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Exploring the Interplay between Habits of Mind and Problem-Solving Skills in Online Mathematics Learning: Insights from Three-Variable Linear Equation Contextual Problems

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Abstrak

This research aims to analyze students' problem solving ability in linear equations of three variables contextual problem solving in the terms of habits of mind of students at class X MA Muhammadiyah 2 Al-Furqan in contextual problem solving in online learning. This research is a qualitative research with descriptive method. The researchers used problem-solving ability test and habits of mind questionnaire as well as in-depth interviews with research subjects as data collection method. The subjects of this research were 3 students of class X IPA MA Muhammadiyah 2 Al-Furqan who came from high, medium, and low ability groups. These students participated in mathematics learning using blended learning. The results showed that the problem solving ability and habit of mind were interrelated and support each other. Students with high habits of mind have high problem solving ability, students with medium habits of mind have medium problem solving ability, and students with low habits of mind have low problem solving ability. Students' problem solving ability is high on the indicator of understanding the problem and low on the indicators of making plans and implementing plans. Students' habits of mind are classified as moderate to high on the indicator of perseverance or never giving up, and moderate to low on the indicator of enthusiasm in responding and the indicator of daring to take responsibility and face risks. The main finding of this study confirms that effective problem solving skills require good habits of mind. The research result shows the importance of developing positive thinking habits in learning mathematics can improve students' problem-solving skills. Thus, the integration of online learning with approaches that pay attention to aspects of habits of mind can be an effective strategy in improving students' mathematics achievement.

Keywords: blended learning, continuous learning, effective learning strategies in mathematics, habits of mind, linear equation of three variables, problem solving

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1. Introduction

Mathematics is one of the subjects that plays an important role in the field of education. Mathematics is a basic science that needs to be taught to students from the early stages of formal education. Mathematics is a science that can be applied to all aspects of everyday life. (Djamilah dkk., 2023;

Nurmeidina dkk., 2022; Lestari dkk., 2021). Moreover, mathematics itself is also a subject that has a significant role in improving students' abilities and human civilization. (Zaqiyah & Djamilah, 2021). According to value of mathematics, the idea behind mathematics education is to foster higher-order thinking skills, such as mathematical creativity through problem-solving (Baiduri dkk., 2022).

According to the National Council of Teachers of Mathematics NCTM (Suci Rahmawati dkk., 2019), There are five competencies in learning, namely: mathematical problem solving, mathematical communication, mathematical reasoning, mathematical connections, and mathematical representation (Ulfah, 2022).

Problem solving skill is needed by students to develop their mathematical skills, as expressed by Husna dkk., (2013), Problem solving ability is referred to mathematical power or mathematical skills (doing maths). So mathematics can be categorised into low-level thinking and high-level thinking. Polya in Hendriana., et al (2017) stated that problem solving is an effort to find a way out of a goal that is not easy to achieve immediately. Based on the description above, it can be concluded that problem solving is a process of overcoming the difficulties faced by using the knowledge possessed to achieve the goal. This research will use Polya's problem solving. The indicators of Polya's problem solving stages are as follows: Understanding the problem, Developing the plan, Implementing the plan, and Looking back (Hanifah, 2021; Simarmata & Lailin Hijriani, 2020).

The mastery of problem solving does not only improve students' understanding of mathematical concepts, but also equips them with logical and systematic thinking skills that are useful in various aspects of life (Nurmeidina dkk., 2021b). However, the observations during online PPL at MA Muhammadiyah 2 Al-Furqan showed that there were still many students in class X IPA who experienced difficulties, especially in SPLTV material.

The majority of them had problems in determining the right strategy to solve the problems that was presented by educators, so it had result in unsatisfactory learning outcomes (Wijaya et al., 2019). One of the factors is the lack of students' attention to the material that was presented and the lack of active involvement in the learning process. Even when there was an opportunity to ask to educators about the clarity of the material, students' responses tended to be silent. After being interviewed, students admitted that they felt embarrassed to ask questions. They were more willing to give opinions after being appointed directly by the educator, even without understanding the material presented fully. Therefore, it is important for students to be able to determine the right strategy in solving problems as an indicator of successful problem solving (Sa'adilla et al., 2020)

Measuring students' problem-solving skills can be done by solving problems which relates to the System of Linear Equations of Three Variables (SPLTV) material. (Afriansyah dkk., 2023). SPLTV was chosen for the research because this material always be met by students in school mathematics problems.

SPLTV involves various types of problems, both in pure mathematics format and in the context of life stories. (Asok & Hashanah, 2021; Rani & Maarif, 2021).

In solving the problem context, students are expected to be able to construct a mathematical model of the story problem, make a plan, and fulfil the indicators of problem solving ability. If students are able to fulfil these indicators, it can be assumed that they have good problem solving skills so that it will

make it easier for them to deal with problems that arise in SPLTV material.

Beside paying attention to problem solving ability as students' cognitive aspect, it must also pay attention to affective aspects in the learning process. One of these affective attitudes is the habit of mind. Based on Syukria et al., (2013) in learning, students must have attitudes and behaviours that are conducive in learning and utilising thinking skills, namely students must connect new knowledge and skills with what they have already knew.

