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ANALYSIS OF STUDENTS' ABILITY TO SOLVE MATHEMATICAL PROBLEMS ON CONTEXTUAL PROBLEMS INVOLVING ALGEBRAIC FORMS

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Abstract

This research is motivated by the fact that problem solving is a basic ability that every student must have. However, observations in the field show that students' mathematical problem-solving skills, especially in the material of algebraic form operations, are still relatively low. This study aims to describe students' mathematical problem-solving skills based on Polya's theory, which consists of four stages: (1) understanding the problem, (2) planning problem solving, (3) implementing the plan, and (4) re-examining the results. This study involved 26 ninth grade students as subjects. The method used was descriptive qualitative with data collection techniques including tests, interviews, and documentation, data analysis conducted based on four levels of problem-solving ability: excellent, good, sufficient, and deficient. The results showed that students' mathematical problem-solving ability on algebraic form operation material obtained as a whole was still relatively low with a scale of 42%. The implications of these findings indicate the need for the alication of more varied and contextualized teaching strategies to improve students' problem-solving skills. This research can be the basis for teachers in providing further assistance to students who are experiencing difficulties, focusing on improving skills in understanding and solving mathematical problems as a whole.

Keywords: *Contextual Problems, Mathematics, Problem Solving Skills*

INTRODUCTION

Education in the 21st century demands that students think clearly, critically, rationally, and confidently when studying mathematics at all levels of schooling. Engaging with mathematical concepts can enhance academic abilities and train students to be independent in addressing problems that arise in various questions, including those encountered in daily life (Annisa et al., 2023). One of the objectives of mathematics education is for students to engage in problem-solving, which encompasses problem understanding, model design, solution execution, and solution interpretation (Latifah & Luritawaty, 2020).

Problem-solving is a crucial aspect of mathematics education. It is a

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systematic way of thinking aimed directly at finding solutions to existing problems (Azhar et al., 2021). Problem-solving serves as a valid experimental test for studying innovations and conceptual models that can provide recommendations for future research (Rahmawati et al., 2022). Problem-solving ability is the process of addressing difficulties encountered in order to achieve desired goals (Putri et al., 2019). Teaching problem-solving skills is a learning process that encourages students to actively engage, enabling them to effectively accept and respond to posed questions and to address challenges in problem-solving (Siagian et al., 2019; Irsyadi et al., 2022). Students must develop problem-solving skills to prepare them to manage various challenges and increasingly complex issues encountered in daily life (Septiani & Nurhayati, 2019).

The problem-solving abilities of each student vary, as evidenced by several research findings. The low problem-solving abilities are experienced at nearly every educational level, from elementary school to higher education (Sumartini, 2018). Previous research concluded that the percentages of students engaging in the stages of understanding, planning, solving, and checking were 7%, 71%, 49%, and 42%, respectively. Not all students could accurately perform the stages of understanding, planning, solving, and checking, which is attributed to their varying thought processes. The indicator for checking back is the lowest in percentage, indicating that students do not revisit their understanding of the problem, the strategies they have devised, or execute their plans accurately, resulting in suboptimal answers. In the context of problem-solving, students' success is not solely measured by the final result but also by the process of obtaining the answer (Kurniawan et al., 2019).

The reality on the ground also indicates that students' abilities to solve problems, particularly in mathematics, are classified as low (Dalimunthe & Ramadhani, 2021). Research by Anggraeni & Kadarisma (2020) revealed that 2 subjects reached Level 1, 2 subjects reached Level 2, 1 subject reached Level 3, and 1 subject reached Level 4. At Level 1, subjects were unable to understand the problem, formulate a solution plan, execute the plan, or check their work. At Level 2, subjects could correctly understand the problem. At Level 3, subjects could understand the problem, formulate a solution plan, and execute the plan, but did not check their work. At Level 4, subjects were able to understand the problem, devise a solution, execute the plan, and check their work accurately.

