy

skill indicator (N1) does not necessarily mean that the second (N2) and third (N3) indicators are met, and vice versa. Therefore, students must meet all three indicators to be considered good numeracy literacy skills. This aligns with the research by [Amalia Putri & Priyo Utomo \(2021\)](#), which suggests that students who can use numbers and symbols related to algebraic operations and analyze information in questions only sometimes have good numeracy literacy skills if all three indicators are met. This becomes more evident when examining each research subject's results of numeracy literacy tests.

1. Students with High Numeracy Literacy Skills

There are 2 out of 26 students with high numeracy literacy skills. Subject ST was selected as one of the students with high numeracy literacy skills. Subject ST obtained a score of 86, categorized as high. The following is an excerpt from subject ST's response with high numeracy literacy skills.

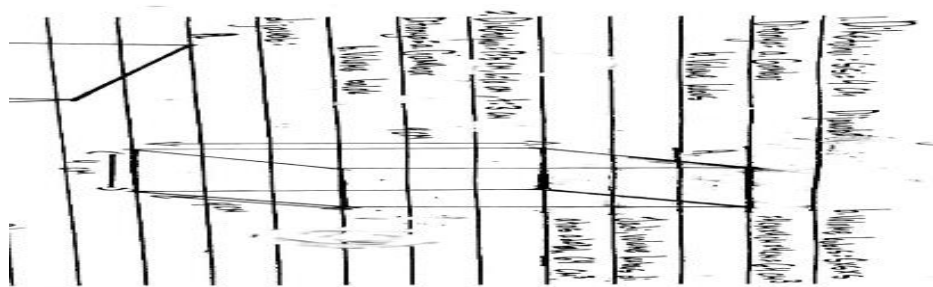


Figure 1. Excerpt from ST's Response

The first indicator (N1), which involves using various numbers and symbols related to geometric shapes, is well met by subject ST. From the excerpt above, it is evident that the student used various numbers, such as the number 4 to represent the sides of a square, and mathematical symbols related to geometric content, such as the letter 's' to denote a side.

The second numeracy literacy skill indicator (N2), which involves analyzing information presented in various forms, is evident in subject ST's ability to answer aspects known and asked in the question. While subject ST did not provide a complete written answer, they were able to provide a verbal response during the interview, as seen in the interview excerpt below

- P : What do you know from question number 1?
 ST : A cube with sides of 4 cm.length
 P : What is being asked in the question?
 ST : Create a cube with the same side length as Rubik's cube and what is the volume of that cube ??

The third numeracy literacy skill indicator (N3), which involves interpreting the analysis results to predict and make decisions, is evident in the interview excerpt above. Subject ST was able to interpret the analysis results and make decisions accurately. However, there was an error in measuring the size of the cube in the drawing, as it was 3 cm instead of the required 4 cm, indicating an error in measuring the drawn cube according to the question's instructions.

2. Students with Medium Numeracy Literacy Skills

There are 7 out of 26 students with medium numeracy literacy skills. Subject SS was selected as one of the students with medium numeracy literacy skills. Subject SS obtained a score of 60, categorized as medium. The following is an excerpt from subject SS's response with medium numeracy literacy skills.

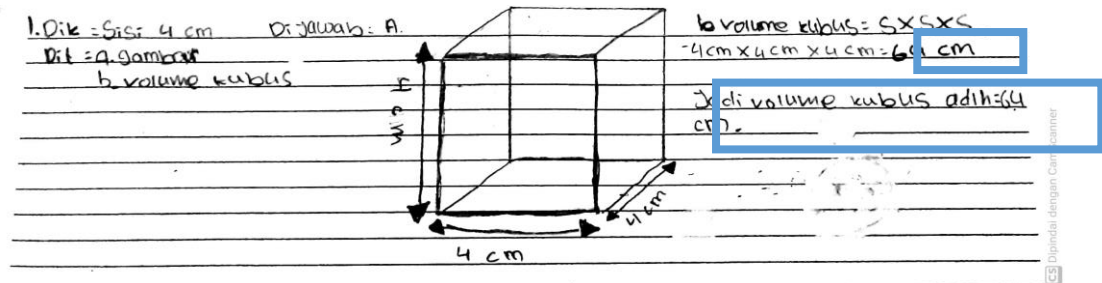


Figure 3. Excerpt from SS's Response

The first indicator (N1), which involves using various numbers and symbols related to basic mathematics to solve problems in various everyday life contexts, is evident in subject SS's response. From the excerpt above, it is clear that subject SS can use various numbers, such as the number 4, and mathematical symbols related to geometric content, such as 's' to represent the side of a cube.