It can help students broaden their horizons so that the important goal of learning is to be able to use their knowledge meaningfully. In general, all mathematics materials require problem-solving skills (Faiziyah dkk., 2024; Wahyudi dkk., 2020). Three-variable linear equation is a subject that requires problem-solving skills to learn. Based on Akbar dkk (2017), in learning process, habits of mind can be observed in the classroom, such as enthusiasm in responding to questions from educators, students' desire to develop problem-solving strategies, and how willing students are to explain the solutions they get.

Habits of mind are the tendency of students' intelligent behaviour in problems solving that are not immediately known. Habits of mind consists of two words, namely "habits" and "mind". In this study, habit of mind is defined as 'habit of thinking'. Habits of mind are defined by Costa dan Kallick in Dwirahayu dkk., (2018) as a characteristic of intelligent people when faced with problems that do not easily know the solution. Based on Marita (2014), habits of mind are a group of skills, attitudes, and values that enable a person to develop performance or behavioural intelligence based on the stimulus provided to guide students in facing or solving existing problems. Based on the understanding above, habit of mind is the tendency of students' intelligent behaviour in problems solving that have no known the solution immediately.

Costa, Arthur L.; Kallick (2015) identified 16 habits of mind when individual address problems in a cerebral manner, which are as follows:

a. Endure or never give up.
b. Regulate conscience.
c. Listening to other people's opinions with empathy.
d. Think flexibly.
e. Metacognitive thinking.
f. Seeking to work thoroughly and precisely.
g. Asking questions and raising issues effectively.
h. Utilising old experiences to form new knowledge.
i. Thinking and communicating clearly and precisely.
j. Utilise the senses in collecting and processing data.
k. Inventing, imagining and innovating.
l. Enthusiastic in responding.
m. Dare to take responsibility and face risks.
n. Funny.
o. Interdependent thinking.
p. Continuous learning.

From 16 characteristics in this research, only 9 habits of mind will be used in this research, namely: (1) persevere or never give up, (2) regulate conscience, (3) think metacognitively, (4) be thorough and precise, (5) ask questions and raise problems, (6) utilise old experiences to form new knowledge, (7) be enthusiastic in responding, (8) dare to take responsibility and face risks, and (9) learn continuously.

Based on Masnis' research result (2017), it explained that the relationship between the ability in mathematics problem solving and mathematics habits of mind. The difference between this research and the previous research is that this research will describe the

problem solving ability and habits of mind habits of students and the questions that will be used to test the problem solving ability are contextual questions.(Kamaruddin dkk., 2020; Noviantari, 2018). Nurmeidina (2022) stated that the ability to think creatively is closely related to the habits of mind of high school students. In this case, the indicators of creative thinking are also in line with problem solving ability. Therefore, it is needed the research that can find out students' problem-solving skills, including the mistakes they often make and their relationship with habits of ts. The results of this analysis can be used to evaluate learning methods and motivate students in solving mathematics problems.

Polia in (Hendriana et al. 2017), states that problem solving is an effort to find a way out of a goal that is not easy to achieve immediately.

According to Krulik dan Rudnik (Hendriana dkk., 2017), Problem solving is a process in which individual uses the knowledge, skills, and understanding that they have acquired to solve problems in unusual situations. Based on the `description above, it can be concluded that problem solving is a process of overcoming the difficulties faced by using the knowledge possessed to achieve goals (Saifulloh dkk., 2024).

There are four stages of problem solving (Madya dkk., 2023; Basadur dkk., 2014, Cahyani & Setyawati, 2017; Savic, 2016) namely understanding the problem, planning to solve the problem, planning the problem, and reviewing the results obtained. Polya's four stages are as follows:

1) Understanding the Problem

The first stage in problem solving is understanding the problem. Students need to identify what is known, what information is present, the relationships and values involved, and what they are looking for (Widodo & Turmudi, 2017). There are some suggestions that can help students to understand complex problems, namely: asking questions about what is known and what is sought, explaining the problem in their own words, explaining the problems with their own words, relating it to other similar problems, drawing attention to important parts of the problem, developing models, and drawing diagrams.

2) Make a Plan

Students need to identify the operations involved as well as the strategies required to solve the given problem. (Montague dkk., 2000). Students can do this by: guessing, developing models, sketching diagrams, simplifying problems, identifying patterns, creating tables, experiments and simulations, and sorting data/information.

3) Implementing the Plan

What is implemented depends on what has been planned before and also includes the following: interpreting the given information into mathematical form and applying strategies during the on going process and calculations. In general, at this stage students need to defend the plan they have chosen. If the plan can not be implemented, then the student can choose another method or plan.

4) Looking Back (Hindsight)

The following aspects need to be paid attention when reviewing the steps previously involved in problem solving, namely: re-examining all the important information that has been identified, re-examining all the calculations that have been made, considering whether the solution is correct or logical, looking at other alternative solutions and re-reading the question and asking yourself whether the question has been answered.

Meanwhile, according to Gagne (Budiarti & Mahendra, 2020; Shishigu et all., 2018; Wagner dkk., 2014), there are five steps that must be taken to overcome this problem, namely:

a. Present the problem in a clearer form,
b. Stating the problem in an operational (solvable) form,
c. Develop alternative hypotheses and working procedures that are considered good for use in problem solving.
d. Test the hypothesis and make efforts to obtain results (data collection, data processing, etc.), the results may be more than one.
e. Re-examine whether the results obtained are correct, or perhaps choose the best alternative solution.

