JARME Journal of Authentic Research on Mathematics Education
Volume 6, No. 1, Januari 2024
https://doi.org/ 10.37058/jarme.v3i1.v6i1.9676 e-ISSN 2655-7762

ANALYSIS OF STUDENTS' NUMERACY LITERACY SKILLS ON THE TOPIC OF SURFACE AREA AND VOLUME OF PRISMS

Julva Rizky Fadilah[1]*, Naufal Luqman[2] , Indry Zahra[3]
[1, 2, 3]Universitas Siliwangi, Jalan Siliwangi, No. 17, Kota Tasikmalaya, 53266, Indonesia
*E-mail: julva.user3@gmail.com

ARTICLE INFO

Article history
Received: 12-11-2023
Revised: 03-12-2023
Accepted: 15-01-2024

Keywords
numeracy literacy, surface area, prism volume.

ABSTRACT

Penelitian ini bertujuan untuk menganalisis kemampuan literasi numerasi peserta didik dalam menyelesaikan masalah pada materi luas permukaan dan volume prisma. Literasi numerasi merupakan salah satu kompetensi esensial yang perlu dikuasai oleh peserta didik dalam mendukung pemecahan masalah sehari-hari. Metode Researcheran yang digunakan adalah deskriptif kualitatif. Subjek Researcheran ini adalah 32 siswa kelas VIII dari salah satu sekolah menengah pertama di kota Tasikmalaya. Instrumen penelitian berupa tes literasi numerasi matematis yang terdiri dari soal-soal berbentuk esai dan pilihan ganda yang telah divalidasi oleh para ahli. Hasil Researcheran menunjukkan bahwa kemampuan literasi numerasi peserta didik secara umum berada pada kategori sedang, namun terdapat perbedaan yang signifikan antara kelompok siswa dengan pemahaman konsep matematis tinggi dan rendah. Siswa dengan pemahaman konsep matematis yang baik cenderung memiliki kemampuan literasi numerasi yang lebih tinggi, terutama dalam menyelesaikan soal-soal terkait perhitungan volume prisma. Namun, pada soal yang memerlukan interpretasi dan penalaran spasial untuk menghitung luas permukaan, banyak siswa mengalami kesulitan, terutama mereka yang memiliki kemampuan literasi numerasi yang rendah. Diskusi hasil Researcheran ini menyoroti pentingnya penguatan pemahaman konsep dasar matematika dalam meningkatkan literasi numerasi peserta didik. Penggunaan model pembelajaran yang lebih interaktif dan kontekstual dapat membantu siswa menghubungkan konsep matematika dengan situasi nyata. Implikasi Researcheran ini menekankan perlunya peningkatan kualitas pembelajaran matematika yang berfokus pada pengembangan literasi numerasi secara simultan. Guru matematika diharapkan dapat merancang strategi pembelajaran yang mengintegrasikan penguatan konsep dengan latihan literasi numerasi dalam berbagai konteks kehidupan sehari-hari.

This study aims to analyze students' numeracy literacy skills in solving problems related to the surface area and volume of prisms. Numeracy literacy is one of the essential competencies that students need to master to support problem-solving in daily life. The research method used is qualitative descriptive. The subjects of this study were 32 eighth-grade students from a junior high school in the city of Tasikmalaya. The research instrument was a mathematical numeracy literacy test consisting of essay and multiple-choice questions that had been validated by experts. The results of the study indicate that students' numeracy literacy skills, in general, are in the medium category, but there is a significant difference between students with high and low mathematical conceptual understanding. Students with *a good understanding of mathematical concepts tend to have higher numeracy literacy skills, especially in solving problems related to calculating the volume of prisms. However, in questions requiring spatial reasoning and interpretation to calculate surface area, many students faced difficulties, particularly those with lower numeracy literacy skills. The discussion of these findings highlights the importance of strengthening basic mathematical concept understanding to improve students' numeracy literacy. The use of more interactive and contextual learning models can help students connect mathematical concepts to real-life situations. The implications of this research emphasize the need to improve the quality of mathematics teaching, focusing on the simultaneous development of numeracy literacy. Mathematics teachers are expected to design learning strategies that integrate concept strengthening with numeracy literacy practice in various everyday life contexts.*

How to Cite:
Fadilah, J. R., Luqman, N., & Zahra, I. (2024). Analysis of Students' Numeracy Literacy Skills on The Topic of Surface Area and Volume of Prisms. *Journal of Authentic Research on Mathematics Education, 6*(1), 114-133. https://doi.org/10.37058/jarme.v6i1.9676

1. INTRODUCTION

The main issue currently faced in the field of mathematics education is the low numeracy literacy skills of students, particularly in the topic of surface area and volume of prisms. Numeracy literacy is a skill that integrates the ability to calculate, reason, and apply mathematical concepts in everyday life (Nurcahyono, 2023; Pulungan, 2022). However, many students still struggle to apply basic mathematical concepts in real-world contexts, especially in geometric topics that involve measurement and spatial visualization, such as surface area and volume of prisms. According to Sa'di et al. (2024), one factor contributing to the low numeracy literacy skills of students is their inability to connect abstract concepts with practical applications in daily life. This aligns with the findings of Esyana et al. (2023), which state that students cannot still solve problems related to mathematical concepts and symbols, as well as struggle to relate word problems to everyday life situations.

This issue is important to study because numeracy literacy not only plays a role in academic success but is also a fundamental skill needed in modern life, which increasingly depends on numerical data and information. Nainggolan (2023) highlighted that students' numerical literacy and analytical thinking serve as a foundation in the field of mathematics. One example is the topic of surface area and volume of prisms, which requires numerical literacy and analytical thinking for problem-solving. However, students' inability to understand and apply the concepts of surface area and volume of prisms will limit their ability to think critically, solve problems, and make informed decisions in various real-world situations, such as calculating building material requirements or understanding room dimensions in the context of architectural design. This low numeracy literacy poses a serious challenge in the global education system and will exacerbate skill gaps among students if not addressed promptly (Dewantara, 2024; Wang et al., 2023).