Both studies indicate that students' problem-solving abilities vary. This diversity in problem-solving skills is further suorted by previous research, which states that students' problem-solving abilities are divided into several levels due to a lack of understanding of information, insufficient ability to create mathematical models, and a lack of precision in solving problems (Leonisa & Soebagyo, 2022). Mastery of problem-solving skills in mathematics remains weak, with misunderstandings present even in the conceptual understanding process (Mitasari & Murtiyasa, 2023).

The mathematical problem-solving abilities of students can be

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analyzed within the context of algebraic material in mathematics education. Algebra serves as the foundation for a journey that equips learners with the skills necessary to tackle more complex problems (Kusuma et al., 2021). In the curriculum implemented in Indonesia, algebraic expressions are one of the mathematics topics explicitly taught at the junior high school level, specifically in seventh grade. One of the algebraic topics covered is the operations involving algebraic expressions. These operations are mathematical concepts that can be alied in daily life and serve as prerequisites for subsequent topics, making it essential for students to master them. It is important for students to understand and grasp the concept of operations with algebraic expressions to avoid difficulties in alying algebraic material in both mathematics lessons and everyday situations.

The types of problems involving operations with algebraic expressions are closely related to everyday life, making them suitable for presentation in the form of contextual problems. Aprilia et al. (2024) state in their research that learning algebra is more enjoyable when connected to real-life issues. Teachers are encouraged to use teaching aids or media to explain concepts related to algebra. This highlights the importance of alying algebra in daily life by linking algebraic concepts with real-world problems, thereby clarifying the significance of understanding algebraic material for various alications beyond the classroom.

The topic of operations with algebraic expressions requires understanding at each step of the solution process. Betha (2021) notes that the ability to solve mathematical problems, particularly involving operations with algebraic expressions, is still low, leading to frequent errors. This finding is consistent with Anggraini & Lestari (2022), who state that some students perceive operations with algebraic expressions as difficult to understand due to the need for precision and problem analysis.

Based on the aforementioned issues, a more in-depth analysis is necessary to understand students' mathematical problem-solving abilities in addressing contextual problems and to identify the underlying factors. According to Polya, there are several steps to analyze students' mathematical problem-solving skills. The indicators of mathematical problem-solving used according to Polya, as cited in Mitasari & Murtiyasa (2023), include: (1) understanding the problem; (2) planning the problem-solving process; (3) solving the problem according to the plan; and (4) checking the accuracy of the results or answers. These steps are expected to facilitate students in working on problems and allow researchers to identify the variations in students' errors that could be addressed to achieve accurate and correct solutions.

This study aims to analyze the mathematical problem-solving abilities of seventh-grade students at Muhammadiyah 4 Junior High School in Pekanbaru when addressing contextual problems related to operations with algebraic expressions using Polya's steps. The research analyzes students' problem-solving abilities at each stage of the problem-solving process. It is hoped that this

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study will serve as a foundation for teachers to provide assistance to students who encounter difficulties in the mathematical problem-solving process.

METHOD

This study aims to describe the problem-solving abilities of students at Muhammadiyah 4 Junior High School in Pekanbaru regarding operations with algebraic expressions based on Polya's Theory. This research employs a qualitative descriptive aroach. Descriptive research is a fundamental form of study that aims to describe or depict existing phenomena, whether they are natural occurrences or human-engineered situations. The researcher only describes the sample's abilities, specifically their problem-solving skills, without administering any treatments. The subjects of the study are 26 students from class IX 1 at Muhammadiyah 4 Junior High School. Through problem-solving ability tests, a sample of 4 students was selected, representing various levels of problem-solving skills: very good, good, adequate, and poor. The data collection techniques used include tests, interviews, and documentation.

The interview activities consisted of questions posed by the researcher to the teacher regarding the usual classroom learning processes, as well as interviews with students concerning their aroaches to solving the problems provided. Subsequently, to obtain authentic evidence, documentation of the research activities was conducted, demonstrating that the implementation of this study occurred in a real and tangible manner.

The students' responses were analyzed and assessed. Polya, as cited in Mitasari & Murtiyasa (2023), identifies four levels of problem-solving ability: very good, good, adequate, and poor. This is illustrated in Table 1.