Based on the stages of problem solving previously described, it is concluded that this research will use Polya's problem solving. The indicators of Polya's problem solving stages are as follows:

a. Understanding problem indicators include: determining what is known and asked about the problem and explaining the problem in your own words.
b. Indicators of plan making include: using all available information to solve the problem and make a plan for the solution steps.
c. Indicators of plan implementation include: using the solution steps correctly, applying strategies during the process and calculations.
d. Indicators of Looking back include: writing conclusions on answers.

Linear equations with three variables are considered as challenging material for students. (Abidatul Imaroh, Ulumul Umah, 2021; Hariati & Septiadi, 2019; Laksana & Fiangga, 2022; Sasmita & Qohar, 2021). Problem-solving skills are required to solve contextualised problems in this subject (Ahdhianto dkk., 2020). In addition to problem-solving skills, habits of mind are also needed so that students can correctly interpret the meaning of contextual problems. (Wardani dkk., 2022; Yandari dkk., 2019).

In this class, the learning of linear equations of three variables is carried out using blended learning method that combines face-to-face and online learning methods (Helsa dkk., 2021; Minarti & Hakim, 2022). Blended learning alternates between these two approaches each week. (Kurnia dkk., 2022; Setiyani, 2019). This method allows students to get benefit from the advantages of offline and online teaching, create a dynamic and interactive learning environment that enhances their understanding of the subject matter. Based on this explanation, it is important to examine the analysis of students' problem solving ability in solving contextual problems of linear equations of three variables in terms of habits of mind (Hamzah dkk., 2022; Purnomo & Suparman, 2020).

This research will discuss in depth the importance of problem solving skills in learning mathematics, especially on the subject of System of Linear Equations of Three Variables (SPLTV). The researchers will elaborate Polya's problem solving stages and how these stages can be applied in the context of SPLTV learning. In addition, this study also will explore the relationship between students' habits of mind and their ability to solve mathematical problems. Observation data from class X IPA at MA Muhammadiyah 2 Al-Furqan will be analysed to provide insights into the students' challenge to face and the strategies that can be implemented to improve their problem-solving skills. Readers will get better understanding of effective learning methods, as well as how habits of mind can contribute to students' academic success in mathematics.

2. Method

This type of research is qualitative research with descriptive method. This research uses a qualitative research design by giving a problem-solving ability test and a habit of mind questionnaire as well as in-depth interviews to the research participants. Qualitative research uses various scientific techniques to obtain an in-depth understanding of the events experienced by research participants, as well as providing oral and written explanations in a unique natural environment. The analysis of problem solving ability based on habits of mind in the context of this study aims to provide an explanation that the use of a qualitative approach is to explore the relationship between problem solving ability and habits of mind which are believed to be interrelated. The results of the reseach are expected to provide a deeper understanding on how students' problem-solving skills and habits of mind affect their ability to solve contextual problems after participating in online learning about the system of linear equations of three variables (SPLTV).

This research aims to confirm or refute the alleged relationship between problem solving ability and students' habits of mind in the previous research. The results of this research are expected to provide a clear description of students' problem-solving skills and habits of mind. Students who have high-level thinking skills are also expected to have high problem-solving skills, and vice versa. To collect data, this research used several methods, including the use of questionnaires about thinking habits, problem solving ability tests, and in-depth interviews.

The respondents of this research were students of class X IPA MA Muhammadiyah 2 Al-Furqan. These students took part in learning mathematics using blended learning. The learning was done in two ways, namely offline in class and online using Zoom. The selection of the respondents in this study used purposive sampling technique, namely sample selection with certain considerations. The respondents of this study were students who carried out online learning on SPLTV material. They were given tests to measure problem solving skills and habits of mind. The selection of respondents were based on the results of the answers to the problem solving questions and the habit of mind questionnaire that had previously been given to groups of students in the high, medium, and low classifications. The research location was MA Muham-madiyah 2 Al-Furqan, class X IPA, even semester of the 2020/2021 academic year.

The problem-solving ability assessment score is adapted from Akbar, dkk (2017), where the assessment sheet refers to the four stages of problem solving. The assessment sheet can be seen in the following table:

Table 2. Indicators and Assessment Instruments for Problem Solving Ability Assessment

No	Polya's Problem Solving Indicators	Question Material	Response To Questions	Score
1.	Understand the problem	Solving contextual problems related to SPLTV	There is an attempt to identify the information contained in the question but it is still lack.	1
			Can identify the information contained in the question but still incomplete	2
			Can identify the information contained in the question completely and correctly	3
2.	Make a plan	Solving contextual problems related to SPLTV	Attempts to write down the strategy but fails	1
3.	Implement the plan	Solve contextual problems related to SPLTV	There is a solution but it is still wrong The problem has a solution, but there are still errors in the calculation Can solve the problem correctly	1
4.	Looking back	Solve contextual problems related to SPLTV	There is an attempt to write a conclusion but it is incorrect The conclusion given is not correct The conclusion given is correct	1

In this research, the questionnaire instrument was used to measure students' habits of mind. The assessment of students' habits of mind uses a Likert scale.

The data collection technique was adapted from Wijayanto dkk (2018) using the highest score 10.

