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Analysis of Students' Mathematical Problem-Solving Ability in Term of Multiple Intelligence

Dian Mayasari[1*], Irmawaty Natsir[2], Abdul Rachman Taufik[3]

[1,2,3]Mathematics Education Department, Universitas Musamus, Indonesia
*Email: *mayasari_fkip@unmus.ac.id*

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Abstract. *Many factors can influence students' ability to solve mathematical problems, and one of them is intelligence. The purpose of this study was to describe problem-solving abilities in terms of dominating multiple intelligences. The descriptive qualitative design was used for this investigation. The subjects of this study were six 7th-grade students chosen through purposive sampling based on dominating intellect in a group of six students. The data for this study were gathered through the use of validated questionnaires, interviews, and tests. The data analysis, which comprises data reduction, presentation, conclusion. Findings of this study show that pupils with naturalist, interpersonal, kinesthetic intelligence are able to solve problems according to plan, and loocking back when they are incorrect. Students with dominating intelligences such as linguistic-verbal, logical-mathematical, and visual-spatial can plan, conduct step-by-step rechecking of the solution to a problem that has not yet been finished. Furthemore, the effect of various intelligences can solve mathematics problems successfully.*

Keywords*: multiple intelligence, problem-solving ability, mathematics learning*

Introduction

Today's rapid technological advancement allows us to gain a better understanding of the world (Arifin, Pujiastuti, & Sudiana, 2020; Latifah & Widjajanti, 2017). Technology has an influence on education as well, making it more meaningful and allowing students to study in the context of their life (Jatisunda & Nahdi, 2020). Changes in communication technologies have an influence on education, and one of the courses that has an affect is arithmetic. Mathematical notions ranging from elementary to sophisticated, systematic concepts that impact human existence play an essential part in technological advancement (Nasri, Rahimi, Nasri, & Talib, 2021). Thus, the goal of educational objectives, particularly in mathematics, is to improve student thinking processes and carry out the learning process in accordance with the students' everyday situation. To increase student thinking, we require adaptability to technology and students' daily life.

The National Council of Teachers of Mathematics (NCTM) defines five required skills for pupils, one of which is problem-solving (NCTM, 2000). Problem-solving is essential for pupils to enhance their cognitive skills. One component of it is problem-solving, in which pupils may use past information (Hobri, Tussolikha, & Oktavianingtyas, 2020; Silwana, Subanji, Manyunu, & Rashahan, 2021; Suryaningtyas & Setyaningrum, 2020). Problem-solving is important to use in the classroom because it allows students to 1) improve their

thinking skills, 2) choose appropriate problem-solving strategies, 3) have a confident attitude when solving problems, 4) improve students' ability to connect previously studied material, 5) improve students' abilities in evaluating problem-solving they have done, and 6) increase a cooperative attitude (Dewi, Mahayukti, & Sudiarta, 2019; Sumadi, Putra, & Astutik, 2018). Kurniawan contends that studying realistic mathematics through Lesson Study Learning Community (LSLC) has met the indications of problem-solving abilities, notwithstanding the urgency of the need to develop student problem-solving abilities, particularly in learning mathematics (Kurniawan, Putri, & Sunaryati, 2020). Learning realistic mathematics through Lesson Study Learning Community (LSLC), according to Kurniawan, may help students be engaged in their groups and create innovative ideas. Learning through open questions makes learning activities more successful. This is consistent with the findings of (Aryaningsih, Mahmud, & Arsyad, 2016) that open questions can increase learning results.

Each pupils in the classroom has a unique intellect, which results in a unique learning style (Sumadi et al., 2018). Learning activities should be carried out with an eye on each student's intelligence, so that learning activities in the classroom are more relevant for pupils (Kurniawan et al., 2020; Wijaya & Sudarmin, 2016). Each class has a distinct personality and intellect, which is referred to as a distinctive multiple intelligence (Eminita & Astriyani, 2018; Sumadi et al., 2018). Learning in terms of the various intelligences that students possess will improve the effectiveness and quality of their actions (Winarso, 2014). Multiple intelligence refers to the many intelligences that pupils possess (Eminita & Astriyani, 2018). Gardner identified eight kinds of intelligence: verbal-linguistic intelligence, mathematical-logical intelligence, spatial-visual intelligence, physical-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence, and naturalist intelligence.

