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Students' Critical Thinking Ability in Solving SPLDV Problems with Jumping Task Based on Emotional Intelligence

Nabilatul Hafidhoh[1], Nurcholif Diah Sri Lestari [2], Inge Wiliandani Setya Putri [3], Didik Sugeng Pambudi [4], Dian Kurniati [5]

[1]University of Jember, nabilatulhafidhoh@gmail.com
[2] University of Jember, nurcholif.fkip@unej.ac.id
[3] University of Jember, ingewiliandani@unej.ac.id
[4] University of Jember, didikpambudi.fkip@unej.ac.id
[4] University of Jember, dian.kurniati.@unej.ac.id

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ABSTRACT

Critical thinking is one of the most essential abilities that students must have. Using the jumping task method can encourage the development of students' critical thinking abilities. Behavior control is also needed in learning activities so students remain confident and motivated to solve problems optimally. One behavioral control over what a person feels is emotional intelligence. This research aims to describe students' critical thinking abilities in solving jumping task questions on SPLDV matter in terms of the students' level of emotional intelligence. This qualitative research uses questionnaires, tests, and interviews to collect research data. Three students from class VIII-B at SMPN 7 Jember were chosen as research subjects. The research results show that students with high emotional intelligence fulfill five critical thinking criteria in solving jumping task questions, specifically focus, reason, inference, situation, and overview. Students with moderate emotional intelligence fulfill four essential criteria of thinking: concentration, reason, inference, situation, and overview, and students with low emotional intelligence fulfill two critical thinking criteria, specifically focus and situation.

Keywords**:** *Critical thinking skill; Jumping Task; Emotional intelligence*.

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1. Introduction

Critical thinking skills are essential for everyone. Critical thinking skills are a person's efforts to gain more profound and meaningful knowledge (Septiana et al., 2019). In contrast, critical thinking is a process that aims to make reasonable decisions about what to believe and what to

do (Ennis, 1996). In teaching and learning activities, critical thinking skills significantly impact students. With critical thinking skills, students will delve deeper into the content concept in a lesson because there are many thinking processes, such as remembering, analyzing, applying, and even creating, in the problem-solving process (Hobri, Oktavianingtyas, et al., 2020). With critical thinking skills and a high willingness and enthusiasm for learning, students will quickly master the desired knowledge (Sofie et al., 2023).

People who delay a little while working on a problem where they still understand the situation and think about the steps to be taken are one of the characteristics of people who think critically. In making these decisions, there needs to be control from within students so that students remain confident and motivated to solve a problem to the fullest (Ajzen, 1991). One of the behavioral controls over what a person feels is emotional intelligence. Emotional intelligence is used to manage emotions in oneself and others (Rejeki et al., 2021). With good emotional intelligence, students can organize a good mood so that students will be more concentrated in participating in learning activities (Nurhayati et al., 2021). Emotional intelligence is the ability to understand one's emotions and those of others to guide the person in thinking and behaving well.

Based on the researcher's experience when participating in teaching assistance activities, there are differences in behavior among students in learning activities. When the teacher explained the content, some students did not pay attention to the teacher's explanation, and they even slept on purpose. When reminded to heed the teacher's explanation, some students do not heed the advice or even argue. Seeing the difference in student attitudes, it is indicated that it happens because of the lack of student interest in learning, which is supported by the lack of student emotional intelligence in the ability to process emotions (Purnama, 2016). When given math problems to work on, some students are reluctant to work on the issues without guidance from the teacher. When questioned, students answer several reasons, such as being too lazy to work independently or problems considered too difficult. Even though, when guided, students can solve problems well. Seeing the difference in students' attitudes when given these math problems, it is indicated that it occurs due to a lack of student motivation to learn, which is caused by a lack of student emotional intelligence in motivating themselves (Basri, 2018). This is corroborated by preliminary studies that researchers have conducted by conducting interviews with mathematics teachers at SMP Negeri 7 Jember. It is stated that one factor that influences this is the factor from within the students. Seeing the problem, researchers are interested in reviewing students' critical thinking skills based on factors from within students, namely emotional intelligence. The researcher's interest is also supported by the results of Fikri (2018) and Sulistianingsih (2016) research, which show a positive relationship between emotional intelligence and students' critical thinking skills.

One of the efforts to develop students' critical thinking skills is by giving jumping task questions (Hobri, Oktavianingtyas, et al., 2020). If faced with a complex problem (jumping task), students will be encouraged to reason in solving the problem (Rahayu et al., 2022). Giving jumping task problems accompanied by an appropriate approach can encourage students to think harder and more critically in learning content so that the knowledge gained is also more than the content usually given. A jumping task is a question or task that exceeds the minimum limit of students' mastery of the content (Nofrion, 2014). Jumping task questions are usually application or development questions from primary conceptual content (Hobri et al., 2021). Usually, jumping tasks are in the form of application problems or applications of primary conceptual content, which not all students can solve (Hobri, Ummah, et al., 2020). The system of linear equations of two variables (SPLDV) is one of the math contents that can be developed into jumping task problems.

Seeing the relationship between critical thinking ability, jumping task, and emotional intelligence, researchers want to know the critical thinking ability of students in solving

jumping task problems on SPLDV content based on students' emotional intelligence. The formulation of the problem in this study is "How is the critical thinking ability of students in solving jumping task problems on SPLDV content based on emotional intelligence?". So, this study aims to describe students' critical thinking skills in solving jumping task problems in SPLDV content regarding students' emotional intelligence level.

2. Research Methods

This research is qualitative, where the data taken is factual in the research field, which will then be analyzed objectively and systematically. The results of this study will be in the form of a description or description of the explanation of the phenomenon under study, namely the critical thinking ability of students at different levels of emotional intelligence (low, medium, and high) in solving jumping tasks SPLDV content.

The research subjects were obtained from the analysis of emotional intelligence by calculating the average and standard deviation of the questionnaire score, which aims to categorize prospective subjects' emotional intelligence levels. The classification of emotional intelligence used in this study consists of five primary abilities that form emotional intelligence according to Salovey (Goleman, 1998), namely: 1) Recognizing self-emotion, 2) Managing emotions, and 3) Motivating yourself. 4) Recognize other people's emotions, and 5) Build relationships. From the calculation of the score of the emotional intelligence questionnaire results, it was found that five students had low emotional intelligence, 19 students had moderate emotional intelligence, and eight students had high emotional intelligence. Subjects were selected based on the consistency of answers between positive statements and negative statements in the emotional intelligence questionnaire, namely one student with low emotional intelligence (SR), one student with moderate emotional intelligence (SS), and one student with high emotional intelligence (ST).

This study used two data collection methods: the test and the interview. The critical thinking ability test (jumping task) was given to research subjects and administered individually within a predetermined period of time. Interviews were conducted in a free-lead manner shortly after students had completed the test questions. The purpose of the interview in this study is to complement the data that has not been obtained from the written test and to find out the subject's critical thinking process in solving the test questions.

Before being analyzed, data obtained from tests and interviews were labeled and coded as follows:

K_iI_j : i-th critical thinking criteria j-th indicator

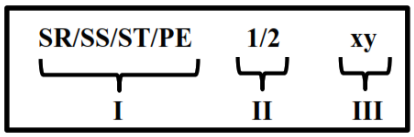


Figure 1 Coding of Interview Transcripts

Description:

SR/SS/ST/PE : subjects with a low level of emotional intelligence/subjects with a moderate emotional intelligence/subjects with a high level of emotional intelligence/ researchers

1/2 : first critical thinking skills test/second critical thinking skills test

xy : conversation sequence for research subject and researcher

The critical thinking indicators used in this study study combine those from Ennis (Ennis, 1996) and Hobri, et al. (Hobri, Oktavianingtyas, et al., 2020) as shown in Table 1.