Numeracy literacy research has been widely conducted by experts. Based on research by Bito et al. (2023), integrating real-world context-based learning into mathematics instruction can help improve students' numeracy literacy. Similarly, Kamsurya & Masnia (2021) found that the use of context in teaching is crucial for applying mathematics to solve problems. This suggests that introducing contextual problems allows students to more easily connect mathematical concepts with real-life situations. According to Rumiyatun's (2021) research, the discovery learning model is effective in enhancing numeracy literacy because it involves students in understanding mathematical concepts. However, while the discovery-based approach has proven effective in improving numeracy literacy in general, there is still little research exploring the impact of understanding geometric concepts such as surface area and volume of prisms.

Although various studies have focused on mathematical numeracy literacy, very few have specifically explored the relationship between students' understanding of mathematical concepts and their numeracy literacy in geometry. Most research has focused more on data presentation and number patterns, as seen in studies by Jeheman et al. (2019) and Febriyani et al. (2022). These studies also did not consider how understanding mathematical concepts can affect students' ability to solve numeracy problems related to space and measurement. This highlights a gap in previous research on how numeracy literacy and mathematical concept understanding can be developed simultaneously in geometric topics.

This study offers an original contribution by combining two important aspects of mathematics education that have been underexplored: numeracy literacy and understanding of mathematical concepts in the context of geometry. Numeracy literacy not only involves the ability to calculate but also includes the ability to effectively use numerical information in various contexts, including geometry (Mastuti et al., 2023). In a study by Atit et al. (2020), it was found that effective numeracy literacy in geometry heavily depends on spatial understanding, an aspect often overlooked in conventional approaches. This becomes increasingly relevant as gaps in understanding basic geometric concepts, such as surface area and volume of prisms, often hinder students' ability to apply mathematical knowledge to real-world situations.

The gap in the literature relates to the lack of attention on the influence of geometric concept understanding on numeracy literacy. Most previous research has focused more on numerical aspects in general, without delving into the significant role of geometric concepts in enhancing students' numeracy literacy (Fachrudin et al., 2019). This study seeks to fill this gap by deeply analyzing how understanding geometric mathematical concepts, such as shapes, sizes, and spatial relationships, can directly contribute to improving numeracy literacy. By combining the strengthening of geometric concepts with real-world problem applications, this research aims to provide an important contribution to the development of more effective mathematics teaching strategies. The discovery-based approach applied to real-life contexts has been proven to enhance students' cognitive skills in analytical and critical thinking throughout the information acquisition process (Fazriansyah, 2023). Additionally, contextual learning that involves geometric elements can also facilitate students' analytical skills in applying numeracy concepts practically (Saputra et al., 2022). The findings of this study not only enrich theoretical understanding of the relationship between geometric concepts and numeracy literacy but also provide practical recommendations for educators in designing more relevant and applicable teaching methods.

2. METHOD

This study employs a qualitative descriptive approach to explore students' numeracy literacy skills on the topic of surface area and volume of prisms. The qualitative approach was chosen to gain a deeper understanding of numeracy literacy skills and the difficulties faced by students when applying geometric concepts in real-life contexts (Rezky et al., 2022). The subjects of this study involved 32 eighth-grade students from a junior high school in the city of Tasikmalaya. The research instruments consisted of a numeracy literacy diagnostic test with 4 (four) questions designed to assess the understanding of mathematical concepts, as well as in-depth interviews to explore students' perceptions and experiences. Data collection was conducted through observation, tests, and interviews, each aimed at obtaining comprehensive data on mathematical understanding and numeracy skills. Data analysis was performed using thematic analysis techniques to identify patterns of difficulties that emerged from the collected data. The indicators used are the numeracy literacy indicators by Sari & Wijaya (2017), which the researchers deemed more appropriate based on the material used. Below is Table 1, which contains detailed explanations of these numeracy literacy indicators.

Table 1. Numeracy Literacy Indicators (Sari & Wijaya, 2017)

No.	Indicator
1	Students can understand the given problem thoroughly and comprehensively.
2	Students can create a mathematical model from the given problem.
3	Students can use mathematical concepts, objects, and facts in solving the problem.
4	Students can interpret and evaluate the problem-solving process they have carried out.

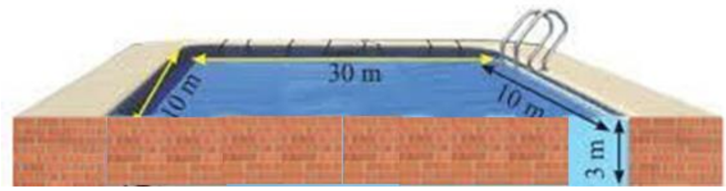
The indicators were adjusted to the numeracy literacy test questions given to the students. The test consists of 1 (one) essay question that includes contextual understanding. The numeracy literacy test question is presented in Table 2 below.

Table 2. Numeracy Literacy Test Question

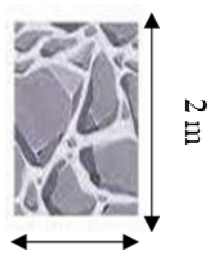
Question Number	Description of the Question
1	Eliza bought a Hello Panda biscuit package with a hexagonal-shaped top and bottom, as shown in the picture.  Upon arriving home, Eliza opened the package by cutting it until all the sides were laid flat. She observed the shapes of the flattened sides. As Eliza's friend, write and draw the shapes and their nets. a) Write and draw the shapes in your way!

b) How do you determine the surface area based on the net you have drawn? Explain!

2 Mr. Dani has a swimming pool in the shape of a prism behind his house. He cleans the pool every two weeks to keep the water looking clear. Below is the description of Mr. Dani's swimming pool along with its dimensions.