Table 1. Steps in Students' problem-solving as viewed through polya's steps

Problem-Solving Steps		**VG**	**G**	**A**	**P**
Understanding the Problem	Students are able to accurately identify the information that is known and what is being asked in the problem	√	√	√	√
Formulating a Problem-Solving Plan	Students are able to utilize all relevant information from the problem and plan a solution or problem-solving aroach	√	√	√	
Implementing the Problem-Solving Solution	Students are skilled in algorithms and accuracy in answering problems	√	√		
Checking Back	Students verify the correctness of the solution by examining the weaknesses of the obtained solution, such as identifying any incorrect steps	√			

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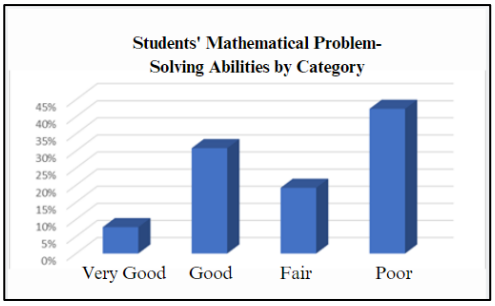
RESULTS AND DISCUSSION

This study was conducted by providing two open-ended test questions aimed at describing the mathematical problem-solving abilities of ninth-grade students in class IX 1 at Muhammadiyah 4 Junior High School in Pekanbaru, specifically on the topic of operations with algebraic forms. The research obtained data on students' mathematical problem-solving abilities, which is illustrated in Figure 1.

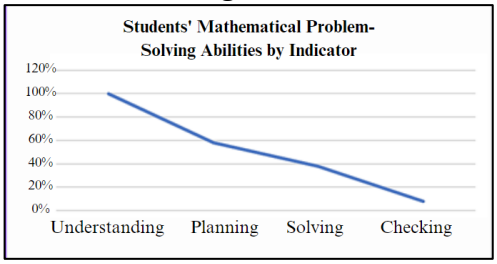


Source: Primary Data, Year: 2024

Figure 1. Graph of students' mathematical problem-solving abilities by category

Based on the primary data obtained, it is evident that students possess varying levels of ability. The results indicate that the students of class IX-1 at Muhammadiyah 4 Junior High School in Pekanbaru have a mathematical problem-solving ability at a poor level, which is the lowest category. Primary data refers to information collected directly from sources and provided to the researcher (Sugiyono, 2016). In this study, the primary data was obtained through written test assessments, interviews with research subjects, and direct observation in the field**.**

In general, the results of students' mathematical problem-solving abilities in solving problems related to operations with algebraic forms, based on the research indicators, are summarized in Figure 2.



Source: Primary Data, Year: 2024

Figure 2. Graph of students' mathematical problem-solving abilities by indicator

The results indicate that students at Muhammadiyah 4 Junior High School in Pekanbaru have the highest percentage in accurately determining the known information and what is being asked in the problem, specifically in the Understanding indicator. Students faced difficulties in solving problem-solving tasks in the Solving and Checking indicators, with percentages of 38% and 8%, respectively.

Results of Problem-Solving Ability in Students at the Very Good Level

In the first stage, students are required to create a representation or illustration if possible, identify specific cases, and attempt to understand the problem in a straightforward manner. The results of the students' work are as follows.

a. Stage 1 (Understanding)

As shown in Figure 3, the student accurately recorded the known information and the question being asked.

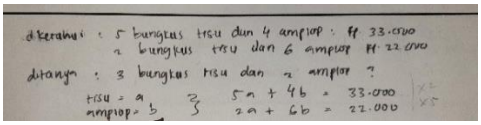


Figure 3. WN's response at the understanding stage

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During the interview, the subject also demonstrated a good understanding of the information presented in the problem. This is evident from the interview excerpt, which indicates that the subject could articulate the problem in their own words.