Table 1 Critical Thinking Indicators

No	Critical Thinking Criteria	Critical Thinking Indicators
1	Focus	a. State the known information in the problem (Hobri, Oktavianingtyas, et al., 2020).
		b. State the information asked in the problem (Hobri, Oktavianingtyas, et al., 2020).
		c. Tells the problem with his own language (Hobri, Oktavianingtyas, et al., 2020).
2	Reason	a. Seeking evidence to justify conclusions in investigating problems (Ennis, 1996).
		b. Seeking reasons for pros and cons in making decision (Ennis, 1996).
		c. Identify and assess the degree of acceptability of the reasons expressed in revisiting the argument (Ennis, 1996).
3	Inference	a. Determines the steps taken based on reason to conclude (Ennis, 1996).
		b. Assess the adequacy of the reasoning expressed to establish the answer/conclusion of the problem (Ennis, 1996).
4	Situation	Connecting prior knowledge in solving problems (Hobri, Oktavianingtyas, et al., 2020).
5	Clarity	Clearly explain the terms used (Ennis, 1996).
6	Overview	Reviewing answers thoroughly (Ennis, 1996).

Source : modified from Ennis (Ennis, 1996) and Hobri, et al. (Hobri, Oktavianingtyas, et al., 2020)

The data from the analysis of test and interview data, then analyzed and concluded in the form of the fulfillment of critical thinking criteria with the following conditions:

1) Focus: the subject can be declared to meet the criteria for critical thinking focus if the subject fulfills K_1I_1, K_1I_2 and K_1I_3, or K_1I_1 and K_1I_2, or only K_1I_3.
2) Reason: the subject can be declared to meet the criteria of critical thinking reason if the subject fulfills all indicators of critical thinking focus because K_2I_1, K_2I_2 and K_2I_3
3) Inference: if the subject meets both indicators (K_3I_1 and K_3I_2), it can be declared to meet the criteria for critical thinking inference.
4) Situation: a subject can be said to fulfill the criteria for critical thinking situations if he is able to remember the content he used in solving the problem (K_4I_1).
5) Clarity: the subject can be said to have fulfilled the critical thinking criteria of clarity if the subject can explain the meaning/intent of the terms/symbols used in the problem solving process correctly.
6) Overview: subjects can be declared to meet the overview criteria if they thoroughly check the accuracy of their answers.

Then students' critical thinking skills are categorized based on their ability to meet the indicators of each critical thinking criterion. The following are the limits of classifying the level of students' critical thinking skills:

a) Low level of critical thinking ability (TKBK 1): where students can fulfill 1 or 2 criteria for critical thinking ability.
b) Moderate level of critical thinking ability (TKBK 2), where students can fiulfill 3 or 4 criteria for critical thinking ability.
c) High level of critical thinking skills (TKBK 3), where students can fulfill 5 or 6 criteria for critical thinking skills.

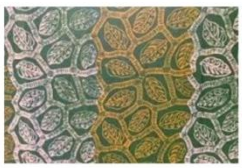
Source: adapted from Hobri (Hobri, Oktavianingtyas, et al., 2020)

his study did not use the TKBK 0 critical thinking ability classification (Hobri, Oktavianingtyas, et al., 2020) Because this research is ski-native, which is necessary to analyze, students who do not write down the steps of solving problems (TKBK 0) are not taken as research subjects.

This research data validity test uses time triangulation; the collection of critical thinking data is done twice with a difference of two weeks. Time triangulation is done by comparing the data obtained in the first and second data collection. The test questions given in the first and second data collection are different but still at the same difficulty level. The first student critical thinking test question can be seen in Figure 2, and the second student critical thinking test question in Figure 3

Ms. Ana, Ms. Yuni, and Ms. Nurul visited a batik shop to buy tobacco-patterned batik and mask konah motif batik. Mrs. Ana bought two tobacco-patterned batiks and three konah mask motif batiks for Rp1,580,000. Ms. Yuni bought one tobacco-patterned batik and two konah mask motif batiks for Rp990,000. Ms. Nurul brings Rp.3,000,000 and will spend the money to buy the same amount of tobacco-patterned batik and batik motif topeng konah. What is the minimum change Ms. Nurul can get from purchasing the batik?

Soal:
Gambar berikut secara berturut-urut adalah batik tembakau dan batik topeng konah:



(a)

(b)

Bu Ana, Bu Yuni dan Bu Nurul mengunjungi sebuah toko batik untuk membeli batik motif tembakau dan motif topeng konah. Bu Ana membeli dua batik motif tembakau dan tiga batik motif topeng konah seharga Rp1.580.000,00. Bu Yuni membeli satu batik motif tembakau dan dua batik motif topeng konah seharga Rp990.000,00. Bu Nurul membawa uang sebesar Rp.3.000.000,00 dan akan membelanjakan uang tersebut untuk membeli batik motif tembakau dan batik motif topeng konah dengan jumlah yang sama. Berapakah kembalian minimal yang bisa didapatkan Bu Nurul dari membeli batik tersebut?

Figure 2 First Critical Thinking Test Question

Figures (a) and (b) show Rara and Nia's receipts at a stationery shop. If, on the same day, Fira has Rp160,000 and wants to buy the most notebooks and pens, how many books and pens can Fira buy if all the money has to be spent?

Soal:
Perhatikan gambar struk berikut:

(a)

(b)

Gambar (a) dan (b) masing-masing menunjukkan struk belanja Rara dan Nia di sebuah toko alat tulis. Jika pada hari yang sama, Fira memiliki uang Rp160.000,00 dan ingin membeli buku tulis dan pulpen dengan jumlah terbanyak, berapakah banyaknya buku dan pulpen yang dapat di beli oleh Fira jika seluruh uangnya harus habis?

Figure 3 Second Critical Thinking Test Question

3 Result and Discusssion

3.1 Research Results

Critical thinking data can be obtained from jumping task-based critical thinking tests and interviews. The following presents the research results for each subject with low, medium, and high levels of emotional intelligence.

A. Critical Thinking Ability of Subjects with Low Emotional Intelligence (SR)

1) SR First Test Result
   SR's critical thinking ability can be seen in Figure 4

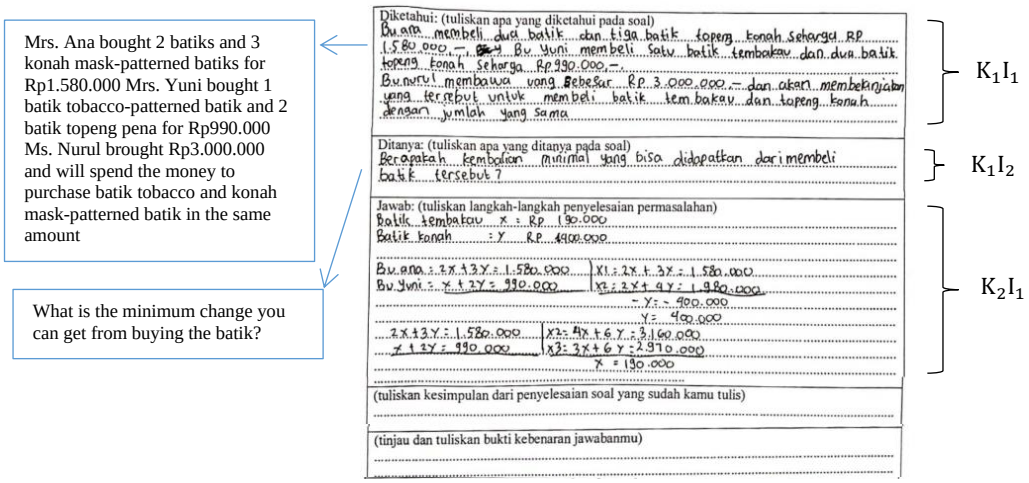


Figure 4 SR's First Test Answer

Based on Figure 4, the code K_1I_1, K_1I_2, and the results of the interview, SR can write the core of the problem correctly and entirely and can answer correctly the questions related to the information known and asked in the problem, which means SR understands the problem given well, although when SR is asked to retell the problem, SR has not been able to tell the problem entirely with his language as in the following quote.