Students with verbal-linguistic intelligence can successfully utilize language (Suarca, Soetjiningsih, & Ardjana, 2016). Students are taught to write and read a variety of literature in order to improve their skills (Setiawan & Nisa, 2018). Students with logical-mathematical intelligence can rationally evaluate an issue or intuitively discover mathematical patterns (Suarca et al., 2016) To improve pupils' thinking skills by presenting them with reasoning challenges (Latifah & Widjajanti, 2017). Students with spatial-visual intelligence may readily visualize geometric pictures as graphs. Students with physical intelligence can regulate movement naturally and are given challenges in the form of narrative questions accompanied by attractive images (Latifah & Widjajanti, 2017). Students that have a high level of physical intelligence are able to move with ease.

Musically intelligent students can readily master music, recall tones, and modify them (Karamikabir, 2012). Musical intelligence may be fostered by assigning issues to students and

having them solve them in groups (Mardiana & Indiati, 2020). Students with high interpersonal intelligence can interact effectively and quickly adjust to their surroundings (Suyitno, Sailan, & Tahir, 2020). Interpersonal intelligence may be improved by posing group-solved issues (Wijaya & Sudarmin, 2016). Intrapersonal intelligence allows students to comprehend themselves and their surroundings (Siagian & Sinaga, 2019). Teachers utilize this intelligence to offer chances for pupils to evaluate their skills since this intelligence is more self-aware (Latifah & Widjajanti, 2017). Students with naturalist intelligence are drawn to the natural world, especially animals (Muhibbin, Fathoni, Arifin, & Sufahani, 2019). Students with this intellect may be fostered by presenting them with challenges that they must solve in their heads

Each intelligence develops its skills in a unique manner; this research focuses on how pupils handle issues based on their dominant intellect. Based on the findings of this study, instructors will be able to describe their students' problem-solving ability. Several studies have been conducted in the past due to the significance of multiple intelligences to attention. By paying attention to the intelligence held by students, the potential of pupils in learning activities may be increased (Aziza, 2019).

According to Sumadi's study, each student in the class has various intelligences and diverse solutions (Sumadi et al., 2018). According to Winarso's study, there is a strong impact between the use of multiple intelligence-based learning and problem-solving skills (Winarso, 2014). Students with logical-mathematical intelligence still need to develop their multiple intelligence (Eminita & Astriyani, 2018). In PBL settings, learning mathematics problem-solving based on different intelligences went well (Wijaya & Sudarmin, 2016). Previous study has focused on students' learning techniques in order to provide more engaging learning activities (Sumadi et al., 2018) As a result, the purpose of this research is to characterize students' problem-solving skills in terms of multiple intelligences. This study is intended to offer information and encourage instructors to help children improve problem-solving skills.

Method

This study is a descriptive study using a qualitative method, with the goal of describe problem-solving abilities in terms of dominating multiple intelligences. This research was conducted one of some junior high school in Papua Province. This study was carried out in 7^{th}-grade with 40 students, 21 girls and 19 boys. This study focuses on six students in the odd semesters of 7^{th}-grade junior high school who have multiple intelligences and at least three dominant intelligences. This study included three students with dominant naturalist, interpersonal, and kinesthetic intelligence, as well as three students with dominant linguistic-

verbal, logic-mathematics, and visual spatial intelligence. The subject was then identified using the purposive sampling approach, which is a sampling methodology with specific considerations

Instrument of this study, namely a multiple intelligence questionnaire to see students' multiple intelligences and presented in the form of a simple statement developed (Ariani, Hartono, & Hiltrimartin, 2017). The second instrument used in this study is a problem-solving ability test. This question is used to assess the problem-solving abilities of the students being studied. The problem-solving test questions used in this study were adapted from 7^{th}-grade mathematics books (As'ari, Tohir, Valentino, Sinaga, & Hutapea, 2014). Finally, according to Polya, unstructured interviews on problem-solving were modified to study indicators that included problem-solving (Abidin, Marwan, & Nazariah, 2017).