P : What information can you write from the presented problem?
S : In the problem, it is stated that the price of 5 packs of tissues plus 4 envelopes is 33 thousand rupiah, and the price of 2 packs of tissues plus 6 envelopes is 22 thousand rupiah.
P : What steps will you take next?
S : I will let a represent tissues b represent envelopes. Then, I will replace the word "tissues" with the symbol a and "envelopes" with the symbol b, and rewrite the mathematical expressions accordingly.

In the interview, the subject WN documented what was known and what was being asked in the problem. Furthermore, WN demonstrated the skill to articulate the information presented in the problem, as expressed by Tambychik and Meerah in Nuraini (2019), which states that the ability to express numerical facts involves understanding the information that arises from the problem.

b. Stage 2 (Planning)

The planning and designing stage of the solution involves systematically outlining the aroach to solving the problem, determining what actions to take, how to execute them, and the expected outcomes. At this stage, it was found that the student wrote a solution plan on the answer sheet, as seen in the following student's response sheet (Figure 4).

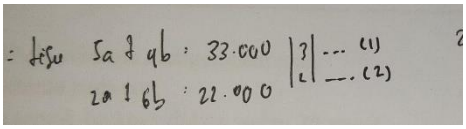

Figure 4. WN's response at the planning stage

At the planning stage, the subject WN wrote the mathematical equations based on the information obtained from the problem. WN also labeled them as Equation 1 and Equation 2 before proceeding to the next steps in the solution process. WN explained this in the following interview:

P : After obtaining information from the problem, what is your next step in solving it?
S : I will perform the subtraction process to find the value of x. So, I will arrange the equations so that they can be subtracted.
P : What do the equations 1 and 2 that you wrote there mean?
S : So that after I find the value of x, I can directly substitute it into one of the equations, either Equation 1 or Equation 2.

Subject WN completely outlined the solution plan. During the interview, WN responded in their own words and understanding, yet they were still able to explain the process in a coherent and accurate manner.

c. Stage 3 (Solving)

The third stage is finding the solution to the problem. In the problem-solving stage, the process heavily relies on the student's experience to be more creative in formulating a solution. At this stage, it is evident that subject WN completed

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the solution plan using the correct procedures, leading to an accurate result, as shown in the Figure 5.

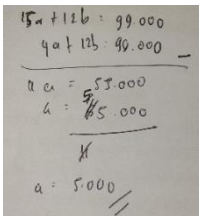

Figure 5. WN's response at the solving stage

WN was able to implement the solution plan by performing calculations and accurately obtaining the price of a, represented as tissues. This is corroborated by the following interview results:

P : Can you complete each of the steps?

S : Yes, I can. After I arranged the equations, I multiplied Equation 1 by 3 and Equation 2 by 2, so they could be subtracted and b would be eliminated. This allowed me to find the value of a, which is 5,000. Therefore, the price of the tissues is 5,000 rupiah. Then, I substituted the value of a back into Equation 1 to find the price of the envelopes.

During the interview, WN was also able to explain accurately, indicating that WN successfully carried out the solution plan effectively and correctly, and the calculations performed by WN were accurate and precise.

d. Stage 4 *(Checking)*

The final stage is to check the solution, which involves specifically reviewing each piece of information and the steps taken, as well as conducting a general review to understand the overall problem and its development. Below are the results of WN's work (Figure 6).

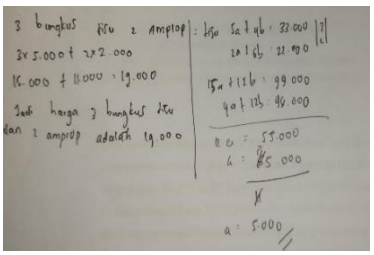

Figure 6. WN's response at the checking stage

As shown in Figure 6, the student was thorough in calculating and completing the solution plan; however, they were less complete in documenting the information during the checking procedure of the solution results. During the interview, it became evident that WN had performed the checking procedure and recorded it on scrap paper, which was not visible on their answer sheet. This can be illustrated by the interview excerpt, which shows that the student was able to articulate the process of checking their answers in their own words.