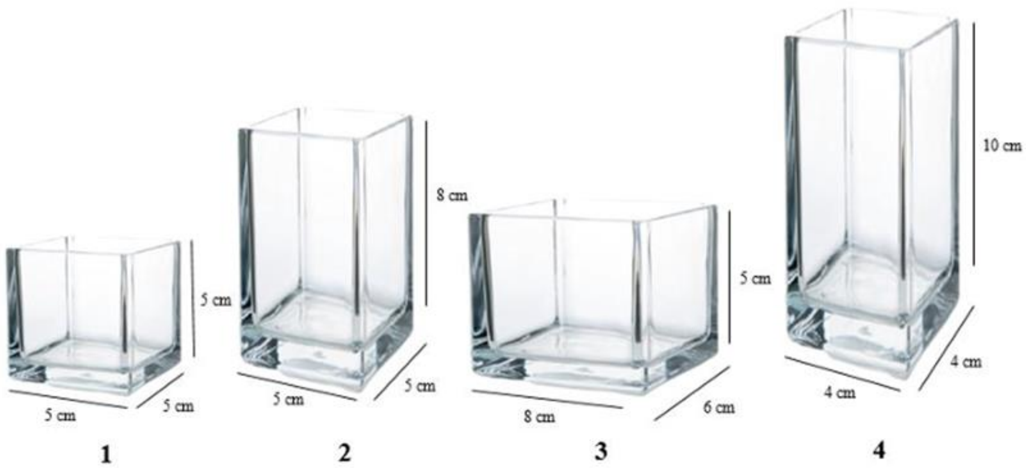


One day, Mr. Dani wants to install stone-patterned tiles on the pool walls and floor to make the pool look more natural. Below are the tiles and their sizes that Mr. Dani will install.



Determine how many tiles Mr. Dani will need!

3 On Sunday, Ali, Budi, Cindy, and Dini went together to a carnival. There, they participated in one of the interesting games, which involved emptying water from a container. Each container was in the shape of a rectangular prism with different sizes. Ali took Container 1, Budi took Container 2, Cindy took Container 3, and Dini took Container 4. The containers had different sizes, as shown in the image below.

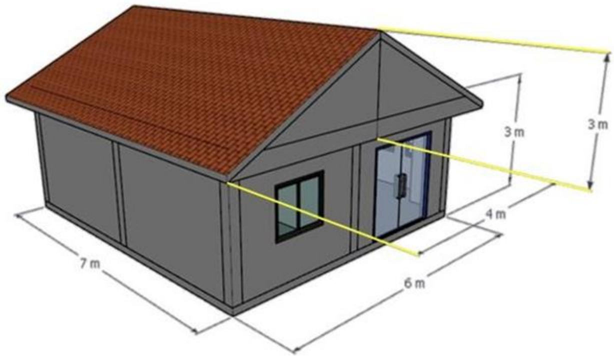


Each container was filled with water and closed with a lid that had a small hole of the same size. Then, they received instructions that the game would start after the whistle was blown. Shortly after, the whistle was blown, and they began to empty the water from the containers together.

a) According to you, whose water will run out the fastest?
b) Whose water will run out the slowest?
c) Rank the containers from the fastest to the slowest in terms of how quickly

the water runs out, and explain how you ranked them!

4 Mr. Yono wants to renovate his house. He plans to fix the damaged walls and repaint the exterior of his house. The front of Mr. Yono's house has one door measuring 2 m x 2 m and one window measuring 1 m x 1 m. Mr. Yono has 5 liters of light gray paint. Below are the shapes and dimensions of Mr. Yono's house.



Mr. Yono will paint the front, side, and back of the house. If 10 square meters of wall requires 1 liter of paint, determine:

a) The area of the walls that will be painted!
b) The total amount of paint needed!
c) The paint shortage!
d) Also determine the capacity of Mr. Yono's house!

Next, a class consisting of 32 students was selected to complete the numeracy literacy test instrument. This aimed to assess the students' numeracy literacy skills by the following process: (1) Students were asked to complete a test instrument created by the researcher after a validation process; (2) After finishing the test, the students submitted their answer sheets; (3) The researcher conducted direct interviews with the students. The scoring guidelines for numeracy literacy skills are presented in Table 3 below.

Table 3. Scoring Guidelines for Numeracy Literacy Skills

Category	Numeracy Literacy Test Score (N)
Good	$85 \le N \le 100$
Fair	$70 \le N < 85$
Poor	$N < 70$

3. RESULT AND DISCUSSION

3.1. Result

The following are the results of students' ability to solve numeracy literacy questions, as shown in Table 4 below.

Table 4. Results of Numeracy Literacy Skills of Eighth Grade Junior High School Students

Category	Number of Students	Percentage (%)
Good	1	3,125
Fair	11	34,375
Poor	20	62,5

Based on Table 4, the majority of students, with a numeracy literacy ability categorized as poor, constituted 62.5%. Conversely, only a small portion of students demonstrated a good level of numeracy literacy, accounting for 3.125%. This is supported by the results of the test answers and the subsequent interviews with the students.

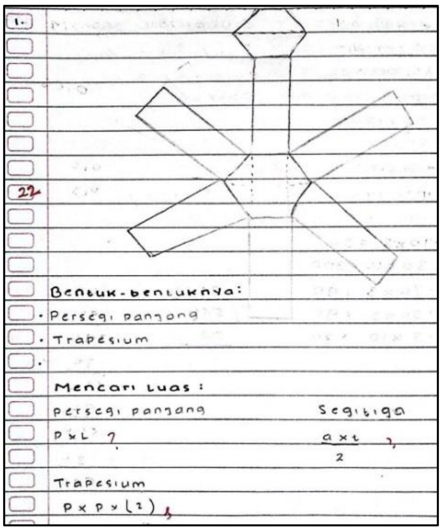


Figure 1. Student Answer Number 1 with Poor Category

Based on the student's answer in Figure 1, the student demonstrated some understanding of the problem presented, but there were still errors in applying the formulas and identifying geometric shapes. The student was able to draw the net of the Hello Panda biscuit packaging, showing that most sides consist of rectangles and trapezoids. However, there was a mistake in the formula used, particularly for the trapezoid, where the student had not written the correct formula to calculate the area. The students also did not fully calculate the surface area, even though they attempted to identify some of the geometric shapes involved. From a numeracy literacy perspective, the student was able to understand most of the problem, especially in depicting the net, but was not comprehensively capable of applying the appropriate mathematical model to calculate the surface area. In terms of using mathematical concepts, objects, and facts, the student appeared to struggle with executing the formulas correctly and accurately. Regarding evaluation, the student had not fully evaluated the mistakes made during the calculation process, especially in determining the surface area. This indicates that further guidance is needed to strengthen the student’s understanding of the concept of nets and the correct application of formulas in solving geometry problems.

