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Analysis of Students' Mathematical Problem-Solving Ability on Whole Number Operations Based on Polya's Framework

Salsabila Baliani Putri Sopian[1*], Turmudi[2]

[1,2] Pendidikan Dasar, Universitas Pendidikan Indonesia, Bandung, Indonesia

*salsabilabaliani28@upi.edu

Abstract. The research aims to determine the results of the analysis of students' abilities in solving problems in whole number calculation operations. This research is a qualitative descriptive study. The subjects in this study were 3 students with low, medium, and high mathematical problem-solving ability categories which were selected from a total of 31 students. Data collection techniques were carried out using written tests and interview. The research results obtained regarding students' mathematical problem-solving abilities are in low category with 77.4%, medium is 9.7%, and high is 12.9% ; (2) students with high abilities are very good at mastering all indicators of mathematical problem-solving abilities, but there are still errors in the indicators of understanding the problem; (3) students with moderate abilities have quite good abilities in understanding the problems presented in the questions, but are still lacking in other indicators; (4) students with low abilities are not able to understand the problem presented in the question well so that students have difficulty in carrying out the next problem-solving steps in the next indicators. Problem solving skills are still relatively low, so it is necessary to improve students' abilities in all indicators, especially in understanding problems.

Keywords: Mathematical problem-solving abilities, whole number calculation operations, Polya's framework

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INTRODUCTION

Mathematics is a branch of science formed from empirical human experience which is processed in the world of ratios and analyzed using cognitive reasoning to produce a mathematical concept expressed in mathematical language and mathematical notation. (Rahmah, 2013). Learning mathematics is a subject that must be studied by students starting from primary education to secondary education (Achsin & Wibawanto, 2020; Naimnule et al., 2020; Nisa, 2018). Mathematics is not only required to be studied by students within the Indonesian curriculum, but mathematics is also a main concern in the global curriculum (Rahayuningsih et al., 2021). Mathematics needs to be studied by elementary school students to increase their ability to think creatively and critically through learning and encouraging students to actively construct their understanding independently (Sopian et al., 2023). Especially, in using thinking skills to improve students' problem-solving abilities which is the goal of the learning process in accordance with curriculum aspects according to the National Council of Teachers of Mathematics (NCTM) (Cahyani & Setyawati, 2016).

Problem-solving abilities are the main goal of mathematics education programs in many countries that are members of the PISA (*Programme for Internasional Student Assessment*) and OECD (*Organisation for Economic Co-operation and Development* (Anggoro et al., 2023). Problem-solving ability is one of the many thinking skills regarding how to think about solving problems flexibly, accurately, and efficiently from mathematical concepts that have been

studied (Carson, 2007; Rahimah, 2019). Mathematical problem-solving abilities can also train students to reason, analyze, and choose the right strategy to solve problems, carry out calculations, and evaluate what has been done to build students' self-confidence in making decisions (La'ia & Harefa, 2021; Nurhayati et al., 2016).

According to Polya, the indicators of mathematical problem-solving abilities explained by Maulana (2018) are; (1) understanding the problem: the student's ability to know what is known and what is asked in the question given using his sentences, (2) making plans: the student's ability to design or estimate the best path/way/various possibilities for answering the problem which is given through the hypothesis created, (3) carrying out the plan: the student's ability to solve mathematical problems through appropriate procedures and calculation operations, and (4) looking back: the student's ability to see alternative problem solving that is more practical and efficient.

However, in fact, it is still found that elementary school students still experience difficulties when solving mathematical problems. Students' difficulties in solving mathematics problems are influenced by differences in basic abilities possessed by students. Therelevant research is shown in the research results of Rahman's et al. (2023) that the difficulties that students often experience in solving mathematical problems are when students carry out arithmetic operations and draw conclusions and answers, which is in line with students' problem-solving abilities which are still low. According to Raharjo et al. (2021) the student who has difficulty learning mathematics often makes mistakes in learning to count and in solving word problems. In line with this, Balaweling et al. (2023) presented the results of their research regarding students' mathematics learning outcomes which were still predominantly below the class average, namely only 5 out of 28 students who only had above average grades, and 4 students who had close to the average score.

The results of the study above are related to the focus of the analysis on the results of the percentage of students as a whole, analysis of students' difficulties in solving problems, and analysis of problem-solving skills in general. Thus, this study will focus on a more in-depth analysis of each indicator of students' problem-solving abilities who have low, medium, and high abilities from the total number of students.