This study's questionnaire contained 80 statements, with 10 statements for each intelligence. The questionnaire revealed that four students had linguistic-verbal intelligence, four students had logical-mathematical intelligence, five students had visual-spatial intelligence, six students had kinesthetic intelligence, three students had musical intelligence, seven students had interpersonal intelligence, three students had intrapersonal intelligence, and eight students had naturalist intelligence. This study included three students with dominant naturalist, interpersonal, and kinesthetic intelligence, as well as three students with dominant linguistic-verbal, logic-mathematics, and visual spatial intelligence

The next step is to put in place a mathematical learning model to help student develop their problem-solving skills. The next step is to give a test of students' problem-solving skills. The exam comes in the form of four narrative questions. Following the completion of the problem-solving ability exam, an interview will be held. The questionnaire was split into sections based on the prevailing intellect of the pupils in the class. Naturalist, interpersonal, kinesthetic intelligence; linguistic-verbal, logical-mathematical, visual-spatial intelligence are the main intelligences. Three students were chosen from each dominating intelligence to be questioned in detail.

The data was analyzed using the purposive sample method for each dominating intellect. Subjects chosen on a limited scale seek to be concentrated and precise in their development through interviews. Data was gathered in two stages: various intelligence data collecting and problem-solving exams. The first stage is to give pupils with an instrument in the form of a questionnaire, followed by a problem-solving skill exam. The previously gathered data was analyzed utilizing problem-solving skills tests and unstructured interviews.

Several intelligence surveys were administered after categorizing each intellect. The multiple intelligence questionnaire contained 80 items and was validated by two educational psychologists. The validator offered suggestions on how to enhance writing and correct certain

inaccuracies by using simple phrases that children might understand. The next step is to estimate the reliability of the instrument with minimum reliability of ≥ 0.70. The reliability results of the multiple intelligence questionnaire and the problem-solving ability test showed that the instruments used were reliable.

Table 1. Questionnaire rubric of multiple intelligence

No	Multiple Intelligence	Description
1	Linguistic-verbal intelligence	1. Good writing skills 2. Be diligent in reading books 3. Has a large vocabulary compared to other children of his age 4. Communicate well
2	Logical-mathematical intelligence	1. Loves things related to numbers 2. Love math 3. likes games related to mathematics 4. Shows an interest in science
3	Visual-spatial intelligence	1. Prefer sports 2. Can express physical feelings at work 3. Having handicrafts 4. Can express something dramatically
4	Kinesthetic intelligence	1. Prefer sports 2. Can express physical feelings at work 3. Having handicrafts 4. Can express something dramatically
5	Musical intelligence	1. Loves art and can play musical instruments 2. He prefers rhythm when speaking or moving 3. More sensitive to sounds found in nature 4. Often repeats songs that have been learned before
6	Interpersonal intelligence	1. Can adapt to peers 2. Having character as a person 3. Have empathy for others 4. Able to teach peers and be a role model for their friends
7	Intrapersonal intelligence	1. Have a strong determination 2. Have a lot of hobbies and interests 3. Prefer to be alone than to gather with others 4. Have better independence and self-confidence than others
8	Naturalist intelligence	1. Sensitive to nature 2. Loves to choose bodies and animals 3. Likes work that is related to nature 4. Talking to others about the environment

Table 2. Multiple intelligence questionnaire samples

No	Statement	Score
1	I like to write poems, notes, stories	
2	I have a good memory for things that were deemed unimportant	
3	I Love word game	
4	I enjoy discussing my ideas	

The test instrument utilized is in the form of narrative questions with integer content. The instruments were prepared in conjunction with an assessment rubric and test grid. (Ariani et al., 2017) grid which can be seen in Table 3.

Table 3. The rubric of test problem-solving abilities.

No	Name	Indicator	Aspect
1	Understanding the problem	1. Focusing attention on relevant and irrelevant in the formation on the problem 2. Able to present the problem	1. Can write down what is known and asked in the problem 2. Can express problems through symbols, shapes etc
2	Devising a plan	1. Understanding the concept 2. Have knowledge and experience in solving problems	1. The data that has been written in the previous step can be completed 2. Can understand the strategies, approaches that can be used in solving problems
3	Carrying out the plan	1. Using a plan to solve problems 2. Check out each stage before writing down the next step	1. Resolve problems according to plan 2. See the suitability of each stage
4	Looking back	1. Looking back each stage of completion 2. Give another solution and in a different way	1. Be seeing the completion according to the previous concept 2. Can solve problems similar to the previous one

The multiple intelligence questionnaire is used to determine each student's level of intelligence. Each multiple intelligence score is totaled together, and the highest score is used to evaluate the intellect of pupils. Table 4 shows the results of the problem-solving ability test, which is graded on a range of 0-100. Interviews with the subject will help to enhance the test findings. The interview may help to explain the outcomes of student completion depending on the prevailing multiple intelligences. Students can comprehend what is intended by the question and translate it into a recognized and asked-for form when it comes to understanding the issue. Students may discover an idea that fits the issue in the aspect of creating a strategy so that it can be a solution to the problem. Plans created by students are not limited to what the instructor teaches, but may also be developed based on the information they possess. In terms of putting the plan into action, students may use the ideas they learned from previous planning to address the issue. Looking back, pupils may see the answer based on the prior implementation plan and can tackle issues that are similar to the previous problem.