Dialog 1

Researcher	:	*"So, do you understand the question in number one?"*
S1	:	*"I do, sir."*
Researcher	:	*"Good. Now I want to know, how did you draw the shapes and the net of the Hello Panda packaging? What was your first step?"*
S1	:	*"Well, sir, I imagined the packaging being opened on all sides. Then I drew it like the net of a hexagonal prism. There are two hexagons for the top and bottom, and I drew the sides as rectangles and trapezoids."*
Researcher	:	*"That's good; you’ve drawn the shapes of the net correctly. However, I see there's a slight mistake in the formula you used for calculating the area,*

		especially in the trapezoid section. What were you thinking when you wrote that formula?"
S1	:	*"As far as I know, a trapezoid has two sides of different lengths, but I only used the length times the width like a rectangle because I was confused about how to calculate the area of a trapezoid."*
Researcher	:	*"That's okay; this is part of the learning process. Now, how did you calculate the surface area based on the net you made?"*
S1	:	*"I calculated the area of the rectangle first because it's easier. But I'm not sure how to combine the areas of all the different shapes, like the hexagon and trapezoid."*

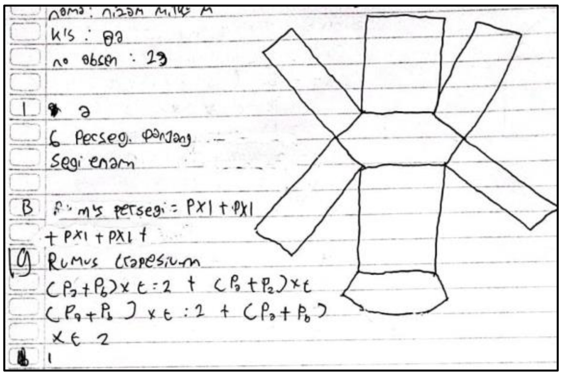


Figure 2. Student Answer Number 1 with Fair Category

Based on the student's answer in Figure 2, it can be analyzed that the student has shown a basic understanding of the hexagonal net concept, but there are several errors in the steps taken to solve the problem. The student attempted to draw the net using several rectangles and hexagons; however, the shape of the rectangles was not accurate because the actual problem depicted the vertical sides as rectangles, not plain squares as written. This indicates that the student's understanding of geometric shapes is not yet comprehensive. Additionally, the student tried to use formulas for the square and trapezoid, but there was an error in writing the square formula, which should have been for a rectangle, although the formula itself was correct. Moreover, there was a mistake in writing the trapezoid formula that should have been applied in this case of the net. The student seems to not fully understand the relationship between the net shapes and how to calculate the surface area, as well as how to structure the formulas correctly. Based on the numeracy literacy indicators, the student was able to understand part of the question and create a simple mathematical model but was not able to use mathematical concepts and facts correctly in calculating the surface area. Furthermore, the student did not interpret and evaluate the results of their work, as seen from the formulas written not reaching the correct and complete final solution. This highlights the need for further understanding of the concepts of solid shapes and nets, as well as the correct way to determine surface areas.

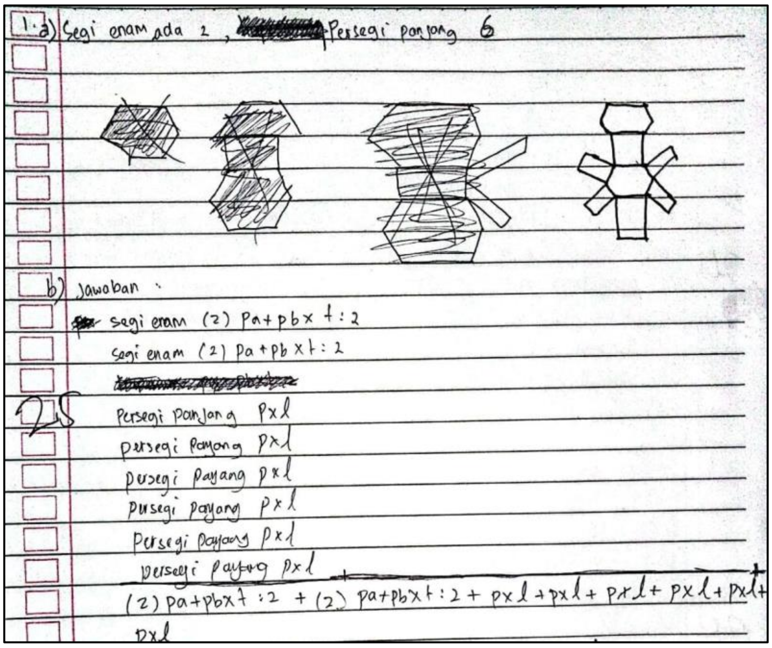


Figure 3. Student Answer Number 1 with Good Category

Based on the answer in Figure 3, it can be seen that the student has a good understanding of the basic concepts of the net of solid shapes. The student was able to depict the net of the Hello Panda biscuit packaging, which consists of two hexagons on the top and bottom, along with several rectangles on the sides. The student also demonstrated understanding in writing the formula for calculating the surface area of the net, although there were some minor corrections needed in the writing of the hexagon and rectangle formulas. The student realized that the hexagon requires calculations using the perimeter and height formulas for the trapezoid and understood that the side of the packaging, which is rectangular, is calculated using the length times the width formula. From the perspective of numeracy literacy, the student has shown the ability to understand the question well, especially in drawing and identifying geometric shapes. The student was also able to create a mathematical model through the application of the correct formulas to calculate the surface area of the shape. The mathematical concepts used by the student, such as the area formulas for the hexagon and rectangle, indicate that the student can use mathematical concepts, objects, and facts. Finally, the student was able to evaluate part of their solution, although there is still room for improvement in some areas, such as writing formulas accurately and consistently.