SR101 : "Mrs. Nurul wants to buy a tobacco-patterned batik and Jonah mask. The money is Rp3,000,000. How much change can Ms. Nurul get?"

In Code K_2I_1, SR wrote down the steps to find the price of each batik, from initialization to the value of each variable, using the elimination method correctly. SR can also state the reasons for the steps taken, but not in the form of pro and con reasons, as in the quote below.

PE102 : "Why did you choose to find by elimination?"
SR102 : "Because I can only use that one, ma'am."
PE103 : "Are you sure the price of batik that you found is correct? Why?"
SR103 : "Yes, because the calculations are correct, ma'am, the method is accurate."

SR can also assess the level of acceptance of the results of the work steps that have been done before (x and y values), the following is an excerpt from the SR interview.

PE104 : "Are you sure that y =400.000, x=190.000? Why?"
SR104 : "Im sure, mom. The problem is that the calculation is correct, the method is correct."

As seen in Figure 4, SR only wrote down the steps until SR found the values of x and y and did not continue to solve the problem. During the interview, SR stated that SR did not know the next step that could be taken to find the minimum change that Mrs. Nurul would get, as in the following quote.

PE105 : "What did you do next after you found the price of the konah mask-patterned batik and the tobacco-patterned batik?"
SR105 : "I don't know mom."

However, when asked whether the answer was correct, SR considered that what had been said was not enough to determine the answer/conclusion of the problem as shown in the following interview excerpt.

SR106 : "Not really mom, because I haven't found the answer yet."

SR can remember and use previous knowledge to solve problems based on the results of SR's interview on the critical thinking criteria indicator situation, where SR stated

that the elimination method used in the problem-solving step is content that has been taught before as in the following quote

SR107 : "Yes, this elimination was taught, ma'am."

In the interview about the critical thinking criteria indicator clarity, when asked about the meaning of the symbols x and y used in solving the problem, SR could not explain it correctly and precisely. However, after being given a stimulus, SR was able to state correctly and clearly that the symbols x and y used were the price of 1 tobacco-patterned batik and the price of 1 konah mask-patterned batik as in the following interview excerpt

SR108 : "x this tobacco-patterned batik, y konah mask-patterned batik."
PE109 : "What is batik? The amount or the price?"
SR109 : "The sum."
PE110 : "What amount is the price?"
SR110 : "Price."
PE111 : "1x means what?"
SR111 : "Price of 1 tobacco-patterned batik."
PE112 : "Then y= what?"
SR112 : "The price of 1 konah mask-patterned batik, ma'am."

However, after being given a stimulus, SR stated correctly and clearly that the x and y, symbols used were the price of 1 tobacco-patterned batik and 1 konah mask-patterned batik.

SR did not re-examine the given answer based on Figure 3; SR did not write a way to prove the truth of his answer. This is reinforced by SR's answer during the interview as follows

PE113 : "Before submiting your answer, did you check its correctness?"
SR113 : "Nope"

2) SR Second Test Result

SR's critical thinking ability can be seen in Figure 5

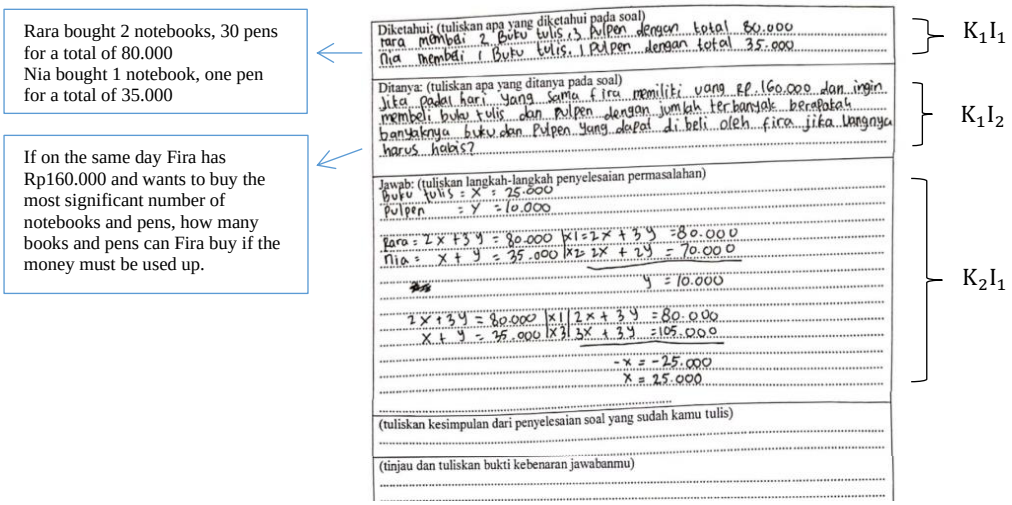


Figure 5 SR's Second Test Answer

Based on Figure 5, the code K_1I_1, K_1I_2, and the results of the interview, SR can write the core of the problem correctly and can answer correctly the questions related to the information known and asked in the problem, which means SR understands the problem given well although SR has not been able to tell the problem with his language completely as follows.

SR201 : " From Fira's money, Rp160,000.00, Fira wants to buy notebooks and pens. The money must be spent on Rp160,000.00."

In Code K_2I_1, SR wrote down the steps to find the price of 1 pack of notebooks and a pack of pens, starting from initialization to finding the value of each variable using the elimination method correctly, but when the interview was conducted, SR was not able to state the reason for finding the value of x and y first, as follows.

SR202 : "The others seem to be like that too, Mom, that's how it is."

SR also assessed the level of acceptance of the results of the work steps that have been done before (x and y values), the following is SR's interview excerpt.

PE203 : "You found that x=25,000. Are you sure that x=25,000 is correct?"
SR203 : "Sure, Mom. That's the one who calculated it and found 25,000. That's the bottom: Mom, equate the y to find x=25,000."
PE204 : "y =10,000. Where did you get it? Are you sure y =10,000 is correct?"
SR204 : "Yes, ma'am. That's what you get from the calculation above. What is multiplied by 1 is equal to multiplied by 2, equaling x."

In Figure 5 it can also be seen that SR only wrote the steps to find the values of x and y and stated that SR did not know and did not have time to solve the problem as follows.

SR205 : "I don't know Mom."

When asked about the sufficiency of the reasons that had been found previously, SR could judge that what SR had done was not enough to prove that the answer was correct because it had not yet solved the problem, as in the following quote.

SR206 : "It's not finished yet mom, not yet"

SR can remember and use previous knowledge to solve the problem based on the results of SR's interview on the critical thinking criteria indicators of the situation. Where when asked whether SR has ever gotten the content that can be used in solving the problem, SR stated that the elimination method used in the problem-solving step is content that has been taught before as follows.

SR207 : "Yes ma'am, that was elimination."

When asked about the meaning of the x and y symbols used in solving the problem, SR could not explain correctly and precisely in the clarity critical thinking criteria indicator interview. But after being given a stimulus, SR can state correctly and clearly that the x and y symbols used are the price of 1 pack of notebooks and the price of 1 pack of pens as in the following interview, except.

PE208 : "Your answer sheet has a notebook = x = 25,000, right? What is x?"
SR208 : "x that's your notebook, ma'am."
PE209 : "The notebook or the price of the notebook?"
SR209 : "Price of the exercise book, Price of 1 pack of exercise books."
PE210 : "What about Y?"
SR210 : "Price for 1 pack of pens."