METHODOLOGY

This research used a descriptive qualitative method. This research carried out aimed to determine the results and analyze mathematical problem-solving abilities of fifth-grade elementary school students based on the Polya's problem-solving framework. The analysis carried out on students' mathematical problem-solving abilities was limited to the material on whole number calculation operations by referring to the problem-solving steps according to

Polya. The subjects in this study were 3 students with low, medium, and high mathematical problem-solving ability categories which were selected from a total of 31 students. The data collection techniques used in this research were written tests of students' mathematical problem-solving abilities, interviews, and documentation. The form of written is the description test with questions containing each indicator of students' mathematical problem-solving abilities. The data analysis technique used in this study is qualitative with the follow steps of data collection, reduction, and conclusion. The reduced data provides a clear picture of students' steps in solving whole number problems for grade V students, then the researcher will present the data that has been systematically arranged in the form of a descriptive report based on Indicators of Students' Mathematical Problem-Solving Ability that are shown in Table 1.

Table 1. Indicators of Students' Mathematical Problem-Solving Ability Test Questions

Indicators of Students' Mathematical Problem-Solving Ability	Question Indicator	Bloom's Taxonomy	Question Number
1. Understand the problem 2. Make a plan 3. Excuting the plan 4. Check again the results that have been obtained	Calculates the results of addition and subtraction operations of whole numbers up to 100,000	C3	1
	Comparing the results of counting operations on whole numbers up to 100,000	C5	3
	Solve mathematical problems related to currency values of hundreds of thousands of rupiah using multiplication and division operations	C4	2

Each indicator of problem-solving ability has a different maximum score. This is determined based on the scoring guidelines for student answers shown in Table 2.

Table 2. Guidelines for Scoring Student Answer Results

Indicator	Rated Aspect	Score	Information	Maximum Score on Each Indicator
Understanding the Problem	Write down the known information in the question	3	Write down the information you know in the question completely and accurately	5
		2	Insufficient writing of known information in the question	
		1	At least there is information written down even though the information is not completely correct	
		0	Do not write known information in the question	
	Write down the information asked for in the question	2	Write down the essence of the thing being asked accurately	
		1	Not being precise in writing the essence of the thing asked in the question correctly	
		0	Do not write down the information stated in the question	
Make a Plan	State the plan/method that will be used in written form or mathematical symbols	3	State the method/flow of resolution clearly and precisely	3
		2	Lack of clarity in stating the way/flow of solutions	
		1	Wrong in stating the solution method/flow	
		0	Does not specify the solution method/flow	
Executing the Plan	Write down each step of the	3	Write down calculation operations completely and correctly	4

Indicator	Rated Aspect	Score	Information	Maximum Score on Each Indicator
	calculation operation performed	2	Inaccurate in writing calculation operations	
		1	There was an error in writing the calculation operation	
		0	Do not write down arithmetic operations	
	Write the answer	1	Correct answer	
		0	Wrong answer	
Check again	Interpret the answer results with a conclusion statement	2	Write the conclusion of the completion steps and answer the results completely and correctly	2
		1	Inaccurate in writing the conclusion of the solution	
		0	Do not write/state conclusions	
Total Score Obtained for Each Question				14

Data collection from research regarding students' mathematical problem-solving abilities was carried out through written tests and interview activities. Data collection on mathematical problem-solving abilities began by giving written tests to 31 fifth-grade elementary school students. The criteria for mathematical problem-solving abilities which are calculated based on the scores obtained by each student are shown in Table 3.

Table 3. Criteria for Students' Mathematical Problem-Solving Ability

Criteria	Score Acquisition Interval
High	Score ≤ 23
Currently	23 < Score ≤ 46
Low	Score > 46

The student test data obtained is then interpreted into three criteria, namely problem-solving ability with low, medium, and high criteria. Next, the percentage of students at each group level was calculated as shown in Table 4.

Table 4. Grouping of Students Based on Level of Problem-Solving Ability

Criteria	Low	Medium	High
Score Range	Score > 46	23 < Score ≤ 46	Score ≤ 23
Number of Students	24 Students	3 Students	4 Students
Percentage	77,4%	9,7%	12,9%

Based on Table 4, there are 4 students in the high problem-solving ability category, 3 students in the medium ability category, and 24 students in the low ability category. The percentage of the group of students with low ability was 77.4%, the group of students with medium ability was 9.7%, and the group of students with high ability was 12.9%. Table 5 shows that there are more students with low problem-solving abilities compared to groups of students with medium and high levels of problem-solving abilities.