P : What method did you use to arrive at your answer and how did you confirm its accuracy?

S : When I substituted the values of x and y into the equations in the problem, the results matched the prices correctly.

In the interview, it was noted that WN demonstrated the ability to perform the checking procedure. Although WN did not write this on the answer sheet, they documented it on scrap paper.

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Results of Mathematical Problem-Solving Abilities in Students at the Good Level

In the first stage, students are required to create a representation or illustration, if possible, identify specific cases, and attempt to understand the problem in a straightforward manner. The results of the students' work are as follows.

a. Stage 1 (Understanding)

As shown in Figure 7, MS thoroughly recorded the known information and what was being asked, even presenting it in an organized and complete manner.

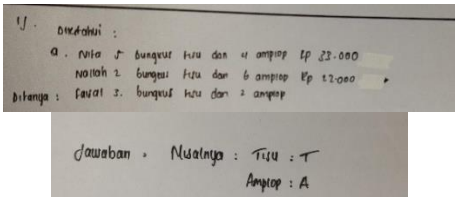

Figure 7. MS's response during the understanding stage

This is evident from the interview excerpt, which indicates that the student was able to articulate the problem presented in the question.

P : What information did you gather from the problem that was presented?

S : It states that the price of 5 tissues and 4 envelopes purchased by Nita is 33,000 rupiah, and the price of 2 tissues and 6 envelopes purchased by Nailah is 22,000 rupiah. The question asks how much Faisal would pay if he buys 3 tissues and 2 envelopes.

P : Why did you represent tissues as T and envelopes as A?

S : So that I can find the values. After I make the substitutions, I simply change the word "tissues" to T and "envelopes" to A, allowing me to obtain the answers later.

In the interview, it was noted that MS demonstrated the ability to understand the problem and adequately recorded what was known and what was being asked in the problem, including the symbols used for the substitutions. However, MS was less complete in expressing the mathematical statements when converting them into symbols, as they directly transformed the information from the problem into mathematical statements during the planning and solving stages.

b. Stage 2 (Planning)

In this stage, it was found that the student recorded the solution plan on the answer sheet, as shown in the following student response (Figure 8).

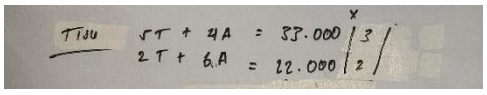

Figure 8. MS's response during the planning stage

In the planning stage, MS wrote the mathematical statements, but did not label them as Equation 1 and Equation 2. MS explained the steps through the following interview:

P : After that, how did you go about solving the problem?

S : I reformulated it using T and A as previously defined, and then I directly equated the numerical values next to a so that when subtracted, the result would be zero. This way, I could determine the value of T for the price of the tissues.

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The results of the interview indicate that MS is capable of creating symbols and forming mathematical statements, but they proceed directly to the calculation and solution processes afterward. MS demonstrates proficiency in planning the solution.

c. Stage 3 (Solving)

The third stage is finding the solution to the problem. In this problem-solving stage, the process heavily relies on the student's experience to be more creative in formulating a solution. At this stage, it is evident that MS completed the solution plan correctly. Below are the results of MS's work (Figure 9).

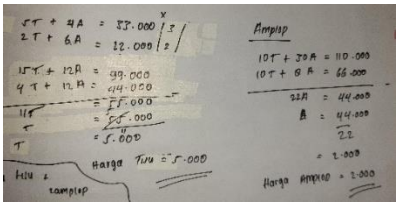

Figure 9. MS's response during the solving stage

MS was able to carry out the solution plan by performing calculations and obtaining the prices of each item, namely the price of one tissue and one envelope. This aligns with Damayanti (2022), whose research indicates that students have a good ability to understand the presented problem, but only a small portion interpret the results of the calculations obtained. This is suorted by the following interview results:

P : Can you complete each of the steps?