SR does not re-examine the answer that has been done based on Figure 5, where SR does not write a way that can prove the truth of his answer and is reinforced by the results of SR's interview which states that he did not re-examine his answer as follows

PE211 : "Before submitting your answer, did you check the correctness of your answer?"
SR211 : "No ma'am."

A recapitulation of the results of the first and second data analyses of SR can be seen in Table 2.

Table 2 Recapitulation of SR Analysis Results

Critical Thinking Criteria	Critical Thinking Indicators	Test and Interview I	Test and Interview II	Conclusion
Focus	K_1I_1	✓	✓	✓
	K_1I_2	✓	✓	
	K_1I_3	-	-	
Reason	K_2I_1	✓	✓	-
	K_2I_2	-	-	
	K_2I_3	✓	✓	
Inference	K_3I_1	-	-	-
	K_3I_2	✓	✓	
Situation	K_4I_1	✓	✓	✓
Clarity	K_5I_1	-	-	-
Overview	K_6I_1	-	-	-

From Table 2, it can be concluded that because the critical thinking criteria of focus and situation are fulfilled, SR has low critical thinking ability. SR is stated to fulfill the focus criteria because, based on the data analysis, SR understands the core of the problem correctly and the indicators of focus and situation are fulfilled. K_1I_1 and K_1I_2. Not fulfilled K_1I_3 is caused by SR's lack of communication skills which does not have an impact on SR'S understanding which has been stated in the interview K_1I_1 and K_1I_2

B. Critical Thinking Ability of Subjects with Moderate Emotional Intelligence (SS)

1) SS First Test Result

SS's critical thinking ability can be seen in Figure 6

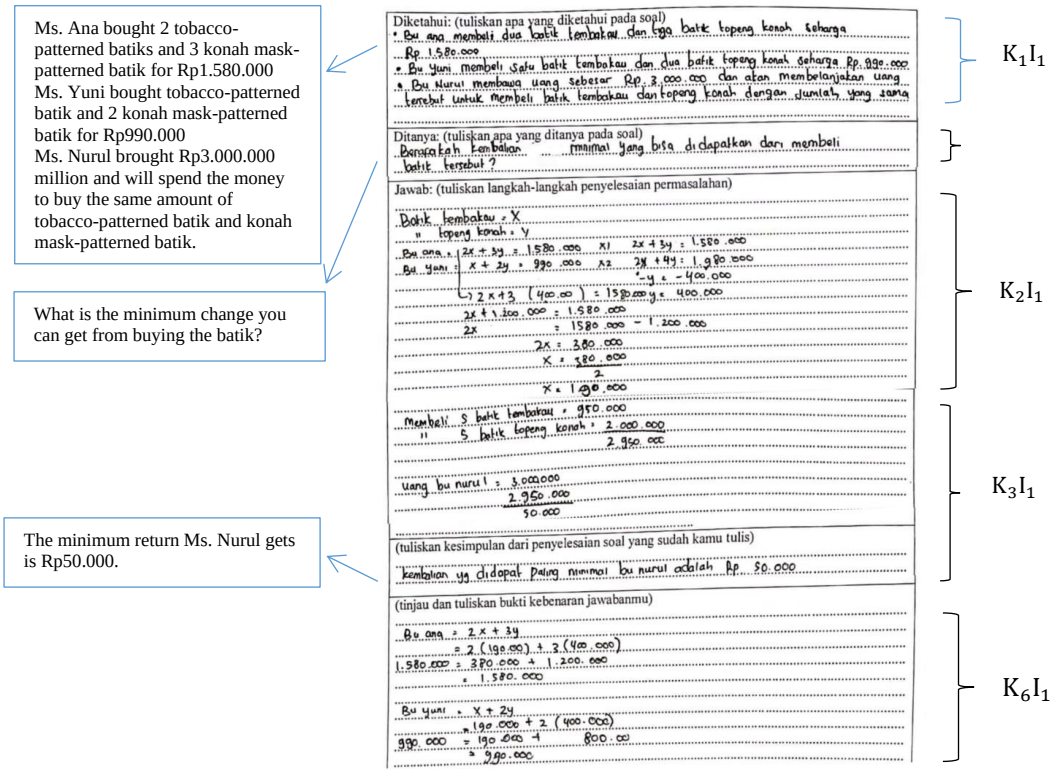


Figure 6 SS's First Test Answer

Based on Figure 6, the code K_1I_1, K_1I_2, and the results of the interview, SS can understand the problem given correctly, and barely retell the problem correctly even though it is not complete as follows.

SS101 : "Yes, ma'am. Mrs. Nurul wants to buy tobacco-patterned batik and konah mask-patterned batik for the same amount as Rp3,000,000.00. What is being asked is how much is the minimum change Mrs. Nurul can accept from the Rp3,000,000.00 used to buy tobacco-patterned batik and konah mask-patterned batik. That's it, ma'am. But the price of the tobacco-patterned batik and konah mask-patterned batik is unknown."

In Figure from 6 modeling Code to K_2I_1, finding wrote the down value of each step to variable finds by correctly deciding the price of each batik mixed method. SS can also state the reasons for the pros and cons in determining the number of batik to buy, as well as assessing the level of acceptance of the results of the work steps that have been done before (x and y values, and the minimum change received by Mrs. Nurul), as in the following interview excerpts.

PE102 : "Is it true that the closest is Rp. 2,950,000.00?"
SS102 : "Yes, ma'am. We request that if the quantity is the same, we buy 5."
PE103 : "What if I add more, for example buying 6 by 6 or something?"
SS103 : "Oh, it's not enough, right ma'am. It's more than Rp. 3,000,000.00."
PE104 : "For example, if I buy 5 tobacco batiks, 4 konah mask batiks, is that possible?"
SS104 : "No, you can't because what is requested is the same amount, ma'am. If you buy four tobacco batiks, you also buy four mask batiks. But earlier, I tried buying four, and it cost more, so it's closer to Mrs. Nurul's money."

SS can also assess the level of acceptance of the results of the work steps that have been done before (x and y values), the following is an excerpt from the SS interview.

PE105 : "Are you sure that y = 400,000, x = 90,000? Why?"
SS105 : "Sure maam, from the calculation, y can be obtained from the elimitation, the problem is that the calculation is also correct ma'am. Yes, so y=400,000 is right, x=190,000 is also right."

In Figure 6 Code K_3I_1 and the results of the interview when SS told the steps to solve the problem, SS could state the steps taken to find the change received by Mrs Nurul based on the price of tobacco-patterned batik and the cost of konah mask-patterned batik found previously. When asked about the adequacy of the reasons that have been seen previously, SS can also assess that the reason is enough to prove that SS's answer is correct, as in the following interview.

SS106 : "Yes, that's enough, ma'am. Because looking for x and y has been checked earlier, it's correct, ma'am, x is Rp190,000.00, and y is Rp400,000.00; in my opinion, that's correct. Then, the one who tried to calculate it, I also made the same amount, 5 and 5, right? The same is true of what was asked in the question, with the same amount. That's also correct. Then the total of 5 and 5 is also correct ma'am. In the question, if you buy 5 of them, it's already the closest to Rp3,000,000.00. You can't add any more ma'am. If it's less, it's not the smallest change ma'am. So in my opinion that's enough to prove it ma'am."

SS can remember and use prior knowledge to solve problems based on the results of the SS interview on the critical thinking criteria indicator situation, where when asked whether SS had ever received content that could be used in solving the problem, SS stated that SS had been taught before as follows.

SS107 : "Yes. The SPLDV is eliminated, then put into the equation, ma'am."

In the interview about the critical thinking criteria indicator clarity, SS could not explain it correctly and precisely when asked about the meaning of the symbols x and y used in solving the problem. However, after being given a stimulus, SS was able to state correctly and clearly that the symbols x and y used were the price of 1 tobacco-patterned batik and the price of 1 konah mask-patterned batik as in the following interview excerpt.