After interpreting the data from the mathematical problem-solving ability test and grouping students into three categories, the researcher then conducted interviews with 3 students who had low, medium, and high problem-solving abilities to find out the process/steps taken and the difficulties faced by the students. The interview guidelines used in this study are shown in Table 5.

Table 5. The Interview Guidelines

Indicator of Problem Solving	**Question**
Understand the problem	1. Do you understand the information presented in the question? 2. In your opinion, what information can you use to answer this question? 3. What does the question ask? 4. Can you explain the meaning of this question in your own language?

Indicator of Problem Solving	Question
Make a plan	1. What strategy did you choose to use to answer this question? 2. Why did you choose that strategy?
Excuting the plan	1. How do you solve this problem? Can you explain it? 2. Is this answer the result of your own thoughts? 3. Did you experience any calculation difficulties in solving this problem?
Check again the results that have been obtained	1. Are you sure about the steps you wrote? 2. How do you know if your steps and answers to this question are correct? 3. What can you conclude from your answer to this question?

RESULTS AND DISCUSSION

The questions given to students are in the form of story problems on whole numbers and contain the context of everyday life problems. The questions given to students are shown in table 6.

Table 6. Problem-solving Ability Test Instrumen

No	Problem
1	The information below is a list of prices for the items were sold at Ibu Rini's Shop.

No	Problem

Name	Unit price
Cooking Oil 250 ml	6.000/pc
Cooking Oil 2L	34.000/pc
Egg	28.000/kg
Wheat	11.000/kg
Sugar	18.000/kg
Tapioca flour	10.000/kg
Cap Lele Rice	14.000/kg
Setrawangi Rice	14.500/kg

After returning from school, Rini usually helps her mother to look after the grocery store and serves the customers who come to her mother's shop. Mrs. Minah went to Mrs. Rini's shop to buy 1 bottle of 2 L oil, 2 kg of strawberry rice, 1 kg of eggs, and 4 kg of wheat flour. If Mrs. Minah brings IDR 150,000, then:

a. How much change will Mrs. Minah receive?

b. Prove that the difference in the price of cooking oil (2L) and the setrawangi rice that Mrs. Minah bought is IDR 5,000! Write down the arithmetic operations!

2 **Read the information and observe the table below to answer the questions number 2 and 3!**

Package A	Package B
1 pc medium meatball	10 pcs of small meatballs
5 pcs small meatballs	2 pcs tofu
2 chicken feet	2 pcs chicken feet
2 pcs of siomay	2 pcs of siomay
1 Sweet iced tea/orange ice	1 Sweet iced tea/orange ice

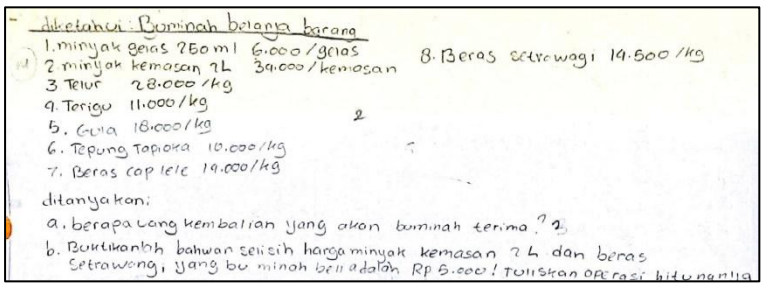
Wina, Rini, Adit, Dika and Sita discussed to determine the package of menu they would buy at the Mas Alam stand. There are 2 menus that they can choose. Wina, Rini and Sita chose

No	Problem
	package B while Adit and Dika chose package A. The total price of package A ordered was IDR 30.000 and the total price of package B was IDR 51.000. a. Calculate the price of 1 portion of package A and package B! b. Prove that the difference between 1 portion of package A and package B is IDR 2.000! Write down the arithmetic operations!
3	Two customers ordered meatballs from different menus. Customer A bought menu package A with 4 portions and package B with 2 portions. Customer B bought menu package A for 2 portions and package B for 4 portions. a. Whose order costs the most? b. If customer A and customer B pay for the order with 2 money with value of 50,000, then prove that the difference between customer A and customer B's change is IDR 4.000!

Answer Results of Students with High Problem-Solving Abilities

Based on the student answer sheets and interview activities that have been carried out, SHK has good abilities in solving questions number 1, 2, and 3. SHK can solve problems with the right answers and conclusions on each number, although there are still solution procedures problems that are not presented completely and sequentially on the completed answer sheet.