S : Yes, I can. I just need to subtract the value of A to find out how much T is. Since I defined T as the price of tissues, that means the price of the tissues is 5,000. Then, I will substitute this back into the first equation to determine the price of the envelopes, and finally, I can calculate how much Faisal needs to pay.

During the interview, MS demonstrated the ability to understand and explain the solution plan.

d. Stage 4 (Checking)

The final stage is to check the solution, which involves specifically reviewing each piece of information and the steps taken, as well as conducting a general review to understand the overall problem and its development. At this stage, it is evident that MS did not revisit their work, as shown in Figure 10.

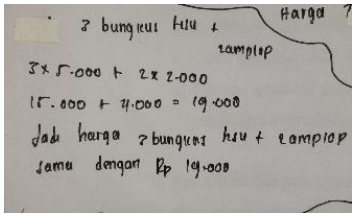

Figure 10. MS's response during the checking stage

As shown in Figure 10, MS did not perform a check on the results of their solution. This aligns with the findings from the interview between the researcher and MS, as follows:

P : How can you be confident in your answer? Have you checked your response again?

S : No, I didn't check it again because I was confident in my answer. I believe I followed the solution process correctly.

From the interview results, it is evident that MS did not perform a re-check of their answer; however, they

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still completed the solution process with correct results. This aligns with the findings of Rezeki et al. (2021), which suggest that students often neglect to review their answers and assume that their solutions are correct.

Results of Problem-Solving Abilities in Students at the Adequate Level

a. Stage 1 (Understanding)

As shown in Figure 11, AU was able to write down the known information, but it was incomplete.

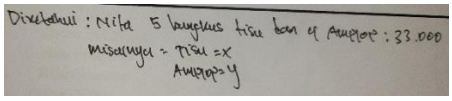

Figure 11. AU's response during the understanding stage

AU also did not include the information that was being asked in the problem. While AU provided some substitutions, the details were lacking. This is evident from the interview excerpt, which demonstrates that AU could articulate the problem presented in the question.

P : What information did you gather from the problem presented?
S : Nita bought 5 packs of tissues and 4 envelopes for 33,000, and then Nailah bought 2 tissues and 6 envelopes for 22,000.
P : Is that the only information you gathered? Is there anything else?
S : Because the question asks for the prices of the tissues and envelopes that Faisal bought.
P : Why didn't you include that information in your answer sheet?
S : I thought that information wasn't important for the question.

In the interview, it was evident that AU had the ability to understand the problem; however, AU did not record the information obtained on the answer sheet. AU also showed uncertainty in transferring knowledge, as symbols and mathematical expressions were written incompletely.

b. Stage 2 (Planning)

The second step in problem-solving according to Polya is planning the solution. This stage involves systematically outlining the aroach to solving the problem, determining what actions to take, how to carry them out, and the expected outcomes. At this stage, it was found that the student wrote a solution plan on the answer sheet, as seen in the following response (Figure 12).

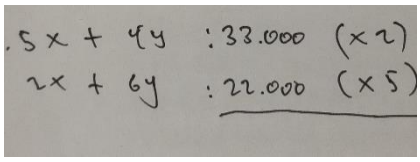

Figure 12. AU's response during the planning stage

At this stage, AU engaged in the planning process, but the response was incomplete. Here are the results of the interview:

P : How do you plan to solve the problem presented in the question?
S : I'll just subtract directly.

The interview results show that AU wrote a solution plan but struggled to provide explanations. This difficulty arose from AU's lack of understanding of why subtraction and multiplication were necessary in the solution process. This aligns with Latifah & Afriansyah (2021), who found that 60% of students experience challenges in explaining

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and interpreting the results of the problems they encounter.

c. Stage 3 (Solving)

The third stage involves finding a solution to the problem. In this phase, a student's ability to creatively formulate a solution is highly dependent on their experience. At this stage, AU exhibited hesitation in continuing the solution process, resulting in an incomplete answer that did not yield a clear and correct final result. Here are the results of AU's work (Figure 13).