SS108 : "x that's tobacco batik."
PE109 : "Earlier we found x=190,000. What is Rp190,000.00 for tobacco batik?Price or quantity?"
SS109 : "Tobacco batik price."
PE110 : "How much is the price?how many batik? 1 or 2?"
SS110 : "One."
PE111 : "What about y?"
SS111 : "Price of one konah mask-patterned batik."

Based on Figure 6 Code K_6I_1 and the results of the interview, SS reviewed his answer but not thoroughly where SS confirmed the correctness of the price of each batik that

had been found previously, but did not ensure the correctness of the change received by Mrs. Nurul, as in the quote below.

SS112 : "Use what I tried to correct, ma'am, if, for example, x=190,000 and y=400,000 is true. The method is if it is entered into the equation; I tried both equations, and it is true, ma'am. The right and left sides are the same, so it is true if the value of x=190,000 y=400,000."

2) SS Second Test Result

SS critical thinking skills can be seen in Figure 7

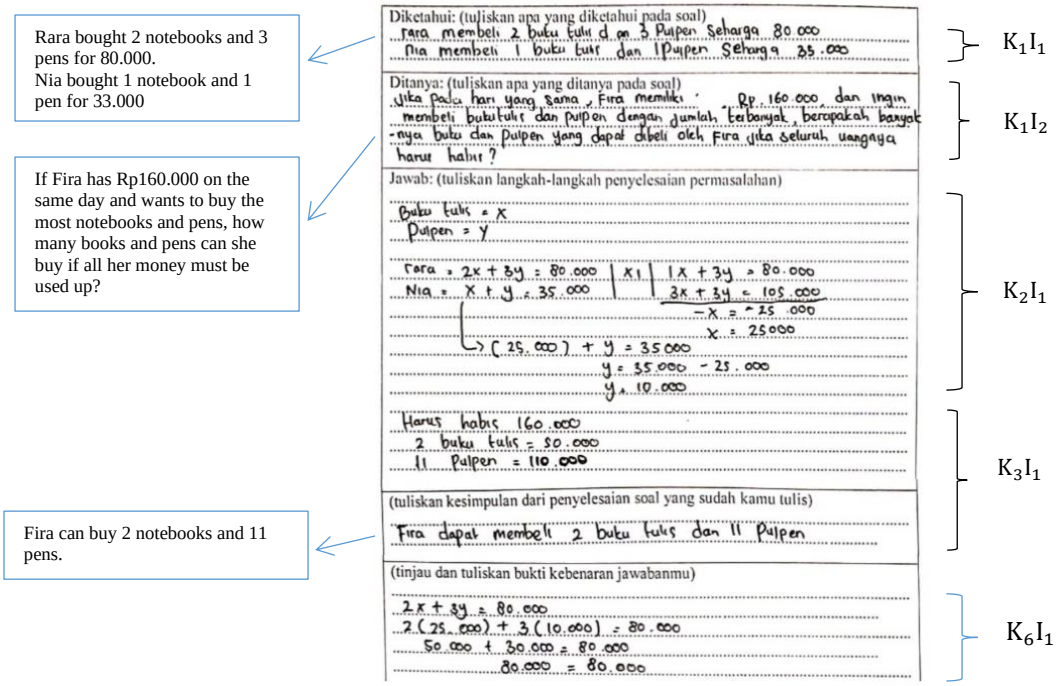


Figure 7 SS's Second Test Answer

Based on Figure 7, the code K_1I_1, K_1I_2, , and interview results, SS can understand the given problem correctly, and retell the problem correctly and completely as follows.

SS201 : "Fira has Rp160,000.00 and wants to buy the most notebooks and pens. How many notebooks and pens can Fira buy if all her money is used? The price of notebooks and pens known in the question is Rp80,000.00 for 2 notebooks and 3 pens, and the price of 1 notebook and 1 pen is Rp35,000.00."

In the Code K_2I_1, writes the steps to find the price of 1 pack of notebooks and 1 pack of pens, starting from the example to finding the value of each variable using the mixed method correctly. SS can also state the pros and cons in deciding the number of notebooks and pens purchased and can assess the level of acceptance of the results of the previously completed work steps (x and y values), as in the following interview excerpt.

PE202 : "The question is about the most items, right? Why don't you buy them all the pens? If you buy them all pens, won't Fira's money run out, Miss?"
SS202 : "Yes, ma'am. I thought about how many notebooks and pens Fira could buy, so I thought about buying notebooks and pens ma'am."
PE203 : "So, are you sure your answer is correct?"
SS203 : "Certain."
PE204 : "Not 16 pens? Your answer is 13. The requested number is the largest."
SS204 : "Be safe, ma'am. Mine are the real ones, a notebook and a pen."
PE205 : "Why?"
SS205 : "Because there is a notebook and a pen."

SS can also assess the level of acceptance of the results of the previously completed work steps (x and y values), the following is an excerpt from the SS interview.

PE206 : "Are you sure y=10,000, x=25,000? If so, why are you sure?"

SS206 : "Because x=25,000, the one written in the book uses the elimination method, that's correct, ma'am. But this x should be 2x, ma'am. 2x-3x=-x is correct, ma'am. It's just that this 1 becomes 2. That calculation is accurate. The y=10,000 is also obtained from the x=25,000 which is entered into the equation x+y=35,000. And from the calculation, it's correct. I'm sure that y=10,000 is the correct answer."

Based on Figure 7 Code K_3I_1 and interview results, SS can state the solution steps in the form of the number of notebooks and pens by calculating their prices, so that the number of notebooks and pens that Fira must buy is obtained until the total cost reaches the maximum amount and her money runs out. When asked about the sufficiency of the reasons that have been found previously, SS can also assess that these reasons are sufficient to prove that SS's answer is correct, as in the following interview.

SS207 : "That's enough, ma'am. To find the amount that can be purchased, you have to know the price individually. x=25,000 and y=10,000 are correct.Then I looked for how much I had bought, and it was true, ma'am, the money was all gone. According to what was asked, ma'am, the amount was also the largest. So according to that, I had enough."

SS can remember and use previous knowledge to solve problems, based on the results of SS interviews on the critical thinking situation criteria indicator. When asked whether SS had ever received content that could be used to solve the problem, SS stated that SS had been taught it before, as follows..

SS208 : "Yes ma'am, the SPLDV one. I used the elimination one and the one that was inserted ma'am."

In the interview of the critical thinking criteria indicator clarity, when asked about the meaning of the symbols x and y used in solving the problem, SS was not able to explain correctly and precisely. However, after being given a stimulus, SS was able to state correctly and clearly that the symbols x and y used were the price of one pack of notebooks and the price of one pack of pens, as in the following interview excerpt.

PE209 : "x what is this in your answer?"
SS209 : "Price of 1 notebook, ma'am."
PE210 : "1 notebook only or 1 pak notebook? Try to see."
SS210 : "Oh, that means the price is 1 pak the notebook is x, if y that means the price of 1 pack of pens."

Based on Figure 7 Code K_6I_1 and interview results, SS reviewed the answers but not thoroughly. SS confirmed the accuracy of the price of each batik that had been found previously but did not confirm the accuracy of the change received by Mrs. Nurul.

The recapitulation of the results of the first and second SS data analyses can be seen in Table 3.