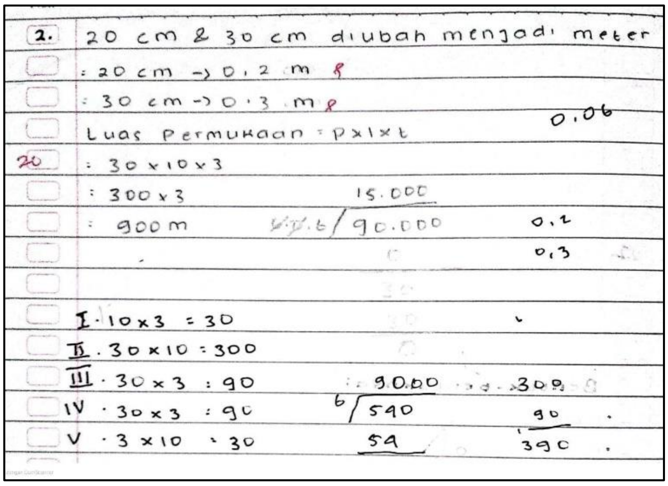


Figure 4. Student Answer Number 2 with Poor Category

Based on the student's answer in Figure 4, it can be seen that the student attempted to solve the problem by applying mathematical concepts but made an error in selecting the formula and approach. The problem required calculating the surface area of the pool's walls and base to determine the number of tiles needed. However, the student used the formula for volume, which is length multiplied by width and height. The correct solution should involve calculating the area of five sides of the pool: two long sides, two short sides, and the pool base. After calculating the total surface area, the result should be divided by the area of one tile to determine the number of tiles needed. This mistake indicates that the student has not fully understood the context of the problem and the relevant concept, which is surface area, not volume. This suggests a need for a deeper understanding of applying formulas according to the problem's context and the ability to critically evaluate the final result.

Dialog 2

Researcher : "How about question number two? Do you understand it now?"
S2 "Yes, sir."
Researcher : "Good. I'd like to know your answer to this problem. While solving it, : you used the volume formula instead of the surface area formula. Can you explain your thinking when you worked on this question?"
S2 : "Yes, sir. I thought, because the pool is in the shape of a prism, I immediately remembered that the volume formula for a prism is length times width times height."
Researcher : "I see that you understand the volume formula well, but this question is asking for surface area, not volume. Do you remember what the question was asking?"
S2 : "The question asked us to calculate the number of tiles needed to cover the floor and walls of the pool, right?"
Researcher : "Yes, that's correct. So, is it right to calculate it by determining the volume of the pool?"
S2 "Seems like it wasn't right, sir."

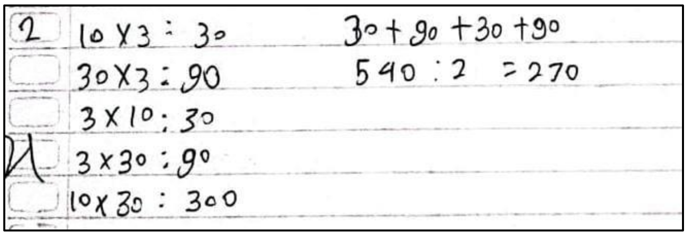


Figure 5. Student Answer Number 2 with Fair Category

Based on the student's answer in Figure 5, it can be concluded that the student understood part of the concept required in the problem, which was calculating the surface area of the pool. The student calculated some sides of the pool, but their explanation was incomplete regarding the naming of the pool's dimensions: length, width, and depth. The student also did not include the correct mathematical unit for the final result, which should have been in square meters (m^2). Additionally, the step of dividing the surface area by 2 was not explained in detail, requiring clarification as to whether this division was meant to manage tiles for half the surface area or was just a calculation error. In terms of numeracy literacy, the student was able to understand the problem and create a mathematical model of the issue involving the pool's surface calculation. However, the concept and interpretation of the problem need improvement, especially in explaining the rationale and context for using mathematical operations and evaluating the final result.

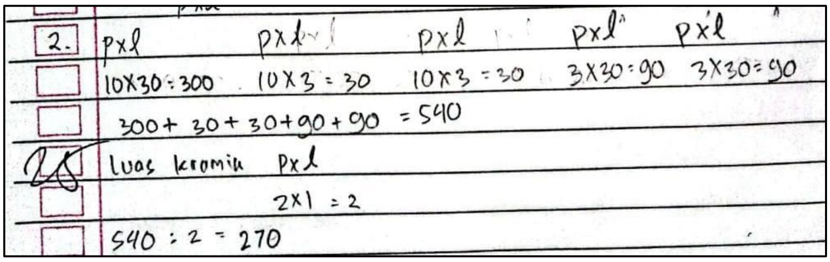


Figure 6. Student Answer Number 2 with Good Category

Based on the student's answer in Figure 6, shows that the student understood the problem thoroughly. The steps taken demonstrate that the student was able to create a mathematical model appropriate to the problem, which involved calculating the surface area of the pool, including the walls and base. The student correctly applied the formula for surface area by adding the areas of the pool's length, width, and depth. Additionally, the student used the concept of tile size (2 m × 1 m) and divided the total surface area of the pool (540 m^2) by the tile area (2 m^2) to determine the number of tiles required, which was 270 tiles. This answer shows that the student was able to use mathematical concepts and facts accurately and interpret their results correctly. Although the calculation is correct, it is recommended that the student always include the unit "tiles" in each step to ensure the accuracy and clarity of the process.