Table 4. Problem-solving ability criteria

No	Score Interval	Criteria
A	$80.0 < \bar{M} \leq 100.0$	Very Good
B	$60.0 < \bar{M} \leq 80.0$	Good
C	$40.0 < \bar{M} \leq 60.0$	Enough
D	$20.0 < \bar{M} \leq 40.0$	Less
E	$00.0 < \bar{M} \leq 20.0$	Very less

The dominating multiple intelligence data in student mathematics courses is derived from questionnaire scores given to students prior to learning. Students' scores on each intellect

included in the questionnaire are used to group multiple intelligences. Table 4 displays the grouping results.

Table 5. Problem-solving ability criteria

No	Intelligencies	Many students
1	Linguistic-verbal	4
2	Logis-mathematics	4
3	Visual-spatial	5
4	Kinesthetic	6
5	Musical	3
6	Interpersonal	7
7	Intrapersonal	3
8	Naturalist	8

From Table 5, the dominant intelligence that can be measured is was divided into two sections, namely Linguistic-Verbal Intelligence, Logical-Mathematical, Visual-spatial and Intelligence Naturalist, Interpersonal, Kinesthetic

Results and Discussion

Data on students' multiple mathematical intelligence were derived from the results of multiple intelligence questionnaires administered prior to the implementation of learning. The mathematics multiple intelligences' classification of pupils is based on the trend of students' scores on the relevant intelligence type. Students with the highest scores on specific kinds of intelligence suggest that they have a proclivity towards that intellect. Based on the results of the multiple intelligence questionnaire, there are four students who have linguistic-verbal intelligence, four students who have logical-mathematics intelligence, five students who have visual-spatial intelligence, six students who have kinesthetic intelligence, three students who have musical intelligence, seven students who have intrapersonal intelligence, and three students who have intrapersonal insecurity (Table 5).

Problem-solving Ability

The results of the analysis of critical thinking skills based on the aspects of students' critical thinking skills from all students are shown in Table 6.

Table 6. Test results of students' problem-solving abilities

Aspect	Average score	Criteria
Understanding problem	92.7	Very Good
Devising a plan	91.7	Very Good
Carrying out the plan	66.4	Good
Looking Back	56.2	Enough

According to Table 6, the understanding problem aspect has an average score of 92.7 in the very good category; the foreign exchange aspect of a plan has an average score of 91.7 in

the very good category; the aspect of caring for the plan has an average score of 66.4 in the good category; and the looking back aspect has an average value of 56.2 in the sufficient category. Overall, an excellent category average score of 76.75 was achieved, with the comprehending issue aspect having the highest average and the looking back aspect having the lowest average.

Analysis of problem-solving abilities of research subjects

Understanding the issue, creating a strategy, carrying out the plan, and looking back were the criteria used to assess problem-solving skills given by Polya. On aspect comprehension, the issue student may write down what is known and requested in the problem, as well as represent difficulties using symbols and forms. On the aspect of designing the intended student, the previous stage may be accomplished, grasp the methods, approaches that can be utilized in issue solving. On the aspect of carrying out the intended, the student may address issues in accordance with the plan, assessing the appropriateness of each step. Looking back, students may observe the fulfillment of the previous idea and answer problems comparable to the prior one.

Based on the findings of tests and interviews with various intelligences study subjects the analysis yielded the following results: Linguistic-verbal, Naturalist, Interpersonal, Kinesthetic, Linguistic-verbal, logical-mathematical, visual-spatial.