The second numeracy literacy skill indicator (N2), which involves analyzing information presented in various forms, can be seen in subject SS's ability to answer known and asked aspects in the question. While subject SS did not provide a complete written answer, they were able to respond to the aspects asked verbally during the interview, as seen in the interview excerpt below:

- P : What do you know from question number 1?
 SS : A side length of 4 cm
 P : What is being asked in the question?
 SS : Create a cube with the same side length as Rubik's Cube, and what is the volume of that cube?

The third numeracy literacy skill indicator (N3), which involves interpreting the analysis results to predict and make decisions, is briefly presented in subject SS's responses. However, subject SS needed to interpret the analysis results to predict and make decisions fully. The decision-making aspect needed to be completed in stating the volume, only mentioning 'cm' without a numerical value. Additionally, there was an error in measuring the size of the cube in the drawing, as it was 3 cm instead of the required 4 cm, indicating a measurement error.

3. Students with Low Numeracy Literacy Skills

There are 17 out of 26 students with low numeracy literacy skills. Subject SR was selected as one of the students with low numeracy literacy skills. Subject SR obtained a score of 46, categorized as low. The following is an excerpt from subject SR's response with low numeracy literacy skills

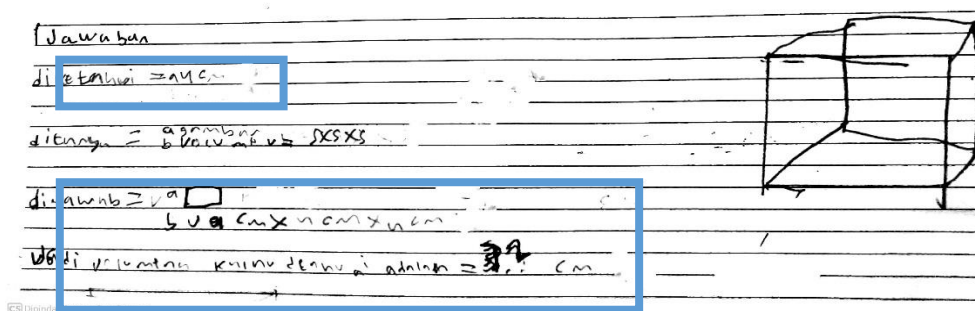


Figure 2. Excerpt from SR's Response

The first indicator (N1), which involves using various numbers and symbols related to geometric shapes, is evident in subject SR's response. From the excerpt above, it is clear that subject SR used various numbers, such as the number 4, and mathematical symbols related to geometric content, such as 's' to represent a side.

The second numeracy literacy skill indicator (N2), which involves analyzing information presented in various forms, is not fully met in subject SR's written responses. However, during the interview, subject SR was able to respond to the asked aspects verbally, as seen in the interview excerpt below:

- P : What do you know from question number 1?
- SR : Rubik cube
- P : What is being asked in question?
- SR : Create a cube with the same side length as Rubik's Cube, and what is the volume of that cube?

The third numeracy literacy skill indicator (N3), which involves interpreting the analysis results to predict and make decisions, is not fully demonstrated by subject SR. The decision-making aspect was incomplete in stating the volume, mentioning only 'cm' without a numerical value. Additionally, there was an error in measuring the size of the cube in the drawing, as it was 3 cm instead of the required 4 cm, indicating a measurement error.

Numeracy Literacy Skills

Table 4. Numeracy Literacy Skill Indicators Fulfilled by ST in Each Question

Numeracy skill indicator	Question1	Questionl	Questionl	Questionl	Questionl	Questionl
	1	2	3	4	5	6
N1	✓	✓	✓	✓	✓	5
N2	✓	✓	✓	✓	✓	5
N3	x	x	✓	✓	✓	3

Students with high numeracy literacy test scores can meet two to three numeracy literacy skill indicators, indicating high numeracy literacy skills (Amalia Putri & Priyo Utomo, 2021, p. 149). Based on Table 4, the numeracy literacy skill indicator that frequently appears is the first indicator (N1), which involves using various numbers and symbols related to geometry. Furthermore, the second numeracy literacy skill indicator (N2), which is expressed briefly in written form, is the ability to analyze information presented for known and asked aspects. However, during the interview session, students were able to explain verbally the known and asked aspects of the questions in full. This is consistent with the research conducted by Amalia Putri & Priyo Utomo (2021) where

research subjects with high numeracy literacy skills often need more written responses but can explain comprehensively during interviews.