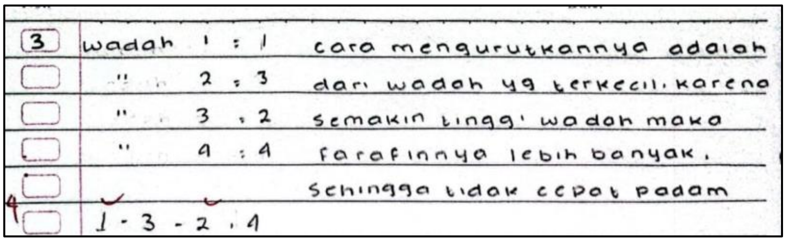

3 wadah 1 : 1 cara mengurutkannya adalah
" 2 : 3 dari wadah yg terkecil. karena
" 3 : 2 semakin tinggi wadah maka
" 4 : 4 tarafinnya lebih banyak.
sehingga tidak cepat padam
4 1 - 3 - 2 . 4

Figure 7. Student Answer Number 3 with Poor Category

Based on the analysis of the student's answer in Figure 7, although the sequence produced is correct, the approach used to solve the problem did not follow proper mathematical principles. The student appears to have relied solely on visual observation of the container sizes without calculating the volume using the formula $V = p \times l \times t$ (length × width × height), which should have been applied to calculate the water capacity of each container. A deep understanding of volume as a mathematical concept is crucial to answering this problem, as volume determines how much water is in each container and, ultimately, the time required to empty it. Although the final result is accurate, using a visual approach without volume calculation does not reflect a comprehensive mathematical understanding. Therefore, the student has not fully met the numeracy literacy skill as per the set indicators, particularly in creating a mathematical model and correctly and systematically applying mathematical concepts.

Dialog 3

Researcher : *"How about question number three? Do you understand it now?"*
S3 *"Yes, sir."*
Researcher : *"Good. Now, I'd like to discuss your answer to this question. You arranged the water from the fastest to the slowest to empty correctly. However, I noticed that you did not use mathematical calculations to solve it. Can you explain how you arranged the sequence?"*
S3 : *"Yes, sir. When I read the question, I immediately looked at the sizes of the containers. I thought that if the length, width, or height were smaller, the water would empty faster. So, I just relied on observing the container sizes to arrange them."*
Researcher : *"I see that you understand the basic idea that the size affects the amount of water. However, in this question, several container dimensions were provided, such as length, width, and height. Do you remember the volume formula?"*
S3 *"Yes, sir! Oh, so I should calculate the volumes of all the containers, right?"*
Researcher : *"That's right!"*

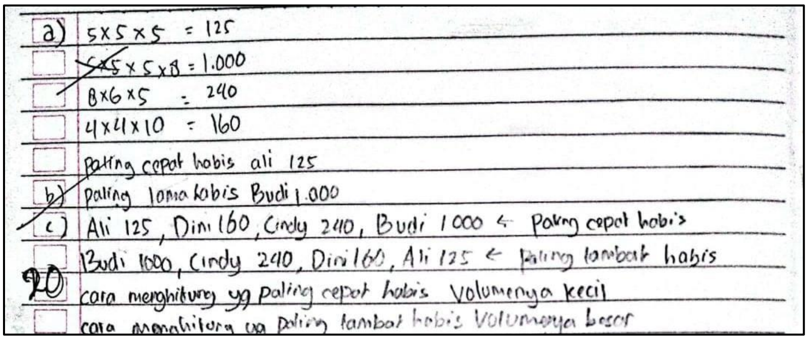

a) 5x5x5 = 125
~~5x5~~ 5x5x8 = 1.000
8x6x5 = 240
4x4x10 = 160
Paling cepat habis ali 125
b) Paling lama habis Budi 1.000
c) Ali 125, Dini 160, Cindy 240, Budi 1000 ← Paling cepat habis
Budi 1000, Cindy 240, Dini 160, Ali 125 ← paling lambat habis
90
cara menghitung yg paling cepat habis volumenya kecil
cara menghitung yg paling lambat habis volumenya besar

Figure 8. Student Answer Number 3 with Fair Category

Based on the student's answer shown in Figure 8, an analysis of the problem-solving steps indicates that the student had a fairly good understanding of the problem and attempted to arrange the containers based on their water volume. The student used the concept of volume to calculate the size of each container using the formula $V = p \times l \times t$, and most of the volume calculations were correct, except for container 2, where the result was incorrectly written as 1000 cm^3 instead of 200 cm^3. In terms of the mathematical model, the student understood that the smaller the volume of the container, the faster the water would empty, and conversely, the larger the volume, the longer it would take for the water to empty. The student also correctly interpreted that Ali, with container 1, had the smallest volume, so his water would empty the fastest, while the container with the largest volume would take the longest. Although the basic concept was understood, accuracy in calculating the volume of container 2 needs to be addressed to ensure the solution sequence aligns with mathematical facts.

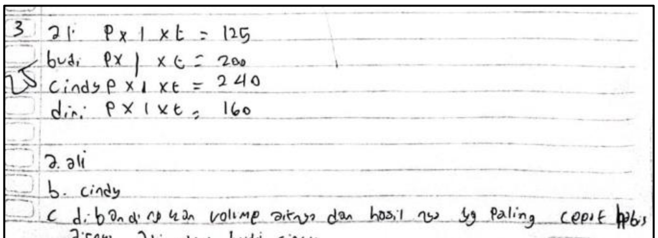

3 ali p x l x t = 125
budi p x l x t = 200
15 cindy p x l x t = 240
dini p x l x t = 160
a. ali
b. cindy
c dibandingkan volume airnya dan hasil nya yg paling cepat habis airnya ali dini budi cindy

Figure 9. Student Answer Number 3 with Good Category

Based on the student's answer in Figure 9, the steps taken to solve the problem demonstrate a good understanding of the given task. The student comprehended the problem well, as evidenced by their ability to determine that the volume of water in the container would affect how quickly the water would empty. In this case, the student correctly used the prism volume formula $V = p \times l \times t$ to calculate the volume of each container. From the calculation results, the student successfully arranged the order of water depletion from fastest to slowest based on the container volume. Ali's container, which had the smallest volume (125 cm^3), emptied the fastest, while Budi's container, which had the largest volume (1000 cm^3), emptied the slowest. Thus, the student was able to create an accurate mathematical model, apply the volume concept to solve the problem, and correctly evaluate the result. Overall, the student demonstrated good numeracy skills in interpreting and scientifically solving the problem.