Table 3. Habits of Mind Questionnaire Scoring Format

Answer options	Positif	Negative
SS	5	1
S	4	2
RR	3	3
TS	2	4
STS	1	5

Table 4. Categories of Problem Solving Ability

No.	Test Results of Mathematical Communication Ability and Problem Solving Ability	Category
1.	$x \leq 33$	Low
2.	$33 < x \leq 66$	Currently
3.	$66 < x \leq 100$	High

Table 5. Habit of Mind Score Range

Habits of mind	Range Score
High	$x \geq 80{,}52$
Medium	$61{,}48 < x < 80{,}52$
Low	$x \leq 61{,}48$

The steps in determining the category of habit of mind was taken from Arikunto (2013). The data analysis techniques which was used : (1) data reduction, (2) data presentation, and (3) conclusion drawing and verification (Baring & Berame, 2022).

3. Results and Discussion

The data in this study were obtained through three methods, namely written tests, questionnaires, and interviews. The written test instrument given to the participants of research contained each of the measuring instruments for the ability to construct mathematical proof. (Herdiansyah et al., 2024; Lazwardi et al.). The results of this research will describe the results obtained during the research. The 6 participants who took the SPLTV question and the habit of mind questionnaire can be seen in Table 6.

Table 6. Research Subjects

Subject Code	Problem solving	*Habits of Mind*
FN	High	High
KS	Medium	Medium
NI	Low	Low

Based on Table 6, it is known that students have high problem solving skills, and their mathematical thinking habits are also high. Students who have moderate problem solving ability so they have moderate mathematical thinking habits. Students who have low problem solving ability, then their mathematical thinking habits are also low. The interview results show that there were three participants who don't be able to understand all of the information in the question. They are not familiar with the problems that was presented in the form of a story. In Fuady et al. (2021) research stated that students felt that they didn't understand well about the material that was explained by the teacher in online class. In line with the research above, Djamilah & Lazwardi's research (2020) stated that regarding students' difficulties in associating many concepts with the problems so the students had difficulty in determining the steps that must be taken in proof, and difficulty imagining the general properties of an object or number due to different experiences.

a. Problem Solving Skills

Subjects with high problem solving ability (FN) and high Habits of Mind.

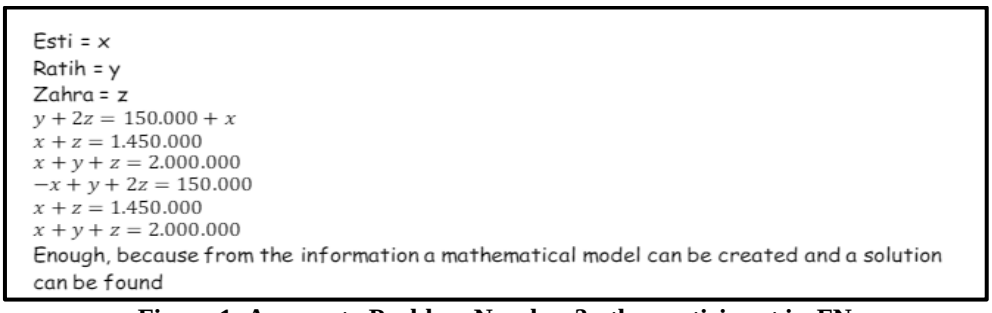

Esti = x
Ratih = y
Zahra = z
$y + 2z = 150.000 + x$
$x + z = 1.450.000$
$x + y + z = 2.000.000$
$-x + y + 2z = 150.000$
$x + z = 1.450.000$
$x + y + z = 2.000.000$
Enough, because from the information a mathematical model can be created and a solution can be found

Figure 1. Answer to Problem Number 3 , the participant is FN

Based on Figure 1, FN showed his ability to understand the meaning of the question well. He deftly translated the problems directly into the form of mathematical models, simplifying the complexity of the problems to make the analysis more structured. This action reflected the ability of FN to use mathematical language as a tool to formulate and solve problems.

Furthermore, FN confidently stated that the information available in the problem was sufficient to form an appropriate

mathematical model and find the solution. This shows that FN's problem solving ability is very good in recognizing relevant information from the context of the problem, as well as his ability to use it efficiently in the problem solving process (Dwiprabowo, 2021; Lutfiya et al., 2021).

Based on the results of the answers of FN , it can be concluded that they are able to understand the information contained in the problem well. These skills provide a strong foundation for FN to apply their mathematical knowledge in real situations, and demonstrate their ability to analyze and solve problems in a systematic and structured manner.

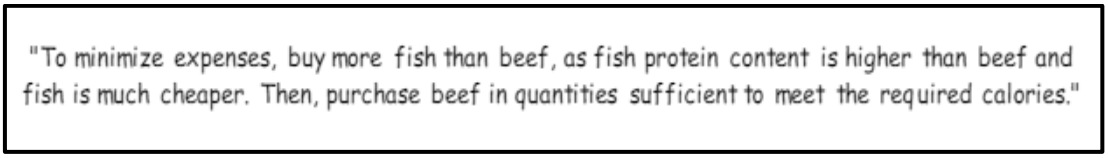
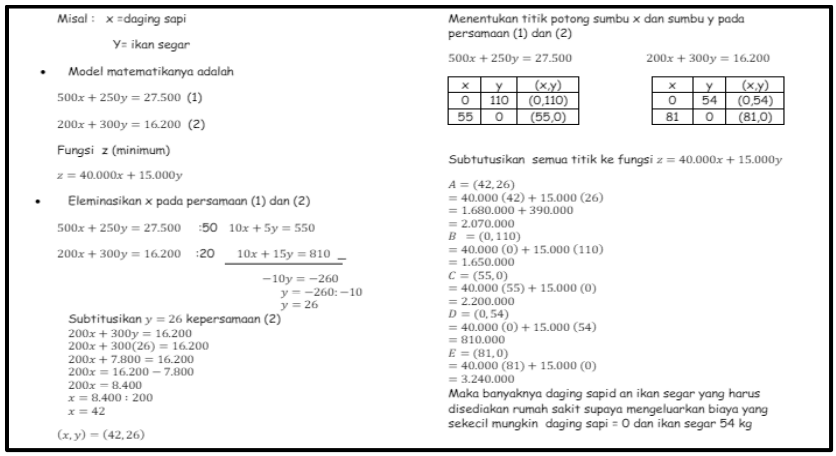