Table 3 Recapitulation of SS Analysis Results

Critical Thinking Criteria	Critical Thinking Indicators	Test and Interview I	Test and Interview II	Conclusion
Focus	K_1I_1	✓	✓	✓
	K_1I_2	✓	✓	
	K_1I_3	✓	✓	
Reason	K_2I_1	✓	✓	✓
	K_2I_2	✓	✓	
	K_2I_3	✓	✓	
Inference	K_3I_1	✓	✓	✓
	K_3I_2	✓	✓	
Situation	K_4I_1	✓	✓	✓
Clarity	K_5I_1	-	-	-
Overview	K_6I_1	-	-	-

From Table 3, it can be concluded that SS has moderate critical thinking skills because the critical thinking criteria of focus, reason, inference, and situation are met. SS's clarity criteria still need to be met because SS has been unable to explain correctly and precisely the

symbols used in solving the problem. The failure to fulfill SS's clarity and overview critical thinking criteria does not impact SS's understanding and problem-solving process.

C. Critical Thinking Ability of Subjects with High Emotional Intelligence (ST)

1) ST First Test Result

ST's critical thinking ability can be seen in Figure 8

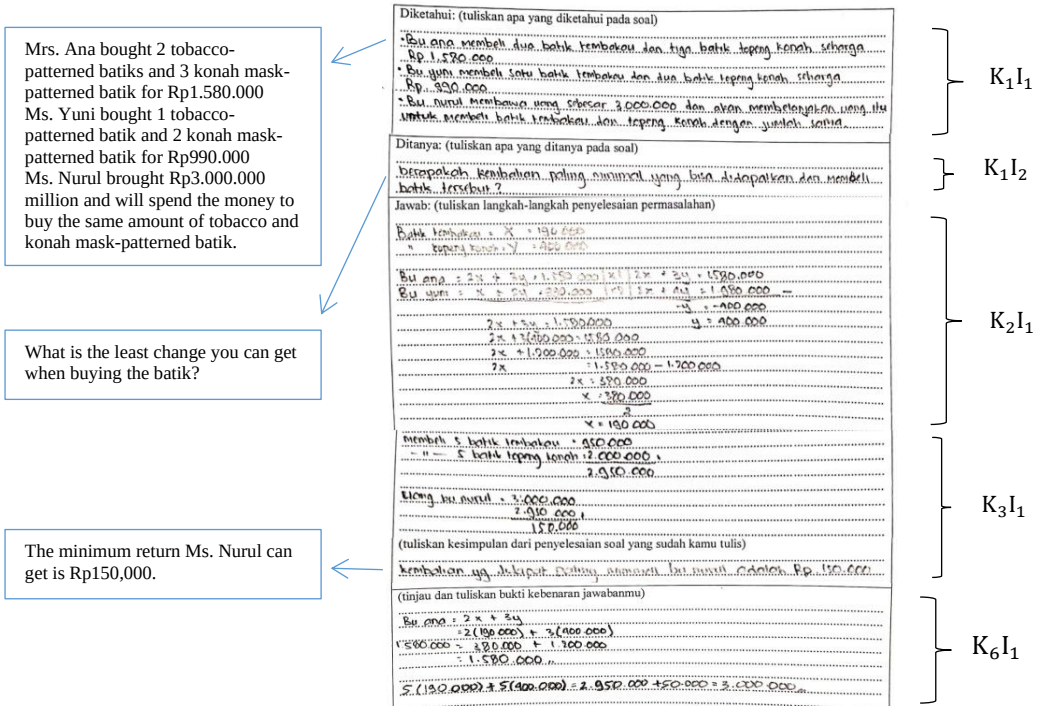


Figure 8 ST's First Test Answer

Based on Figure 8, the code K_1I_1, K_1I_2, and interview results, ST can understand the given problem correctly and retell the problem wholly and correctly, as follows.

ST101 : "Mrs. Nurul brought 3,000,000 and wanted to buy 2 types of batik, tobacco batik and konah mask batik with the same amount using the 3,000,000. But Mrs. Nurul needed to know the price if she bought one of the tobacco batik and if she bought 1. But she found out that from Mrs. Ana, she had bought 2 tobacco batik and 3 mask batik for 1,580,000. Mrs. Yuni had also bought 1 tobacco-patterned batik and 2 konah mask batik for 990,000. Now what was asked was the least change that Mrs. Nurul could get. That's it, ma'am."

In the Code K_2I_1, ST wrote down the steps to find the price of each batik, starting from the example to see the value of each variable using the mixed method correctly. In the interview, ST was also able to state the pros and cons in deciding the amount of batik purchased, as well as assess the level of acceptance of the results of the previously completed work steps (values of x and y, and the minimum change received by Mrs. Nurul), here is an excerpt from ST's interview.

PE102 : "Why are you looking for the amount of batik that can be bought closest to Mrs. Nurul's money, which is 3,000,000?"
ST102 : "Because what is asked is the minimum change, so it is the slightest change. Well, if you want the slightest change, that means looking for the closest to 3,000,000."
PE103 : "Why don't you buy 4 tobacco batiks and 4 konah mask batiks?"
ST103 : "If you buy 4 tobacco batik and 4 konah mask batik, the remaining money can still be used to buy more, ma'am. And because what is asked is the minimum change, the remaining cash can't be used to buy more batik, right ma'am?"
PE104 : "Why not buy 7 tobacco batik and 4 konah mask batik?"
ST104 : "Because in the question, some spend the money to buy tobacco batik and konah mask-patterned batik in the same amount. So buying 7 tobacco batik and 5 konah mask batik is impossible. Because the amount is not the same. What is asked for in the question is that the amount must be the same."

ST can also assess the level of acceptance of the results of the previously completed work steps (x and y values). The following is an excerpt from an ST interview.

PE105 : "Are you sure that y=400,000, x=190,000? If so, why?"
ST105 :"Sure ma'am. Because in elimination, it equates to the x ma'am. Ms. Ana, 2x+3y=1,580,000, Ms. Yuni x+2y=990,000. Multiply by 1, multiply by 2. So the x is finished, ma'am, subtract it. -y=-400,000 so y=400,000. Then, it is put into the equation 2x+3y=1,580,000, so what is replaced from the equation is the y to 400,000. 2x+1,200,000=1,580,000, moved side to side so 2x=1,580,000-1,200,000, x=380,000/2 because the 2 are eliminated, we find x=190,000."

In Figure 8 Code K_3I_1 and interview results, ST can state the steps taken to find the change received by Mrs. Nurul based on the price of the tobacco-patterned batik and the price of the konah mask-patterned batik found previously. When asked about the sufficiency of the reasons found previously, ST can also assess that the reasons are sufficient to prove that ST's answer is correct, as in the following interview.

ST106 : "Yes, ma'am, because I've found the price of tobacco and mask batik, the price is also correct, and the amount of batik purchased is also according to what was requested. Then, because what was requested was the minimum change, I also wrote the minimum change that was obtained from Mrs. Nurul's money minus the total of her purchases. So that's enough proof."

From the results of the ST interview on the critical thinking criteria indicator, ST stated that the elimination method used in the problem-solving step was content that had been taught before. This shows that ST can remember and use previous knowledge to solve problems. The following is an excerpt from the ST interview.

ST107 : "Yes, I have been taught the mixed method for finding x and y values. Next, I will do it myself."

In the interview about the critical thinking criteria indicator clarity, when asked about the meaning of the symbols x and y used in solving the problem, ST could not explain it correctly and precisely. However, after being given a stimulus, ST could state correctly and clearly that the symbols x and y used were the price of 1 tobacco-patterned batik and 1 konah mask-patterned batik as in the following interview excerpt.

PE108 : "What are x and y?"
ST108 : "x is a tobacco-patterned batik, y is a konah mask-patterned batik."
PE109 : "What did you get just now x=what?"
ST109 : "x=190,000."
PE110 : "What does x mean?"
ST110 : "The price of tobacco-patterned batik, ma'am, and the price of konah mask-patterned batik, ma'am"
PE111 : "Price of 1 konah mask-patterned batik? 2? 3?"
ST111 : "Price for 1 month mask-patterned batik, ma'am"

Based on Figure 8 Code K_6I_1 and interview results, ST conducted a thorough review of the answers where ST confirmed the accuracy of the prices of each batik found previously and the change received by Mrs. Nurul.