Table 7. The results of the analysis of problem-solving abilities in terms of multiple intelligences

No	Intelligencies	Aspect Problem-solving Ability				Percentages (%)	Category
		Understanding Problem	Devising a plan	Carrying out the plan	Looking Back		
1	Linguistic-verbal (LV-1)	3	3	2	1	64.3	Good
2	Logis-mathematics (LM-1)	3	4	3	2	85.7	Very Good
3	Visual-spatial (VS-1)	3	2	3	1	64.2	Good
4	Kinesthetic (K-1)	3	3	2	1	64.3	Good
5	Musical (M-1)	3	2	2	1	57.1	Enough
6	Interpersonal (I-1)	3	4	4	2	92.8	Very Good
7	Intrapersonal (In-1)	3	3	1	1	57.1	Enough
8	Naturalist (N-1)	3	4	4	1	85.7	Very Good

According to Table 7, the LV-1 subject has the capacity to answer issues in a good category. The problem-solving skills of LM-1 individuals are exceptional. The VS-1 subject has a strong problem-solving skill. Subjects (K-1) have strong problem-solving skills in their respective categories. M-1's subject has adequate category problem-solving skills. Subject I-1

has a high level of problem-solving skills. Subjects in category 1 have adequate problem-solving skills. N-1 subjects are outstanding problem solvers.

Table 8. The summary of the analysis of problem-solving abilities in terms of multiple intelligence

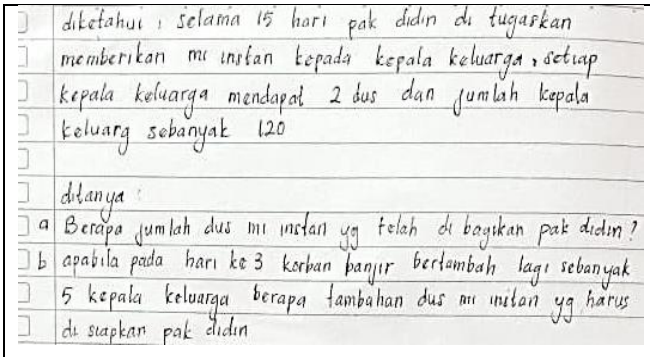
Multiple Intelligences	Percentages (%)	Problem-solving Category
Linguistic-verbal	67.1	Good
Logis-mathematics	94.2	Very Good
Visual-spatial	90.3	Very Good
Kinesthetic	65.4	Good
Musical	57.2	Enough
Interpersonal	61.4	Good
Intrapersonal	42.8	Enough
Naturalist	54.2	Enough

The goal of this study is to characterize students' problem-solving skills based on various intelligences that are students' dominant intelligences. The following indicators of problem-solving abilities were utilized in this study: comprehending the issues, developing a strategy, and implementing the plan. Putting the idea into action and looking back. The subject of this study is 40, and six students were chosen based on their dominating intellect to conduct in-depth analysis of the exam and interviews to collect information on problem-solving tests. The findings of the student analysis were split into the dominating intellect in the class, as shown in the complete description. Naturalist dominant intelligence, interpersonal, kinesthetic; linguistic-verbal, logical-mathematical, visual-spatial dominant intelligence are all included in the lesson.

Three Students with Dominant Naturalist, Interpersonal, and Kinesthetic Intelligences

Stage of Understanding the Problem

At this stage, students have understood the questions being read, with the indicators can make, write down what is known and asked in the questions, can present the problem and focus attention on relevant and irrelevant in the formation contained in the problem, can state it in symbols. At this stage, students identify problems which can be seen in Figure 1.


diketahui : selama 15 hari pak didin di tugaskan
memberikan mi instan kepada kepala keluarga , setiap
kepala keluarga mendapat 2 dus dan jumlah kepala
keluarg sebanyak 120

ditanya :
a Berapa jumlah dus mi instan yg telah di bagikan pak didin ?
b apabila pada hari ke 3 korban banjir bertambah lagi sebanyak
5 kepala keluarga berapa tambahan dus mi instan yg harus
di siapkan pak didin

It is known that for 15 days, Mr. Didin was charged with providing instant noodles to the householders; each homeowner received two boxes, and the total number of householders was 120. Mr. Didin, how many cartons of instant noodles have you distributed? b, if the number of flood victims increases by 5 on the third day, how many more boxes of instant noodles do you need to prepare?