"To minimize expenses, buy more fish than beef, as fish protein content is higher than beef and fish is much cheaper. Then, purchase beef in quantities sufficient to meet the required calories."

Figure 2. Answer to Problem Number 4 Participant: FN

Making a plan. Based on Figure 2, FN has understood the meaning of question number 4 even though the answer was not correct. The participant had a plan to solve the problem. Based on the solution plan that was submitted by the participant, it showed that the subject had not been able to use all the information available and could plan the solution steps. (DP Lestari et al., 2023; Nuryah et al., 2020; Vilianti et al., 2018). But the interesting thing was the participant had a plan to solve the problem. Although they have not succeeded in formulating the right answer, the participant had the strategies outlined or steps that will be taken to reach the solution. It showed that the participants had an awareness of the importance of planning the solution steps before going further.


Misal : x =daging sapi

Y= ikan segar

- Model matematikanya adalah

$500x + 250y = 27.500$ (1)

$200x + 300y = 16.200$ (2)

Fungsi z (minimum)

$z = 40.000x + 15.000y$

- Eleminasikan x pada persamaan (1) dan (2)

$500x + 250y = 27.500$:50 $10x + 5y = 550$

$200x + 300y = 16.200$:20 $10x + 15y = 810$ −

$-10y = -260$

$y = -260 : -10$

$y = 26$

Subtitusikan $y = 26$ kepersamaan (2)

$200x + 300y = 16.200$

$200x + 300(26) = 16.200$

$200x + 7.800 = 16.200$

$200x = 16.200 - 7.800$

$200x = 8.400$

$x = 8.400 : 200$

$x = 42$

$(x, y) = (42, 26)$

Menentukan titik potong sumbu x dan sumbu y pada persamaan (1) dan (2)

$500x + 250y = 27.500$

x	y	(x,y)
0	110	(0,110)
55	0	(55,0)

$200x + 300y = 16.200$

x	y	(x,y)
0	54	(0,54)
81	0	(81,0)

Subtutusikan semua titik ke fungsi $z = 40.000x + 15.000y$

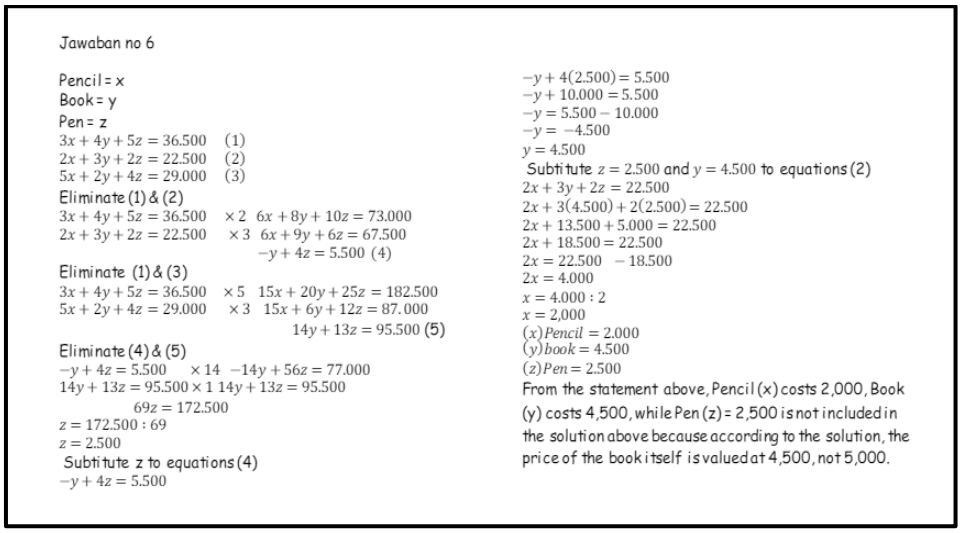
$A = (42, 26)$
$= 40.000\ (42) + 15.000\ (26)$
$= 1.680.000 + 390.000$
$= 2.070.000$
$B = (0, 110)$
$= 40.000\ (0) + 15.000\ (110)$
$= 1.650.000$
$C = (55, 0)$
$= 40.000\ (55) + 15.000\ (0)$
$= 2.200.000$
$D = (0, 54)$
$= 40.000\ (0) + 15.000\ (54)$
$= 810.000$
$E = (81, 0)$
$= 40.000\ (81) + 15.000\ (0)$
$= 3.240.000$

Maka banyaknya daging sapid an ikan segar yang harus disediakan rumah sakit supaya mengeluarkan biaya yang sekecil mungkin daging sapi = 0 dan ikan segar 54 kg