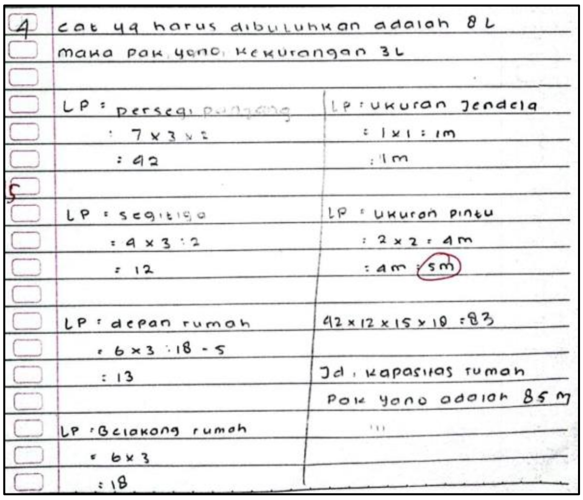


Figure 10. Student Answer Number 4 with Poor Category

Based on the student's answer in Figure 10, it can be seen that the student has a fairly good understanding of the given problem. The student was able to calculate the area of the side walls (left, right), front, and back of the house and accounted for the subtraction of the areas for the doors and windows to obtain the total area of the walls to be painted. However, the answer did not include an explanation of how the sizes of the windows and doors relate to the areas of the walls. This shows that the student struggled to create a relevant mathematical model for the problem. The calculation steps were not presented systematically, and there were minor errors in writing the units. The student also demonstrated an understanding of mathematical concepts, such as calculating the area of rectangles and triangles, to determine the total roof and wall area. The calculation of the total paint required, based on the area calculated, was correct—dividing the total area by the paint usage ratio (10 m^2 per liter of paint). The student also accurately calculated the paint shortage by comparing the available paint to the amount needed. Overall, the student was able to interpret and evaluate the solution well, but more attention should be paid to including units and the final answer.

Dialog 4

Researcher	:	"How about question number four? Do you understand it now?"
S4		"Yes, sir."
Researcher	:	"Great. Overall, you were able to solve the problem well. However,
	:	I'd like to discuss a few minor issues, particularly regarding the units at the end of your answer. Can you explain how you solved this problem?"
S4	:	"So, sir, I started by calculating the area of the front, side, and back walls of Mr. Yono's house. I also subtracted the areas of the doors and windows from the front wall, as the problem asked."
Researcher	:	"You followed the right steps, but I noticed that at the end of your answer, you didn't include units like square meters or liters. Why do you think it's important to include units in your calculations?"

S4 “Sorry, sir. I thought since I used the units at the beginning, I didn’t need to write them again at the end.”

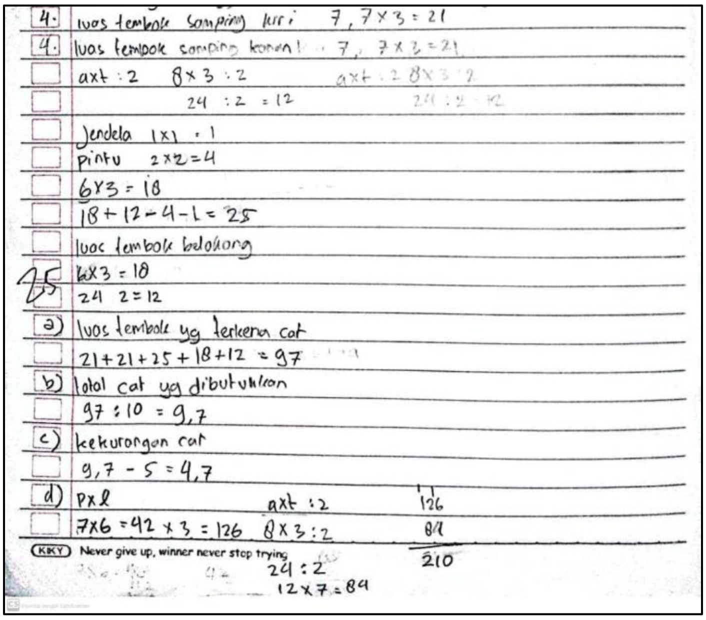


Figure 11. Student Answer Number 4 with Fair Category

Based on the student’s answer shown in Figure 11, it can be analyzed that the student understood part of the problem reasonably well. The steps taken indicate that the student could create a mathematical model of the problem, especially by calculating the area of the front, side, and back walls of the house systematically. The student also accounted for the areas of windows and doors in the calculations to determine the area to be painted. However, some aspects need improvement. First, the student did not explain where the value of 5 square meters for the door area came from, as the door area should be 4 square meters (2 m × 2 m). Second, the student’s answer only covered part A, calculating the wall area to be painted, but did not address parts b and c, which asked about the total paint needed and the paint shortage. In general, the student was able to use basic geometric concepts, such as calculating the area of rectangles and triangles, to solve the problem. However, the evaluation and interpretation of the solution were incomplete because the student did not continue to address the total paint requirement and shortage.