Figure 1. The results of the problem understanding stage test

Figure 1 shows students writing down what they know about the issue and then asking questions about it. When a student writes on a topic that is well-known and often inquired about, it indicates that the subject has fulfilled the signal that the problem is well-understood. This indication of issue comprehension may also be created in the form of a symbol that represents an example of the problem. However, as can be seen from the student's answer in Figure 1, the subject puts the question back in the known and asked form without distinguishing in detail what the primary issue in the problem is. Figure 1 shows that pupils are unable to construct symbols as a description of the issue. This is because pupils believe that just rewriting the issues included in the questions is sufficient. The solution shown in Figure 1 is a classroom habit practiced by the instructor. The attitude of students in finishing the topic in stage 1 may be observed in depth via interviews, as follows:

Researcher	:	*What actions did you take once the questions were provided to you?*
Student	:	*I saw and read about Ma'am*
Researcher	:	*Which question did you read first? Is it all question or question number one?*
Student	:	*I read question number 1 and thought about what is meant in question ma'am*
Researcher	:	*Can you explain what is meant in question number 1?*
Student	:	*There was an incident that happened and Mr. Didin distributed instant noodles to 15 families and the family type got two boxes of noodles*
Researcher	:	*If you see in the question what was asked in the question?*
Student	:	*There are two questions, Ma'am, in the questions, first, how many noodles did Pak Didin share, the second day there were an additional 5 families, so how many noodles did Pak Didin share*

Through the results of the interview above, students already understand the meaning of the questions and understand the questions that arise in the first problem. Based on the indicators of the stages of understanding the problem and the results of the interview students can write down what is known and asked in the questions, be able to present the problem focusing attention on relevant in the formation and that is not in the problem, and express it in symbols.

Thus, it is concluded that students with naturalist intelligence, interpersonal intelligence and Kinesthetic intelligence have mentioned what is known in the questions even though they are not specific and can write down those asked by rewriting the problems that the researcher has given. The research results of (Kurniawan et al., 2020) said that students who have naturalist intelligence, interpersonal intelligence, and kinesthetic intelligence can understand problems well. This is same with (Sumadi et al., 2018) research that student in this intelligence can understand the problem by identifying what is known, using variables to describe the problem.

Stage of Devising a Plan

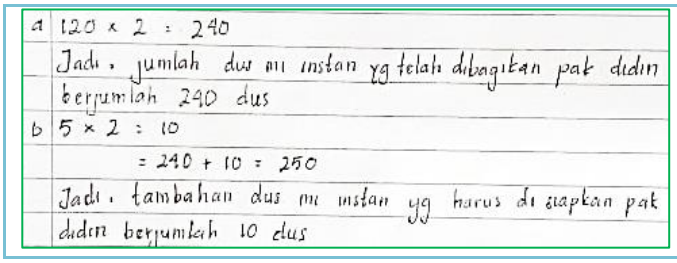
Students may write out steps to address an issue and comprehend the methods employed to solve difficulties, which is an indication that they have devised a plan. The first student must have an idea to be utilized and prior knowledge or expertise in problem solving at the stage of developing a strategy. The study findings indicate that students can plan a solution, as shown by the following interview results.

Researcher	:	*What did you do to solve the problem?*
Student	:	*By multiplying the number of boxes of noodles by the number of households, the question is completed. Then, on the third day, there were five more families. So I'll count the total amount of noodles*
Researcher	:	*What comes to your mind to solve it?*
Student	:	*By counting the number of noodles that Pak Didin will share with the families affected by the flood*
Researcher	:	*What are the stages?*
Student	:	*I took the first step by counting the quantity of noodles before there were any more inhabitants. Following that, I would add additional families*

It is clear from the interviews that students prepared their problem-solving strategies. When seen from the interview, students may prepare the answer in their minds after reading the questions, and via the steps stated, the students have already finished the questions, thus it is inferred that the students have grasped the idea. This is evident from the outcomes of students' responses, which can differentiate between what is known and what is requested. Thus, students with strong naturalist, interpersonal, and kinesthetic intelligence can plan issues and modify the ideas required to solve them

Stage of Implementing the Plan

At this stage, students have compiled a plan to solve the questions they read, with the indicators being able to solve the problem in stages according to the plan and see the suitability at each stage. At this stage, students identify the problem which can be seen in Figure 2.



120 multiplied by 2 equals 240. As a result, Mr. Didin has delivered 240 cartons of instant noodles.

5 x 2 = 10 240 +10=250. So Mr. Didin will need to make an extra ten cartons of instant noodles.

Figure 2. Solution of problem

Figure 2 shows students writing down their answers in accordance with the plan. The first issue is addressed by multiplying the number of homes by the number of noodles received, which equals 120 x 2 = 240. The second issue is that the subject writes the sum of 5 heads of

households, such that the total number of instant noodles is the sum of the first and second outcomes. According to the interview, students have written the solutions to these issues.