Figure 1. SHK's Answer on Number 1



First, following the steps for solving mathematical problems based on Polya's framework, the answer of question number 1 in the step of understanding the problem with sub-indicators determines the information asked in the question, SHK is not precise in writing the essence of the question being asked. This is proven in Figure 1 which shows the results that SHK did not write down the essence or meaning intended in the question sentence number 1, but instead SHK re-wrote the complete question presented in the question.

Not only limited to number 1, but SHK also wrote information repeatedly which was presented in questions numbers 1, 2, and 3. The information in the questions written by SHK had not been presented completely so SHK's score on the problem-solving ability indicator did not reach the perfect score. The results of SHK's also show that there are question sentences

written by SHK with command sentences, which are exactly the commands contained in each question in numbers 1, 2, and 3. The results of SHK's answers in numbers 2 and 3 are shown respectively in Figure 2 and Figure 3.

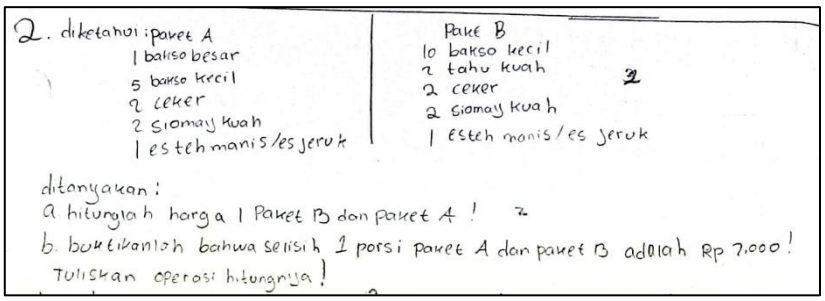


Figure 2. SHK's Answer on Number 2

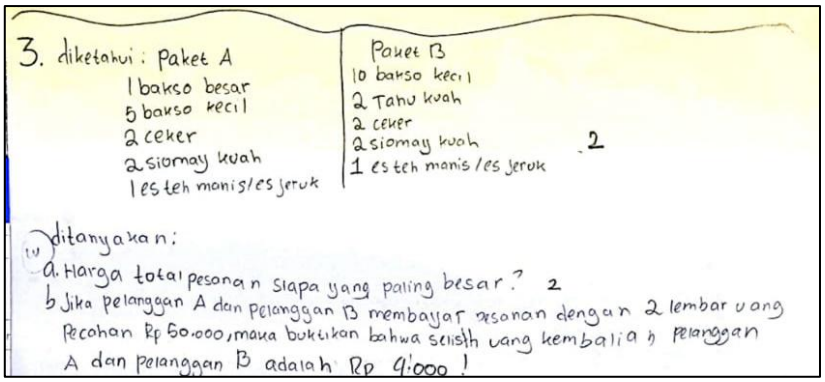


Figure 3. SHK'S Answer on Number 3

SHK also rechecked the answers written by SHK on the answer sheet. The interview data are as follows.

Researcher : "Take a look at your answer to question number 1! In your opinion, what information do you need to be able to answer question number 1?"

SHK : "Information about prices, ma'am."

Researcher : "What are the prices?"

SHK : "The price of the groceries purchased by Mrs. Minah"

Researcher : "In your opinion, do you need to write down all the information presented in the question?"

SHK : "I shouldn't, ma'am"

Researcher : "What should it be like?"

SHK : "Only information that is important and appropriate to what you are looking for."

Research : "That's right, why don't you just sort out the important information you need in solving questions 1, 2, and 3?"

SHK : "Yes ma'am it should be like that, actually I understand but sometimes I have difficulty writing down what I understand."

Researcher : “Take a look again at numbers 1, 2, and 3 in point b! How is your writing different from the question in point b?”

SHK : "Same ma'am, because I re-wrote question point b in the question"

Researcher : “That's right, your answer is the same as the question asked. You should change the command sentence that you read in the question into the form of the main question, not rewrite the question presented in the question."

SHK : "Yes ma'am, I did that because I was confused about writing down what I meant in my own language"

In the interview session, he explained that SHK actually understood the intent of the questions presented in questions 1, 2, and 3. However, SHK felt confused in presenting the intent of the questions he was thinking about in written form. This situation is related to students' ability to explain an idea or mathematical situation in written form. In line with Hikmawati et al. (2019) who stated that students have good communication skills if students are also able to identify important information asked in problem-solving questions.