2) ST Second Test Result
ST's critical thinking skills can be seen in Figure 9.

Based on Figure 9, in Code K_1I_1, K_1I_2, and interview results, ST can understand the given problem and retell it wholly and correctly as follows.

ST201 : "Fira wants to buy a notebook and a pen. Fira's money is 160,000. From the 160,000, Fira intends to buy the most significant number of notebooks and pens. The number of notebooks and pens. So how many books and pens can be purchased? That's it, ma'am."

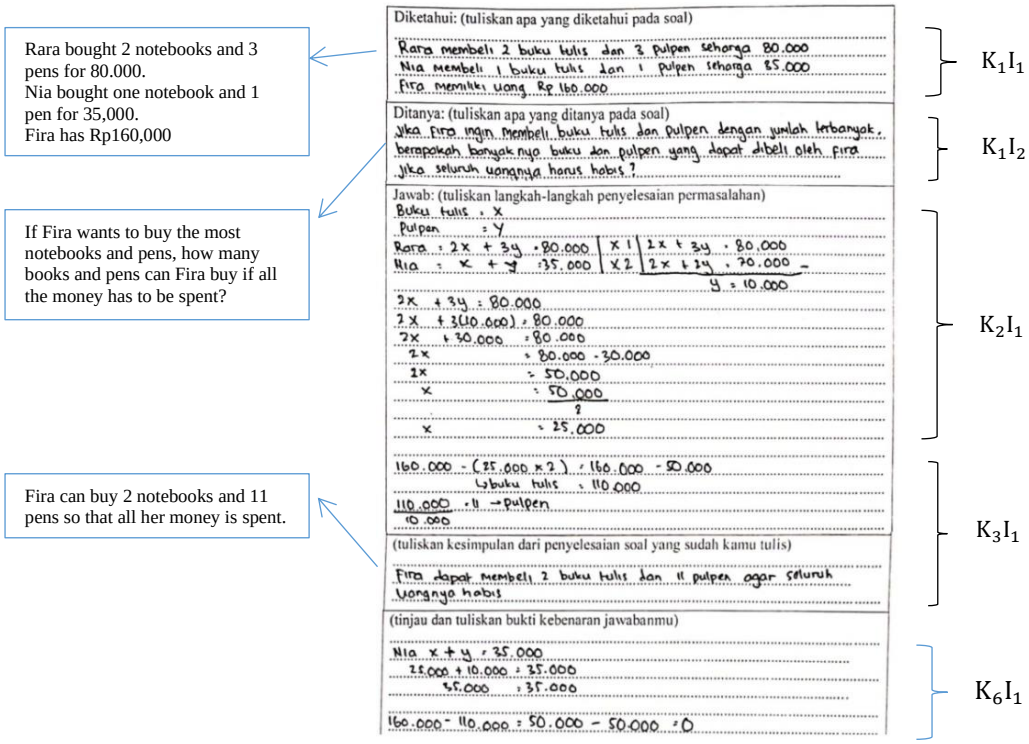


Figure 9 ST's Second Test Answer

In the Code K_2I_1, ST wrote the steps to find the price of 1 pack of notebooks and 1 pack of pens, starting from the example to seeing the value of each variable using the mixed method correctly. In the interview, ST was also able to state the pros and cons in deciding the number of notebooks and pens purchased as in the following interview excerpt.

ST202 : "No way, ma'am. Because that's if Fira buys a notebook and a pen. Because a notebook and a pen, the notebook still has to be purchased. Unless you purchase a notebook or a pen with the most significant number, it's okay if you want to buy all the pens."

ST can also assess the level of acceptance of the results of the previously completed work steps (x and y values). The following is an excerpt from an ST interview.

PE203 : "Are you sure y=10,000, x=25,000? If so, why are you sure?"
ST203 : "Sure ma'am. Because the x's are equalized, right, ma'am? Rara's 2x+3y, Nia's x+y, the x's are equalized so Rara's is 2x+3y. Nia's is 2x+2y. They're already equal; the top is 2x, and the bottom is 2x, right? Subtract them so the x's are gone, and the remainder is y. 3y-2y is y, y=10,000. if, for example, what is equated is y, then what is found is x. That's why I entered the value y=10,000. From the equation 2x+3y=80,000, y is replaced by 10,000; y is gone, ma'am. x remains. 2x+3(10,000)=80,000. 30,000 is moved to the side, so 2x=50,000. 50,000/2=25,000. so x=25,000. The calculation is correct ma'am."

Based on Figure 9 Code K_3I_1 and interview results, ST can state the solution steps in the form of the number of notebooks and pens by calculating their prices, so that the number of notebooks and pens that Fira must buy is obtained until the total cost reaches the maximum amount and her money runs out. When asked about the sufficiency of the reasons that have been found previously, ST can also assess that these reasons are sufficient to prove that ST's answer is correct, as in the following interview.

ST204 : "Yes ma'am. Because from the values of x and y that have been obtained, for example, if they are entered into the picture, the results are the same ma'am. And I have also written that ma'am, you have to buy 2 notebooks, the rest are used to buy pens, so the number is large, so 13 items can be obtained, ma'am. And there is no money left either. So according to that, I have proven it enough ma'am."

ST can remember and use previous knowledge to solve problems based on the results of ST's interview on the critical thinking situation criteria indicator, where ST stated that

ST had known similar questions and the elimination and substitution methods used in the steps to find the values of x and y were contents that had been taught previously as in the following excerpt.

PE205 : "Have you ever encountered the same problem before?"
ST205 : "Regarding buying books, pens, and pencils, I have met them several times, ma'am. The ones with pictures like this are also common, ma'am. But they are different from this."
PE206 : "Have you ever received learning content that you can use to solve these problems?"
ST206 : "If you want to find the values of x and y, you can do that from the SPLDV, which is eliminated and entered, ma'am."
.

In the interview of the critical thinking criteria indicator clarity, when asked about the meaning of the symbols x and y used in solving the problem, ST was not able to explain correctly and precisely. However, after being given a stimulus, ST was able to state correctly and clearly that the symbols x and y used were the price of one pack of notebooks and the price of one pack of pens, as in the following interview excerpt.

PE207 : "On your answer sheet, you use the terms x and y, so what is x? What is y?"
ST207 : "x is a notebook, y is a pen."
PE208 : "x How many did you meet earlier?"
ST208 : "25,000."
PE209 : "What is 25,000? The amount and price?"
ST209 : "Price."
PE210 : "What price?"
ST210 : "Price per pak notebook, y that's the price of 1 pack of pens."

In Figure 9 Code K_6I_1 and interview results, ST conducted a thorough review of her answers where ST confirmed the truth of the price of 1 pack of notebooks and 1 pack of pens that ST had found previously and the total cost of the items purchased was able to spend all the money that Fira brought.

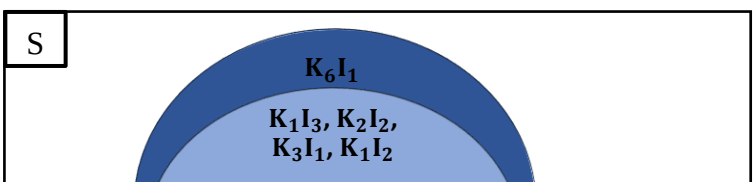
The recapitulation of the results of the first and second ST data analysis can be seen in Table 4.