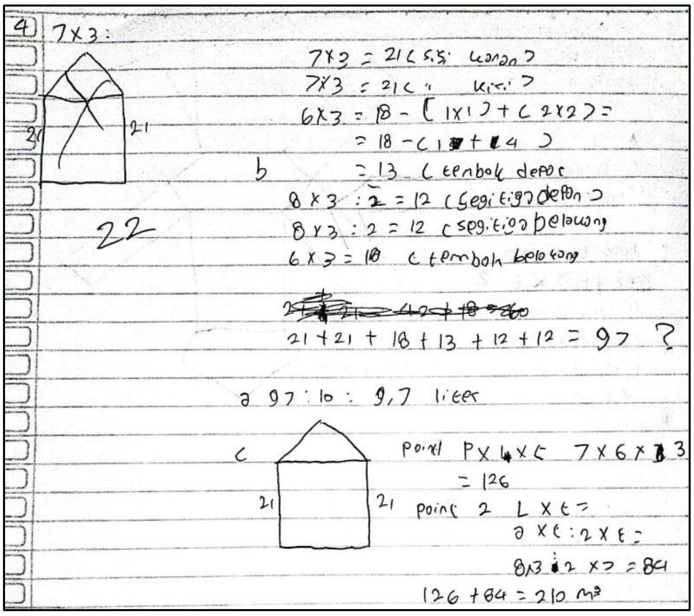


Figure 12. Student Answer Number 4 with Good Category

Based on the student's answer in Figure 12, the student demonstrated a thorough understanding of the problem, particularly in calculating the area of the house walls to be painted and the total amount of paint needed. The student accurately modeled the problem by dividing it into several parts and calculating the area of each wall: front, side, and back. The student also accounted for elements that would not be painted, such as doors and windows, demonstrating the ability to apply the concept of subtracting areas. The student used the appropriate formulas to calculate the surface area of a rectangular prism and a triangular prism, which represented parts of the roof. Additionally, the student was able to calculate the total paint required by dividing the total wall area by the paint usage ratio per square meter. The student also correctly calculated the total volume of the house to determine capacity, along with the appropriate units. Overall, the student showed a good ability to use mathematical concepts, objects, and facts, as well as interpret and evaluate the results accurately.

3.2. Discussion

Based on the results obtained from the four analyzed problems, it can be concluded that the students demonstrate a reasonably good understanding of basic mathematical concepts, particularly in measuring the area of plane figures such as rectangles and triangles. The students were able to identify key variables in the problems, such as the dimensions of the walls, windows, and doors, and included relevant calculations in the context of the task. However, there were some minor errors related to the accuracy of the results, such as the incorrect calculation of the door area. Moreover, the students did not complete the entire problem, particularly the questions regarding the amount of paint required and the shortage. This indicates that their understanding of numeracy concepts is stronger in the initial stages of calculation but still requires reinforcement in solving problems that involve multiple computational steps.

Musyafak et al. (2024) suggest that students are better able to understand and implement computational concepts when these are presented in meaningful or relevant situations. Additionally, Shafara et al. (2024) emphasize the importance of adopting a student-centered learning approach and providing sufficient practice in solving various types of mathematical problems.

When compared with previous research on students' numeracy literacy skills at the secondary education level (Rosidi et al., 2022; Salsabilah & Kurniasih, 2022; Pulungan, 2022), consistency can be observed. Earlier studies have shown that students are often able to understand the initial parts of numeracy problems well, particularly those involving simple formulas such as surface area or volume. However, researchers have also found that students tend to struggle when faced with problems requiring comprehensive conclusions or involving multiple steps. The findings from this analysis confirm these observations. The students in this context were strong in identifying and calculating individual elements of the problem but faced difficulties when it came to completing the problem as a whole, such as calculating the paint shortage.

From a theoretical perspective, these findings suggest that the students have mastered most of the basic concepts of numeracy literacy, but their ability to integrate various concepts into a comprehensive solution still needs improvement. In line with Nurrohmah et al. (2024), students need to have abstract thinking skills, use logic in problem-solving, and be able to identify patterns and relationships between different concepts to integrate them effectively. Syarif (2024) argues that having a strong conceptual integration foundation helps students solve more complex mathematical problems and apply their mathematical knowledge in real life. Therefore, teaching should focus more on comprehensive problem-solving steps and understanding the relationships between mathematical concepts, as this could positively impact students' learning outcomes.

Practically, these results suggest that teachers need to emphasize exercises that not only focus on simple calculations but also require students to solve multi-step problems. A teaching method that uses contextual problem-solving can help students become more familiar with real-world problems that involve comprehensive calculations. Zafirah et al. (2024) argue that contextual learning helps students address real-life problems. Fatimah (2020) notes that when students are given contextual problems, they can solve them by modeling their solutions from concrete situations, known as the "model of." Therefore, educators can provide more detailed feedback on the importance of attending to each calculation step and evaluating the overall solution thoroughly.

There are several limitations to this analysis that should be noted. First, the evaluation of students' numeracy literacy skills is based on only four questions, which may not fully represent their overall numeracy abilities. The limited number of questions could lead to premature generalizations about students' numeracy literacy. Second, the errors found in the students' answers could be attributed to other factors, such as misunderstanding the problem instructions, rushing through the task, or losing focus during the calculations. Third, the contextual nature of the problem, such as house renovation, may have affected students who are less familiar with real-world contextual problems. Therefore, further research with a wider variety of questions is needed to obtain a more comprehensive picture of students' numeracy literacy skills.

4. CONCLUSION

This research shows that the numeracy literacy skills of eighth-grade students on the topic of surface area and volume of prisms in Tasikmalaya remain low, with many students struggling to understand and apply geometric concepts. Although the students demonstrated a solid grasp of basic numeracy concepts, they still require further development in solving more complex and comprehensive problems. Therefore, efforts to improve the quality of teaching through more structured and problem-solving-based strategies are crucial. A more contextual and active teaching approach, such as discovery-based learning methods and the integration of technology, can help enhance students' understanding. Additionally, professional development for teachers is essential to ensure they can implement effective teaching strategies. These findings contribute to curriculum development and open opportunities for further research aimed at improving students' numeracy literacy and mathematical understanding in the future.

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