After SHK successfully passed the first stage, namely being able to understand mathematical problems as demonstrated by SHK's ability to write known information and question sentences in the problem, then SHK continued the problem-solving stage to the strategy planning stage. At this stage, SHK did not get a perfect score on the answer results because SHK did not provide a clear explanation or description of the steps or procedures that would be carried out. In the questions presented, there is information that there are several shopping items purchased by Mrs. Minah. We can find out the remaining money that Mrs. Minah has by subtracting the nominal value of the money that Mrs. Minah brought with the total price of Mrs. Minah's purchases, which must be known first. The total price that Ms. Minah must pay can be found by adding up the calculated unit price of the item to the number of each item purchased by Ms. Minah. The steps that SHK should take are to explain or write down the general steps that SHK will take in the form of explanatory sentences, mathematical models, and mathematical symbols.

In fact, SHK did not write down the stages or second steps according to indicators of mathematical problem-solving ability, but SHK directly wrote down the calculation operation of reducing the value of the money that Mrs. Minah brought with the total value of Mrs. Minah's purchases as in Figure 4 below.

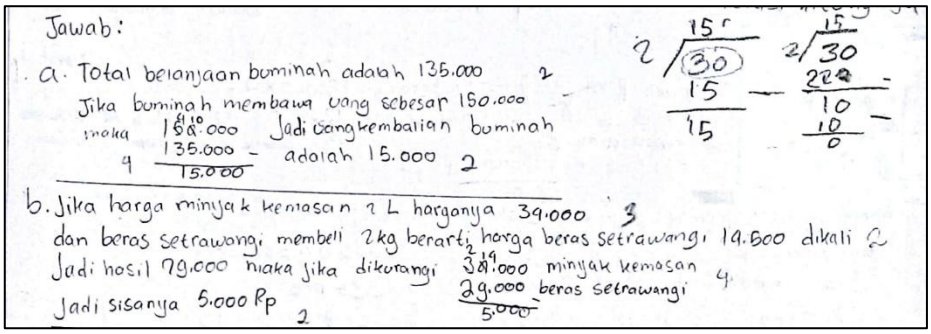


Figure 4. SHK's Answer According to the Second Step of Problem-Solving

Figure 4 shows that SHK has very good abilities in carrying out subtraction calculation operations, such as on the answer sheet, namely determining the subtraction result of 150.000 – 135.000 and the subtraction result of 34.000 – 29.000. Based on the results of the answers written, SHK understands the technique of borrowing and storing numbers in multi-level subtraction arithmetic operations. However, there is evidence that SHK made a mistake in carrying out the division calculation operation. This is proven in the small note located on the right side of the answer sheet. At first, SHK immediately divided the number 30 directly by the number 2 and produced the answer 15. The next step that SHK should have was to multiply the number 15 by the number 2 to produce the value 30 which was then placed directly below the number being divided, namely the number 30 until it produced a final remainder with a value of 0.

Each indicator of problem-solving ability was able to be met very well by SHK, although there were still several errors made at several stages of problem-solving. SHK's ability to re-examine the steps taken from start to finish and the results of the answers is demonstrated by a conclusion that is written completely and correctly. Of the many students who took the written test, only SHK achieved a perfect score in writing conclusions completely and correctly on numbers 1, 2, and 3.

Answer Results of Students with Medium Ability

MAZ's mathematical problem-solving ability in the first indicator, namely in understanding the problems presented, is included in the quite good category when viewed from the score obtained per indicator. When seen empirically, the answer sheet that MAZ has worked on can show that MAZ was simply not careful in completing all the information that was known and asked about the questions. However, if we look further at the results of the work at the planning

and implementing strategy stages, MAZ did not write the correct answer at all according to what was asked for in the question. This is an interesting finding that students' ability to write information in the questions does not necessarily mean that students are able to have good representational skills in understanding the meaning or essence. The results of MAZ's answers are shown in Figure 5.

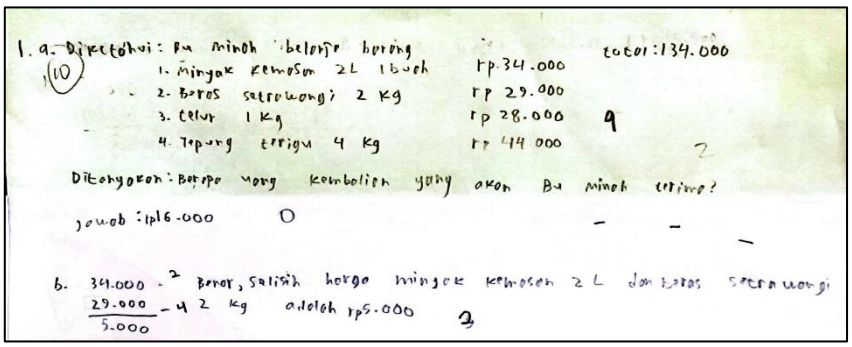


Figure 5. MAZ's answer on Number 1

In the next step, an interview test was carried out with the aim of finding out how MAZ carried out each step of problem-solving and why MAZ did not write down the procedures and solutions until the last step to produce a conclusion.