Figure 3 Answer to Problem Number 5 Participant: FN

Developing a planning . Based on Figure 3, FN can solve the problem number 5 correctly. It was shown by the participant was able to connect the information in the problem with the plan that he was used. Based on the description above, the participant can use the steps of the solution planning to solve the problem.(Gunawan et al., 2018; Wulan & Anggraini, 2019). Students applied the problem solving strategy. But The interesting thing was the participant that the participant had a planning to solve that problem. Although it was not successful yet, in preparing the correct answer, the participant

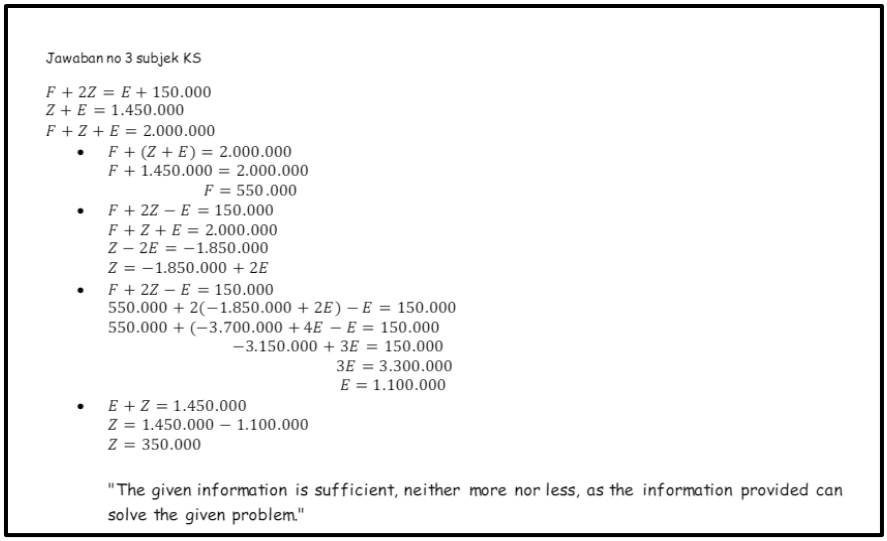
had outlined the strategies or steps that must be taken to reach a solution. It showed that the participant had an awareness of the importance thing of the solution steps planning before going further (Nurmeidina et al., 2021a).


Jawaban no 6

Pencil = x
Book = y
Pen = z
$3x + 4y + 5z = 36.500$ (1)
$2x + 3y + 2z = 22.500$ (2)
$5x + 2y + 4z = 29.000$ (3)
Eliminate (1) & (2)
$3x + 4y + 5z = 36.500 \quad \times 2 \quad 6x + 8y + 10z = 73.000$
$2x + 3y + 2z = 22.500 \quad \times 3 \quad 6x + 9y + 6z = 67.500$
$-y + 4z = 5.500$ (4)
Eliminate (1) & (3)
$3x + 4y + 5z = 36.500 \quad \times 5 \quad 15x + 20y + 25z = 182.500$
$5x + 2y + 4z = 29.000 \quad \times 3 \quad 15x + 6y + 12z = 87.000$
$14y + 13z = 95.500$ (5)
Eliminate (4) & (5)
$-y + 4z = 5.500 \quad \times 14 \quad -14y + 56z = 77.000$
$14y + 13z = 95.500 \times 1 \; 14y + 13z = 95.500$
$69z = 172.500$
$z = 172.500 : 69$
$z = 2.500$
Subtitute z to equations (4)
$-y + 4z = 5.500$
$-y + 4(2.500) = 5.500$
$-y + 10.000 = 5.500$
$-y = 5.500 - 10.000$
$-y = -4.500$
$y = 4.500$
Subtitute $z = 2.500$ and $y = 4.500$ to equations (2)
$2x + 3y + 2z = 22.500$
$2x + 3(4.500) + 2(2.500) = 22.500$
$2x + 13.500 + 5.000 = 22.500$
$2x + 18.500 = 22.500$
$2x = 22.500 - 18.500$
$2x = 4.000$
$x = 4.000 : 2$
$x = 2,000$
$(x) Pencil = 2.000$
$(y) book = 4.500$
$(z) Pen = 2.500$
From the statement above, Pencil (x) costs 2,000, Book (y) costs 4,500, while Pen (z) = 2,500 is not included in the solution above because according to the solution, the price of the book itself is valued at 4,500, not 5,000.

Figure 4 Answer to Problem Number 6 Subject FN

Looking back. Based on Figure 4, it can be seen that the FN can solve problem number 6 correctly. The subject changed the information in the problem into the form of a mathematical model. Then he used mix methods (elimination-substitution) to solve problem number 6. The conclusion that was written by FN was in accordance with the results obtained and the purpose. It showed that FN can check the correctness of the results of his answers (Pradana & Murtiyasa, 2020).