The indicator that rarely appears is the third numeracy literacy skill indicator (N3), which involves interpreting the analysis results to predict and make decisions. This is due to errors made by the students in drawing measurements of geometric shapes, thus leading to the third numeracy literacy skill indicator needing to be fulfilled. This aligns with the research conducted by [Nurhayati et al., \(2022\)](#) where subjects with high numeracy literacy skills often use various numbers or symbols and can analyze information presented in various forms of two-dimensional shapes. However, the ability to interpret the analysis results to write conclusions is only demonstrated by subjects in specific questions.

Table 3 Numeracy Literacy Skill Indicators Fulfilled by SS in Each Question

Numeracy Skill Indicator	Question 1	Question 2	Question 3	Question 4	Question 5	Total
N1	✓	✓	✓	✓	X	4
N2	✓	✓	X	✓	✓	4
N3	X	x	X	x	✓	1

Students with moderate numeracy literacy skills can fulfill one to two numeracy literacy skill indicators. Research subjects with moderate numeracy literacy skills are reasonably proficient in numeracy indicators ([Nurhayati et al., 2022, p. 728](#)). The numeracy literacy skill indicators that frequently appear are the first indicator (N1), involving the use of various numbers and symbols related to geometry, and the second indicator (N2), which involves analyzing information presented in various forms (graphs, tables, charts, diagrams, etc.). Students briefly present these first and second numeracy literacy skill indicators in writing during the numeracy literacy test.

However, the third numeracy literacy skill indicator (N3), which involves interpreting the results of the analysis to predict and make decisions, needs to be optimally demonstrated by students with moderate numeracy literacy skills. This aligns with the research conducted by [Baharuddin et al., \(2021\)](#) which suggests that students with moderate numeracy literacy skills may need to reach the conclusion stage when solving problems.

Table 6. Numeracy Literacy Skill Indicators Fulfilled by SR in Each Question

Numeracy skill indicator	Question1 1	Question1 2	Question1 3	Question1 4	Question1 5	Question1 6
N1	✓	x	x	x	x	1
N2	X	x	x	x	x	0
N3	X	x	x	x	x	0

Students with low numeracy literacy skills can only fulfill one indicator, which is the first numeracy literacy skill indicator (N1). This indicator involves using various numbers and symbols related to basic mathematics to solve everyday problems. Students with low numeracy literacy skills demonstrate this ability only in non-complex questions within the numeracy literacy test.

Regarding the second indicator, which involves analyzing information presented in various forms (graphs, tables, charts, diagrams, etc.), students with low numeracy literacy skills can only demonstrate this during interviews. As for the third numeracy literacy skill indicator, which involves interpreting results to predict and make decisions, students with low numeracy literacy skills do not demonstrate it, [Pulungan \(2022\)](#) states that students

with the lowest numeracy literacy test scores only fulfill one indicator, primarily due to errors made by the students, such as failing to draw conclusions or interpret the problem-solving process correctly.

CONCLUSION

Students with high numeracy literacy skills demonstrate mastery of two to three numeracy literacy skill indicators. Students with moderate numeracy literacy skills can fulfill one to two numeracy literacy skill indicators. On the other hand, students with low numeracy literacy skills can only fulfill one indicator, particularly in simple questions.

The unfulfilled numeracy literacy skill indicators among students are primarily due to errors made by the students. These errors include not providing complete information for the known and asked aspects, failing to write down the steps of solving problems involving geometric shapes accurately and comprehensively, creating drawings that do not align with the instructions given in the questions, and making mistakes in performing arithmetic operations. Additionally, some students need to express their decision-making statements completely and accurately based on the answers they have obtained.

These errors made by students in solving numeracy literacy test questions can be attributed to their need for familiarity with questions that encompass numeracy literacy skill indicators.

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