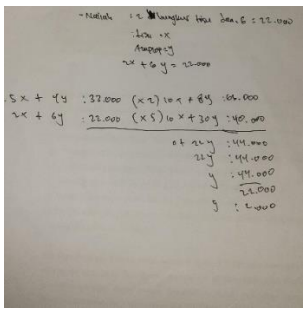

Figure 13. AU's response during the solving stage

AU made errors in executing the solution plan by only writing up to finding the value of Y, without continuing to provide the subsequent steps.

The results of the interview with AU are as follows:

P : Why didn't you write the continuation of the answer on this paper?
S : Yes, I wasn't sure how to proceed with the next steps.
P : Do you remember the concepts of elimination and substitution in solving equations?
S : No, I forgot about them.

During the interview, AU showed limited ability to understand and explain the solution plan as well as the problem-solving process.

d. Stage 4 (Checking)

The final stage involves evaluating the solutions, which comprises a detailed examination of each piece of information and the steps taken to reach a resolution, as well as a broader assessment to understand the overarching issues and their development. At this stage, the subject (AU) does not review the results of their work, as they were unable to complete the resolution plan. Consequently, the subsequent response sheet consists solely of blank pages.

This observation aligns with the findings from the researcher's interviews with AU as follows:

P : Did you check your answer again?
S : No, I did not
P : The value of y that you obtained is correct; however, you did not find the value of the symbol x, which represents the price of the tissue. Please be more thorough next time.
S : Yes,

Based on the results of the interview, AU did not perform any verification or re-examination.

Results of Problem-Solving Skills Among Students at a Poor Level

a. Stage 1 (Understanding)

As shown in Figure 14, the subject FA is able to articulate information comprehensively, including what is known and what is being asked.

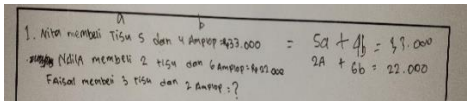

Figure 14. FA's responses at the understanding stage

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This is evident from the interview excerpts, which demonstrate that the subject can narrate the issues presented in the problem.

P : What information did you obtain from the issues presented in that problem?
S : Nita purchased 5 tissues and 4 envelopes for a total of 33 thousand, while Nailah bought 2 tissues and 6 envelopes for a total of 22 thousand.
P : What other information did you gather?
S : What is being asked is the price of the tissue and the envelopes.

In the interview, it was noted that the subject FA has the ability to understand the problem; however, the subject only recorded what was known.

b. Stage 2 (Planning)

The second step of problem-solving according to Polya is to plan the solution. This stage involves systematically designing and planning the solution, determining what actions to take, how to execute them, and what results to expect. At this stage, it was observed that FA wrote a solution plan on the answer sheet, as illustrated in the following response sheet (Figure 15).

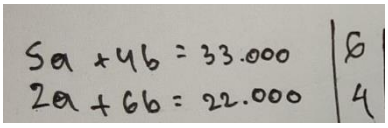

Figure 15. FA's responses at the planning stage

At this stage, FA wrote the solution plan, but it was incomplete. The subject did not provide an explanation that the mathematical sentences represented two equations and did not clearly outline the procedures for the subsequent problem-solving process. The following are the results of the interview:

P : How do you plan to solve that problem?
S : I don't know, I just did it that way.

The interview results indicate that FA experienced difficulty in formulating a plan because they did not understand the concepts of arithmetic operations in algebraic forms. As a result, the subject did not write a correct solution plan. In line with the research conducted by Chabibah et al. (2019) and Wardhani et al. (2022), which states that many students possess mathematical abilities sufficient to understand problems but struggle with planning solutions, even though they may carry out procedures correctly.

c. Stage 3 (Solving)

The third stage is finding a solution to the problem. In this phase of problem-solving, a student's experience significantly influences their creativity in formulating a solution. At this stage, it was observed that FA did not complete the solution because they had not yet grasped the concepts of arithmetic operations in algebraic forms. The following are the results of FA's work (Figure 16).