Stage of Looking Back

Students have completed the questions at this point, with the indicators re-checking each stage of completion, which includes solving the problem according to the previous concept and providing other solutions and different ways for students to solve problems that are similar to the previous problem. At this point, it may be shown by the results of the following interviews:

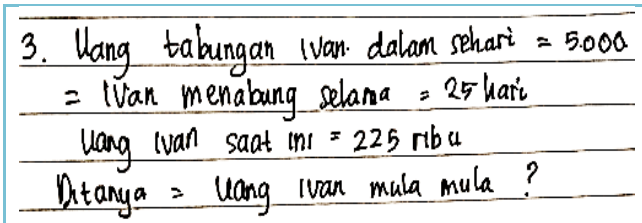
Researcher	:	*Are you sure of the answer?*
Student	:	*It's probably true, ma'am*
Researcher	:	*How can you show that your solution is correct?*
Student	:	*I don't know Mom, how to prove that*

They have not been able to establish whether the response is accurate or not based on the findings of interviews with pupils. This is due to pupils' lack of understanding of the proper idea utilized to prove the issue. As a result, kids with naturalist, interpersonal, and kinesthetic intelligence solve issues until they reach the point where they don't know how to verify the answer again. Students with a strong naturalist, interpersonal, or kinesthetic intelligence comprehend the issue but simply write the questions back in the form they were asked in without altering the structure of the questions to make them easier. According to Suhartini's (2020) study, students prepare for and solve issues by first examining what is known and requested. Completion is carried out in accordance with the prior plan, and pupils demonstrate it again in accordance with the phases. Students struggle to show it at the re-proof stage of completion because they do not grasp the ideas they use to verify their answers again. Kurnia (Kurniawan et al., 2020) found that students with a strong naturalist, interpersonal, and kinesthetic intelligence were able to solve issues according to plan, but students were unable to solve them while looking back.

Three Student with Dominant Linguistic-verbal, Logical-Mathematical, Visual-Spatial Intelligence

Stage of Understanding the Problem

At this point, students have understood the questions being read, with the indicators being able to write down what is known and asked in the questions, present the problem, focusing attention on what is relevant in the formation and what is not in the problem, and express it in symbols, as shown in Figure 3. The students' answers did not make apparent what was known in the questions, but based on the findings of the interviews, the students properly comprehended what was intended by the questions.



Ivan's daily savings = 5000 = Ivan saves = 25 days, Ivan's current funds = 225 thousand Asked: Where did Ivan's money come from in the first place?

Figure 3. Student result in dominant intelligence linguistic-verbal

According to the findings of the interviews, children with linguistic-verbal intelligence, mathematical logical ability, and visual-spatial ability may grasp the issue effectively. The following are the outcomes of student interviews:

Researcher	:	*What did you think of the questions you saw?*
Student	:	*Be seeing and understanding about Mom*
Researcher	:	*Why is it understood?*
Student	:	*So that I may complete it, ma'am*
Researcher	:	*How do you solve it?*
Student	:	*Ivan's savings in a day are Rp. 5000, and he saved for 25 days; how much money did Ivan have?*

Students properly grasped the issue after conducting interviews. Students can comprehend the questions in this part by putting down what is known and what is requested.

Stage of Devising a Plan

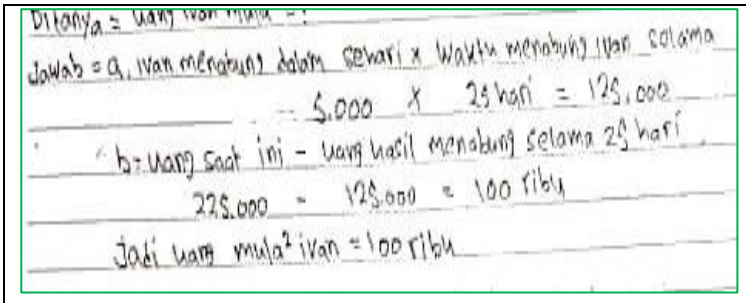
At this level, pupils can write down problem-solving processes and comprehend problem-solving methods. Students must first comprehend a topic to be utilized and have prior knowledge or expertise in problem solving before creating a strategy. According to the study findings, students can design a solution, as shown by the following interview results.