Researcher : "Are you having trouble when you solve number 1? I see your answer in number 1 is not accompanied by the steps."

MAZ : "Yes ma'am, I'm confused about how to do it"

Researcher : "Haven't you written down what is known and asked in the question?"

MAZ : "Yes, what is asked is how much the change will Mrs. Ratih receive."

Researcher : "Do you understand the information presented in the question?"

MAZ : "I understand ma'am actually. I have also added everything up, what should I do next? Because I'm confused, so I skip this question for now."

Researcher : "In your opinion, have you written down all the information you need in the question?"

MAZ : "Yes."

Researcher : "Are you sure? Check it again!"

MAZ : "Yes ma'am, it turns out there is information that I didn't write down"

Researcher : "What is that?"

MAZ : "Amoun of Mrs. Minah's money"

Researcher : "That's right, you're not detailed enough in writing down the information presented in the question"

The results of the interview showed that MAZ felt confused about some of the information presented in the questions. The amount of information presented in the questions made MAZ confused about what steps MAZ should take to solve question number 1, so MAZ decided to skip question number 1a and continue working on question number 1b, which according to MAZ was easier to understand. The results of the analysis from the interview session explained that MAZ's difficulty in determining what steps to take next was because MAZ did not write down very important information as the key to solving question number 1a. MAZ does not interpret in detail all the information presented in the questions, but MAZ only writes down the parts known and asked about by copying and pasting the complete information. MAZ's difficulty in understanding the problem will make MAZ difficult to determine the strategy or steps to be taken.MAZ's difficulties in understanding mathematical problems also did not only appear in solving problem number 1, but also appeared in solving problems number 2 and 3. Based on the answer sheet, it shows that MAZ did not write down the information he knew correctly. MAZ students do not write supporting information in the form of information or facts on the questions. Figure 6 below shows the results of MAZ's answer to number 2.

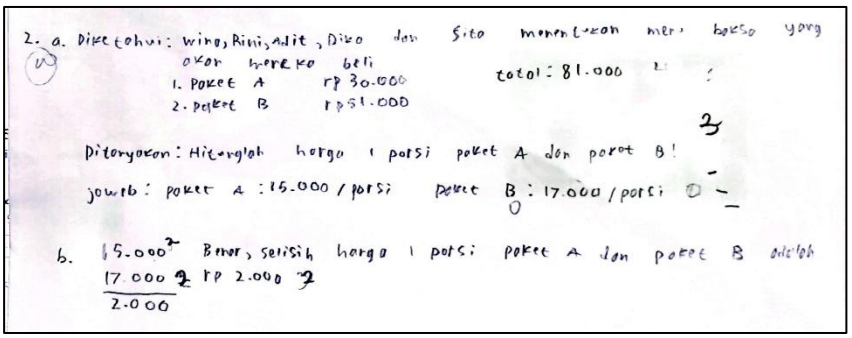


Figure 6. MAZ's answer on Number 2

Based on the MAZ answer result sheet, MAZ only wrote down the total price of package A and package B, both of which contain supporting information as a key that can help MAZ in carrying out further calculation operations until finding the answer regarding the unit price of package A and package B. Saparwadi (2022) stated that students' ability to understand the problem is viewed from the student's ability to identify information and facts about the problem presented, identify the information that is being questioned, and identify supporting information. The situation that occurs at MAZ regarding the ability to understand problems is certainly related to the ability to read and understand. Laily (2014) stated that reading comprehension ability can be interpreted as a process carried out by students in actively involving the knowledge and experience they have with the reading they read to obtain the meaning of the reading read by students. In other words, students' activities in reading

questions aim to enable students to retell the story contained in the questions in their own words.