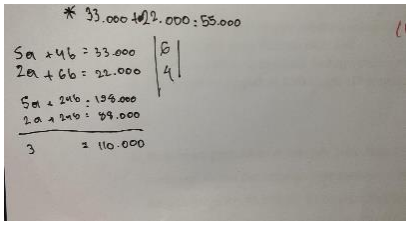

Figure 16. FA's responses at the solving stage

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The subject FA did not plan or execute the solution correctly. The following are the results of the interview with Subject FA:

P : Do you remember the concepts of arithmetic operations in algebraic forms?
S : No, I don't remember.
P : What do you mean by writing 3 = 110,000?
S : I don't understand.

During the interview, FA demonstrated difficulty in understanding and explaining the solution plan, as well as the problem-solving process.

d. Stage 4 *(Checking)*

The final stage involves reviewing the solution, which consists of activities that include a detailed examination of each piece of information and the steps taken to reach a conclusion, as well as a general assessment to understand the overarching issues and their developments. At this stage, FA did not review the results of their work because they did not arrive at a solution. This is evident in the following answer sheet (Figure 17).

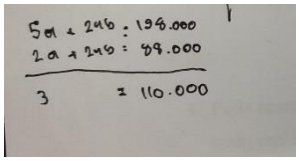

Figure 17. FA's responses at the checking stage

This is consistent with the findings from the researcher's interview with FA as follows:

P : Did you check your answer again?
S : No, I did not
P : Do you think the result of multiplication 3 = 110.000 is correct?
S : I don't understand.

Based on the interview results, FA did not perform a review of their work.

Based on the interviews conducted, it can be concluded that several key factors influence the level of problem-solving ability among students, namely:

1. Insufficient understanding of the concepts of arithmetic operations in algebraic forms. Students who lack comprehension of these concepts will encounter difficulties in solving mathematical problems that involve algebraic operations.
2. Inaccurate planning and problem-solving processes. Students who do not employ aropriate methods during the planning and calculation stages will face difficulties in devising and implementing effective problem-solving strategies.
3. Difficulty in creating mathematical models from contextual problems. Students who struggle to develop mathematical models from real-world issues will find it challenging to connect mathematical concepts with real-life situations.

These factors align with Nadhifa et al. (2019), who state that the factors influencing the level of problem-solving ability among students include a lack of understanding of algebraic operation concepts, the failure to employ aropriate methods during the planning and calculation stages, difficulty in creating mathematical models from provided contextual problems, and the inability to make

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connections and transfer acquired knowledge.

According to Aftriyati et al. (2019), students with very good problem-solving abilities experience difficulties in transferring knowledge. Those at a good level face challenges in understanding and visualizing mathematical concepts. Students with adequate problem-solving skills exhibit weaknesses in calculations, while those with poor problem-solving abilities struggle with making connections and have significant weaknesses in their calculations.

CONCLUSIONS AND SUGGESTIONS

Based on the research findings, discussions, and interviews, it can be concluded that the mathematical problem-solving abilities of ninth-grade students at Muhammadiyah 4 Junior High School Pekanbaru in addressing mathematical issues related to algebraic operations, assessed through the indicators of Understanding, Planning, Solving, and Checking, fall at a poor level, categorized as the lowest. Students with very good problem-solving skills can successfully tackle questions across all indicators: Understanding, Planning, Solving, and Checking. Meanwhile, students with good problem-solving abilities are capable of addressing problems in the indicators of Understanding, Planning, and Solving.

Students with adequate problem-solving abilities can tackle questions in the indicators of Understanding and Planning. Students with poor problem-solving skills are only able to address questions in the Understanding indicator. This situation is attributed to several factors, including students' difficulties in creating mathematical models from provided contextual problems, insufficient understanding of the concepts of arithmetic operations in algebraic forms, and their inability to perform the necessary calculations effectively.

The researcher recommends that the school and teachers increase the variety of problem-solving questions. Since the subjects and materials of this study are still limited, future research should aim to encompass a broader environment. Conducting studies in various schools with different backgrounds will provide a more diverse perspective on students' abilities, variations in learning, and will be more representative and relevant for a larger student population.

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