Researcher	:	*In this question, what did you do to solve the problem?*
Student	:	*Read the question, Ma'am*
Researcher	:	*What did you do after reading the problem?*
Student	:	*First, I calculated how much money Ivan saved in 25 days by multiplying 5000 by 25." After that, I computed Ivan's starting money by deducting Ivan's current money from Ivan's savings for 25 days*

The findings of the remaining interviews revealed that the students had properly planned the completion. Although it seems that students do not write down what is understood and asked explicitly at the stage of comprehending the issue, students may plan the solution

Stage of Carrying out the Plan

At this point, students have developed a strategy for solving the issues they have read, with the indicators able to tackle the problem in phases according to the strategy and assess the appropriateness of each step. At this point, students identify the issue, as seen in Figure 4.



a) Ivan's savings each day multiplied by the amount of time he saves equals 5000 multiplied by 25 days equals 125,000.
b) Current money Equals money saved for 25 days (225,000 - 125,000 = $100,000). So Ivan's first investment is $100,000.

Figure 4. Student completion process to solve a problem

According to the completion results, students addressed the issue in accordance with the prior plan and interview. In the first task, the students searched for Ivan's value and stored it for 25 days. The second stage is to locate Ivan's initial funds if the money he now has is 225.000.

Stage of Looking Back

Students have completed the questions at this point, with the indicators re-checking each stage of completion, which includes solving the problem according to the previous concept and providing other solutions and different ways for students to solve problems that are similar to the previous problem. At this point, it may be shown by the results of the following interviews:

Researcher	:	*Do you think your response is correct?*
Student	:	*I think that is true, ma'am*
Researcher	:	*What makes you think it is true?*
Student	:	*Because the original money was $100.000, I spent 25 days searching for the money Ivan acquired." And if I multiply 100.000 by 125.000, I get 225.000. The conclusion is that under Ivan's money totals 225.000*

According to the interview findings, students could grasp the subject and demonstrate it again under what had previously been prepared and accomplished. Thus, pupils with linguistic-verbal, logical-mathematical, and visual-spatial intelligence comprehend the issue, plan solutions, carry them out, and may verify the answer again if it is not yet completed.

This research demonstrates that each intelligence has distinct problem-solving skills, and that students' perceptions of each intelligence vary (Kurnia, 2016). Students face a variety of challenges when it comes to problem solving. As a result, various intelligences must be addressed in order to enhance pupils' problem-solving skills. Previous study found that each student's intellect has a unique method of solving issues, which influences the degree of student comprehension of a teaching material.

Students with linguistic-verbal intelligence, logical-mathematical intelligence, and visual-spatial intelligence comprehend issues, develop solutions, carry them out, and can double-check their answers. This is consistent with study findings (Arsyad, Nasrullah, & Safarddin, 2020)

Students with logical-mathematical intelligence can comprehend and plan problem-solving effectively. Kurnia (Wijaya & Sudarmin, 2016) His study showed that pupils can answer issues according to plan but are unable to double-check their responses. In this research, students with naturalist, interpersonal, and kinesthetic dominant intelligences solved Polya's puzzles in four phases. Students with this intelligence can recognize the material included in the questions. When creating a problem-solving plan using the same approach, both solving stages are under the plan, and looking back at the answers acquired tends to be verified just once. However, this study solely looks at intrapersonal and interpersonal intelligence.

Students with strong linguistic-verbal, logical-mathematical, and visual-spatial intelligence went through three phases of problem-solving. According to Kurnia's (2016) study, pupils who are able to solve issues according to plan take measures to re-check the outcomes of problem-solving but have not completed. Thus, while preparing students for learning, instructors must pay attention to the intelligence that each student has in order for students to comprehend and solve issues.

Conclusion

Students with dominant naturalist, interpersonal, and kinesthetic intelligence can understand the problem well; at the completion planning stage, they can plan for completion; at the carrying out the planning stage, students solve problems based on the initial planning; and at the checking the completion stage, students have not been able to see when the problem has been completed. In terms of student understanding. Students with strong linguistic-verbal, logical-mathematical, and visual-spatial intelligence may understand the problem well, as evidenced by the fulfillment of problem understanding markers. Students can plan their completion based on the concepts they learn during the planning step. At the completion stage, students address issues in accordance with what has been pre-planned. While checking again, students may notice that the completion is not quite complete. It is expected that future research will be able to assess the mathematical abilities of each type of intelligence.

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