In the process of solving problem number 1b, evidence was found that MAZ did not include the strategy that MAZ chose in solving the problem. There is no specific explanation regarding how MAZ could write that to find out the price of 2 kg of rice, you need to multiply the price of rice per kilo by the number of kilos of rice that Mrs. Minah bought. Furthermore, MAZ needs to perform an arithmetic operation to subtract the price of 2 liters of packaged oil from 2 kg of Setrawangi rice. MAZ stated that MAZ actually understood that the value of 29,000 was the result of the calculation of 14,500 x 2. However, he did not include how to sequentially answer question number 1b. Figure 6 also shows MAZ's error in carrying out the subtraction calculation operation. The initial suspicion was that MAZ simply made a mistake in writing the correct arrangement of numbers when carrying out the sequential subtraction arithmetic operation. However, in Figure 7 further evidence is found that MAZ is still wrong in understanding the method or flow of sequential reduction.

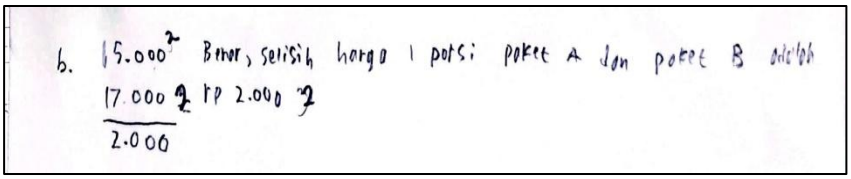


Figure 7. MAZ's answer on number 2b

The interview process was carried out again at MAZ to find out whether MAZ had misconceptions about carrying out sequential reductions. Ozkan (2012) defines misconception as an error in conceptualizing what is considered correct into a habit. Misconceptions can occur because students' low understanding of a concept will encourage students to make their understanding of the concept that students understand.

Based on interviews that have been conducted, it is known that MAZ feels confused about carrying out sequential reductions. MAZ thought that if the numbers 5 and 7 were subtracted, they would produce the value 2. The situation experienced by MAZ was related to MAZ's understanding of positive and negative integers and the value of the thousands place which was still wrong. MAZ should have been able to know that 17.000 is a number with a greater value than 15.000, so MAZ should have written 17.000 in the upper order and 15.000 in the lower order. This MAZ error is included in the random error caused by students' lack of understanding in understanding the basic concept of subtraction. In line with Arnidha (2015) who stated that mistakes made by students in working on subtraction arithmetic operations can be caused by students' lack of concentration, students' lack of understanding in carrying out transfer techniques for subtraction, and limited time. The mistakes that students usually make in subtraction operations lie when students subtract small numbers from larger numbers.

MAZ's mistake in carrying out the subtraction calculation operation also resulted in an incorrect final result. The results of wrong answers will also lead to incorrect conclusions in the student's mathematical problem-solving process. This is proven by the results of MAZ's answer which does not include a conclusion on the question.

Answer Results of Students with Low Ability

Based on the results of student answers and interview activities that have been carried out, DSY students have a low ability to solve problems in questions number 1, 2, and 3. DSY students have not been able to solve problems with the right plans, procedures, answers, and conclusions for each number. Only in number 1 did DSY write down the information he knew and asked about in the problem, but did not continue with planning an effective strategy in solving problem number 1. The results of DSY's answer in solving number 1 are shown in Figure 8.

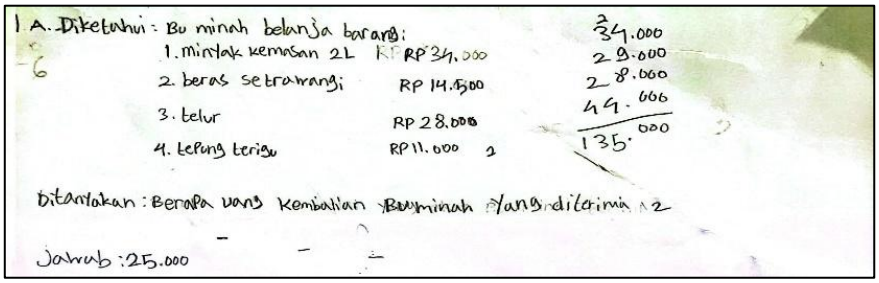


Figure 8. MAZ's answer on Number 2a

In the next step, Next, an interview session was conducted with DSY to determine whether DSY experienced any obstacles in understanding the problems presented in the questions or not. In the interview session, DSY explained that the reason DSY did not complete the solution to problem number 1 was because DSY did not understand what was meant in the question and DSY was confused about how to answer question number 1.

Researcher : “Why didn’t you write your answer until the end? Is there any difficulty?”

DSY : “I don’t understand”

Researcher : “Which part do you not understand?”

DSY : “All of it, ma’am!”

Researcher : “Do you understand the problem presented in the question?”