Jawaban no 3 subjek KS

$F + 2Z = E + 150.000$
$Z + E = 1.450.000$
$F + Z + E = 2.000.000$

- $F + (Z + E) = 2.000.000$
  $F + 1.450.000 = 2.000.000$
  $F = 550.000$
- $F + 2Z - E = 150.000$
  $F + Z + E = 2.000.000$
  $Z - 2E = -1.850.000$
  $Z = -1.850.000 + 2E$
- $F + 2Z - E = 150.000$
  $550.000 + 2(-1.850.000 + 2E) - E = 150.000$
  $550.000 + (-3.700.000 + 4E - E = 150.000$
  $-3.150.000 + 3E = 150.000$
  $3E = 3.300.000$
  $E = 1.100.000$
- $E + Z = 1.450.000$
  $Z = 1.450.000 - 1.100.000$
  $Z = 350.000$

"The given information is sufficient, neither more nor less, as the information provided can solve the given problem."

Figure 9. Answer of Problem Number 3 Participant: KS

The participant with moderate problem solving ability (KS) and moderate Habits of Mind understand the problem. Based on Figure 9, it can be seen that KS can understand the problem. The participant wrote it down in the form of a mathematical model immediately. He did not only take the modeling in mathematical form, but he also

looked for solutions for the problems above that should not be sought. Furthermore, the participant explained that the information given in the problem was sufficient, no more and no less because the information above can solve the problem given.

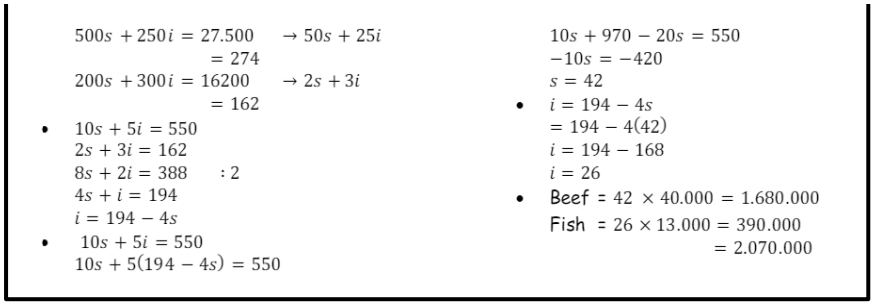


Figure 10. Answer of Problem Number 4 Participant: KS

Making a plan. Based on Figure 10, it can be seen that KS has not understood the problem number 4. The participant did not write a plan for the completion steps in problem solving number 4. It showed that the participant has not been able to use all the information that was available and was unable to make a plan for the completion steps.

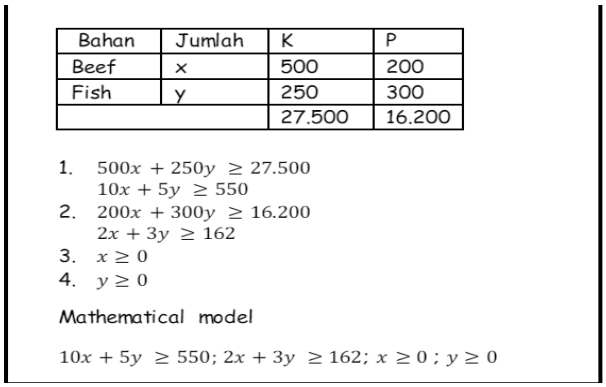


Figure 11 Answer of Problem Number 5 Participant: KS

Apply the plan based on Figure 11, it can be seen that KS had difficulty in understanding the meaning of question number 4. When analyzing the participant, it saw that there was no written solution planning. It showed that the participant has not use maximally utilized all available information and has not been able to formulate a systematic solution plan.

The the participant didn't know the meaning of problem number 4. It can be a serious obstacle in the problem solving process. Without a good understanding of the problem, the participant may find difficulty to identify the steps needed to solve the problem. In dealing this situation, further efforts are needed to help the participant to understand the meaning of problem number 4 and train him in planning the steps to solve it. This approach may involve more intensive coaching, additional practice, or the use of more interactive learning strategies to help the participant to develop better problem-solving skills. With the right support, it is hoped that the participant can overcome these obstacles and improve his ability to solve complex problems.

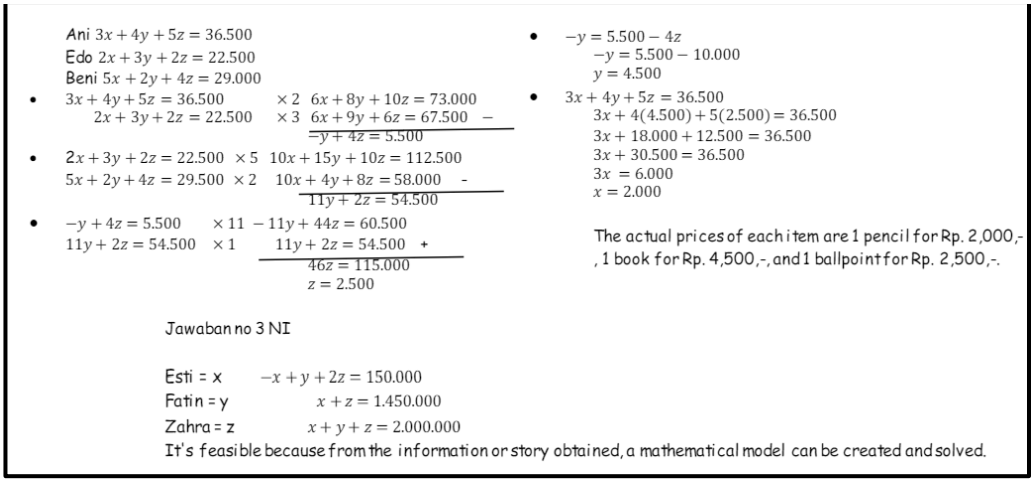


Figure 12 Answer of Problem Number 6 Participant: KS

Looking back, Based on Figure 12, KS can solve problem number 6 correctly. The participant changed the information in the problem into the form of a mathematical model. Then the participant used the mixed method (elimination-substitution) to solve the problem above. The conclusion written by the participant was in accordance with the results obtained and the purposed. It showed that the participant can check the correctness of the answer.