DSY : “No, ma’am!”

Researcher : “But, why can you write your answer like this?”

DSY : “I don’t understand, so I asked my friend”

Then, the researcher asked DSY about the reasons and how DSY wrote down the information regarding Mrs. Minah's total purchases of IDR 135.000, while DSY himself said that DSY did not understand what was meant in the question. The interview results provide an illustration that DSY actually asked other students for answers on how to calculate the total cost of Mrs. Minah's shopping. DSY carried out every instruction given by his friend where DSY multiplied the price of 2 kg of rice bought by Mrs. Minah by Rp. 14.500/kg and multiplied the price of wheat flour by Rp. 11.000/kg by the number 4 even though DSY did not understand the reason why he had to do this.

The situation experienced by DSY is certainly related to students' low reading comprehension abilities. Relevant research was conducted by Almadiliana et al. (2021) regarding the relationship between students' reading comprehension ability and students' ability to understand mathematics problems. The results of the research show that there is a positive and significant relationship between the ability to read and understand mathematics story problems. Students who have high reading comprehension abilities will also have high abilities in understanding mathematical stories. Research by Almadiliana et al. (2021) is in line with research by Andanik & Fitrianawati (2019) which also reveals that there is a significant influence between reading comprehension skills and the ability of fifth-grade students to solve mathematical problems.

The obstacles that DSY faced in the first mathematical problem-solving step, namely the indicator of understanding the problem, certainly had a serious impact on DSY in carrying out the next problem-solving stages. On answer sheets number 1, 2, and 3, DSY did not write down the problem-solving strategy that DSY would use. There were also no calculation operating procedures that DSY wrote on the three questions given, so DSY got a very low score on the mathematical problem-solving ability test. Apart from obstacles regarding DSY's ability to understand the problem, Figure 9 shows the mistakes that DSY also made when trying to answer question number 1b.

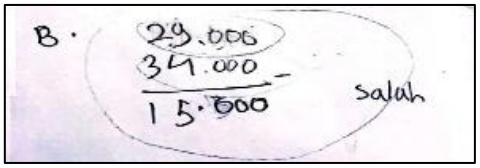


Figure 9. DSY's answer on Number 2b

Just like MAZ writes numbers with larger values at the bottom in the short-order subtraction technique. Meanwhile, the smaller number values are placed at the top. The subtraction arithmetic operation carried out using a short-order technique on the value of thousands has

been empirically carried out correctly by DSY, namely by subtracting the number 9 from the number 4, where the value of the number 9 is greater than the value of the number 4. Then, in the operation of calculating the value tens of thousands, DSY has also carried out the correct subtraction calculation operation procedure, namely subtracting a larger number from a smaller number, number 3 and number 2. Based on empirical evidence in the results of DSY's answer, it can be seen that DSY already understands the concept of subtracting whole numbers which is done by subtracting larger numbers from smaller numbers. Even when subtracting using the second subtraction technique, the number tens of thousands is still wrong. The errors that occur can also be influenced by DSY's understanding of the place value of tens of thousands. However, the interview results do not show that DSY has a poor understanding of comparing two tens of thousands. DSY stated that DSY knew very well that 34.000 had a greater value than 29.000 so the error in calculating operation number 1b was only due to DSY's lack of understanding in placing numbers in the short-order subtraction technique.

CONCLUSION

Based on the results of the analysis and discussion regarding the mathematical problem-solving abilities of fifth-grade elementary school students in the material on whole number counting operations, it shows that problem-solving abilities are dominated by students in the low category. Students with mathematical problem-solving abilities in the low category were at a percentage of 77.4%, in the medium category at 9.7%, and in the high category at 12.9%. The problem-solving abilities of students in the high category can go through each stage of problem-solving according to Polya very well. It's just that several mistakes are still made by students with high problem-solving abilities, namely mistakes in writing down the information asked for in the question, where this aspect is included in the problem-solving indicators at the stage of understanding the problem. Furthermore, the problem-solving abilities of students in the medium category still experience difficulties in understanding the problems presented in the questions. Students with moderate abilities also often make mistakes in writing down the information known in the questions in full for each question number and experience difficulty in carrying out short-order subtraction techniques correctly. In addition, students with low problem-solving abilities are not able to understand the problems presented in the questions well, so students have difficulty carrying out the next problem-solving steps, namely the step of making and implementing a plan, as well as re-checking the steps that have been taken by students. Problem solving skills are still relatively low, so it is necessary to improve students' abilities in all indicators, especially in understanding problems.

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