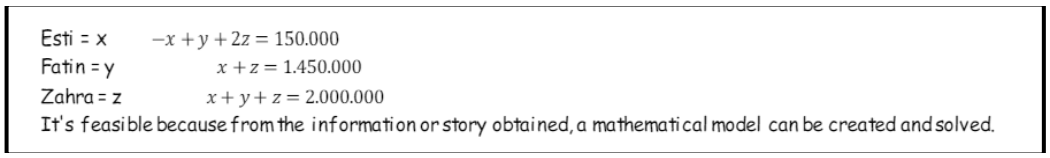


Figure 13. Answer to Problem Number 3 of Subject NI

Understand the problem. Based on Figure 9, it can be seen that NI has understood the meaning of the question. In mathematic modeling form, the answer of NI was correct. Then the participant explained that the information contained in the problem was sufficient or possible to create mathematical models and solutions.(Chinnappan et al., 2012; Davies et al., 2021). The problem number 4, 5, and 6 did not answered. The participant who had low scores as the result he cannot construct their mathematical abilities well (Adnan et al., 2021).

b. Habits of Mind

Habit of mind is a form of behavior that combines right and left brain activity, by combining intellectual and emotional aspects. (Dwirahayu et al., 2018; Hutajulu & Minarti, 2017). It is a regular and consistent pattern or way of thinking that a person has in responding, processing, and solving various problems or situations. Habits of mind includes a series of thinking process, problem-solving strategies, mental attitudes, and cognitive tendencies that influences the way of a person deals with various situationsin daily life. In other words, habits of mind becomes the base of how individual understands, responds to, and interacts with their environment. The following are the results of the students' habits of mind questionnaire for each indicator.

Tabel 7. Categories of Habit of Mind Indicators

No.	Indicators of habits of mind according to Costa	Subject		
		FN	KS	NI
1.	Endure or never give up	High	Medium	Low
2.	Set your heart	Medium	Medium	Low
3.	Metacognitive thinking	Medium	Medium	Medium
4.	Thorough and precise	Medium	Medium	Medium
5.	Ask questions and pose problems	Medium	Medium	Low
6.	Utilise old experiences to form new knowledge	Medium	Low	Low
7.	Be eager to respond	Medium	Low	Low
8.	Dare to take responsibility and face risks	Medium	Low	Low
9.	Continuous learning	Medium	Medium	Low

Student who has high problem solving ability, he has high mathematical habits of mind. Student who has moderate problem solving ability, he has moderate mathematical habits of mind According to Masni (2017) there was a relationship between problem solving ability and mathematical habits of mind. The importance of habits of mind in mathematics learning and daily life so that students can face life's challenges confidencely. (Miliyawati, 2014; Isfiani, 2016). In addition, habits of mind and building role models also play an important role in developing students' habits of mind. Habits of Mind has a role in learning mathematics (Ayu et al., 2023).

Teachers should encourage students to be aware of and use the necessary resources and information so that students can be open-minded and able to find solutions to difficult problems (Suharti et al., 2024). Problem-based learning is an approach that can improve students' problem solving skills, even in this thinking activity students have monitored the planning process to reduce errors in problem solving (Ijirana et al., 2021; Putri et al., 2022). Meanwhile, context-based learning is learning that can improve problem solving skills by using habits of mind. The students who have critical thinking habits tend to find it easier to solve problems based on context (Faiziyah et al., 2021; Faiziyah et al., 2024; Nugroho, 2017).

4. Conclusion

Based on the results of the research and the discussion, several main findings can be concluded. Firstly, students' problem-solving ability is closely related to their habits of mind. The students who have high problem-solving ability tend to have high thinking habits as well, and vice versa. Second, students' problem-solving ability in solving contextual problems in blended learning on SPLTV material is high in the indicator of understanding the problem. Third, students' problem-solving skills are medium on the backward-looking indicator, and relatively low on the indicators of making plans and implementing plans. In addition, students' habits of mind is vary from moderate to high on the indicator of perseverance or never giving up, and from moderate to low on the indicator of enthusiasm in addressing and taking responsibility and facing risks.

These findings answered the research questions by showing the relationship between problem-solving skills and students' habits of mind, as well as providing a detailed picture of students' level of ability in specific aspects of problem-solving in SPLTV material in blended learning. These condition contribute to a broader understanding of how habits of mind can influence students' problem-solving skills in an online learning context. This conclusion also directly relates to the research objectives outlined in the introduction, namely to identify the

relationship between thinking habits and students' problem-solving skills, and to evaluate students' problem-solving skills on SPLTV in the context of online learning.

For future research, it is recommended to further explore teaching strategies that can improve students' critical and analytical habits of mind, as well as to investigate other factors that may affect students' problem solving ability in the context of blended learning. In addition, further research can be conducted to overcome the limitations faced in this study, such as a larger sample and a variety of different learning methods.

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