Table 4 Recapitulation of ST Analysis Results

Critical Thinking Criteria	Critical Thinking Indicators	Test and Interview I	Test and Interview II	Conclusion
Focus	K_1I_1	✓	✓	
	K_1I_2	✓	✓	✓
	K_1I_3	✓	✓	
Reason	K_2I_1	✓	✓	
	K_2I_2	✓	✓	✓
	K_2I_3	✓	✓	
Inference	K_3I_1	✓	✓	
	K_3I_2	✓	✓	✓
Situation	K_4I_1	✓	✓	✓
Clarity	K_5I_1	-	-	
Overview	K_6I_1	✓	✓	✓

From Table 4, it can be concluded that ST has high critical thinking skills because the criteria of focus, reason, inference, situation, and overview are met. ST's clarity criteria still need to be met because ST has been unable to explain correctly and precisely the symbols used in solving the problem; however, the lack of clarity does not affect ST's understanding and problem-solving process.

Figure 10 depicts the results of analyzing the subjects' critical thinking abilities.



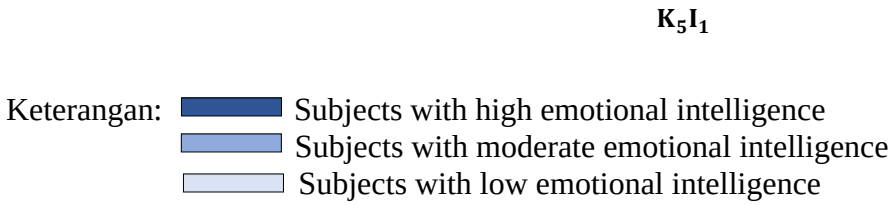


Figure 10 Subject Indicator Fullfillment

3.2 Discussion

Based on Figure 10 on the criteria for critical thinking focus, students with low, medium and high emotional intelligence can fulfill the indicator of stating information known in the question and stating information asked in the question. The difference between the three students is in the indicator of telling the problems in the question in their language, whereas students with low emotional intelligence have not fulfilled this indicator; from the questionnaire data, it can be seen that students lack the ability to communicate with others. When asked to tell the story in full, students with low emotional intelligence appear reluctant and do not try to retell the problem in the question completely; this can happen due to a lack of self-control control emotions, the ability to remain optimistic, and students' drive to achieve (Sofie et al., 2023). A person with limited emotional skills is more likely to experience stress and experience emotional difficulties in learning (2008). Students with moderate emotional intelligence and students with high emotional intelligence differ in how they tell problems even though they both fulfill the indicator of telling the problems in the questions in their own language. Students with moderate emotional intelligence tend to say to problems briefly but still contain important points from the problem, while students with high emotional intelligence tend to tell problems in detail. Ability students with high emotional intelligence in understanding and retelling the problems given in detail, students with high emotional intelligence, able to explain the core of the problem in the form of what is known, asked, and the meaning of the information in the question (2021). By the emotional intelligence possessed, students with high emotional intelligence can work on jumping task questions more optimally (Pangastuti et al., 2014).

Based on Figure 10 on the critical thinking criteria, students with medium and high emotional intelligence can fulfill all indicators. In contrast, students with low emotional intelligence cannot yet fulfill the indicator of finding pros and cons in making decisions. When making a decision or taking steps to solve a problem, students with low emotional intelligence tend to only see from one point of view and immediately use it to make a decision, so there is no process of weighing up the several points of view. This can happen because the way students think is less enthusiastic about solving problems and only think about the final results that will be obtained using a method usually done (Rejeki et al., 2021). This is also supported by the data obtained from the questionnaire, where students with low emotional intelligence tend to be lazy in learning mathematics. Other studies also explain that students exhibit low critical thinking because they cannot provide proper reasons (Rahmayani, 2021). This can happen because students lack practice with contextual questions, so they are not used to conveying ideas from questions different from routine example questions (Septiana et al., 2019). Although students with moderate emotional intelligence and students with high emotional intelligence both meet the indicators of looking for pros and cons in making decisions, there is a slight difference

where students with moderate emotional intelligence were initially fooled by the arguments put forward by the researcher. In contrast, on the same question, students with high emotional intelligence immediately stated that the arguments given by the researcher were wrong and stated reasons that supported the answers that had been found.

Based on Figure 10, students with moderate and high emotional intelligence fulfill both indicators of critical inference thinking criteria. In contrast, students with low emotional intelligence do not fulfill both indicators. Students with low emotional intelligenceare not yet able to determine steps to solve problems based on the reasons they have found. This can be seen in Figures 3 and 4 where students with low emotional intelligence write down the solution until finding the value of x and y, and do not continue solving the problem using the values of x and y that have been found previously. Students with low emotional intelligence also expressed that they did not know what steps they could take to solve the problem. The inability of students with low emotional intelligence to solve this problem can also occur due to a lack of understanding of problem-solving (Hobri, Oktavianingtyas, et al., 2020). This is also in line with the results of other studies which state that students with low emotional intelligence can less use appropriate reasoning and arguments to solve a problem (Tasyanti et al., 2018). In the indicator determining the steps taken based on reasons for concluding, there is no difference between students with moderate emotional intelligence and students with high emotional intelligence, but on the indicator assessing the adequacy of the reasons stated to determine the answer/conclusion of the problem. Students with high emotional intelligence tend to be more able to explain that the reasons given are sufficient to prove that the answer is correct than students with moderate emotional intelligence. Students ' self-confidence and self-control greatly influence decision-making to complete problem-solving steps (Rejeki et al., 2021).

Based on Figure 10, students with low, medium, and high emotional intelligence all meet the critical situation thinking criteria indicators, namely connecting previous knowledge in solving problems. Students with high emotional intelligence stated they had encountered problems similar to those. In contrast, students with moderate and low emotional intelligence indicated that they had never experienced the same problem. However, all students still remembered that the SPLDV, elimination, and substitution contents had been obtained before and used this knowledge to solve the problem. The answers of students with high emotional intelligence in the critical thinking criteria interview situation showed that students often worked on several types of questions before, with that students with high emotional intelligence can achieve optimal critical thinking skills (Ismail, 2018). Therefore, it is recommended for teachers to provide various mathematical problems so that students' critical thinking skills can be more optimal (Rejeki et al., 2021).

Based on Figure 10, students with low, medium, or high emotional intelligence do not meet the indicators of the critical thinking criteria of clarity, namely explaining the terms used clearly with the fulfillment of the indicator that students can explain the meaning/intent of the terms used (x and y) in the problem-solving process correctly. All students tend to answer incorrectly when asked about the symbols x and y used in the example to solve the answer. In the first interview, students tended to answer only x, which is tobacco-patterned batik, and y, which is konah mask-patterned batik. Similarly, in the second interview, students answered only with x as a pencil and y as a notebook. This is related to the mathematical communication skills of the in-depth interviews conducted, it is assumed that students understand the meaning/intent of the symbols used (x and y), but students find it difficult to state them correctly and precisely. Because after being given stimulus questions, all students generally understand and can explain the terms used correctly and precisely. However, all students still do not meet the criteria for critical thinking clarity, because clarity must be clear and not cause different meanings in conveying the intent (Ennis, 1996). This can happen because of the lack of students' habituation in stating the definition of terms/symbols/notations completely, even though it is important to

have the ability to communicate well both in writing and orally so that other people can understand the information conveyed (Choridah, 2013). Therefore, teachers are expected to explain to students the importance of the meaning of each term/symbol/notation used in the known part of the answer sheet.

The indicator of the critical thinking criteria overview is reviewing the answer thoroughly. In solving a problem, the overview must be done continuously, not only at the end (Ennis, 1996). From the answer sheet for the critical thinking test based on students' jumping tasks, only students with high emotional intelligence meet the indicators of reviewing answers thoroughly. In the interview test, students with low emotional intelligence do not know how to write a review of the correctness of their answers even though students review their answers by looking back at the calculations that have been written before submitting the answers. Students with moderate emotional intelligence review their answers correctly but less thoroughly, whereas students do not review the final answers found. This study's results align with other studies that show a significant influence between emotional intelligence and students' critical thinking skills (Sulistianingsih, 2016). Students' emotional intelligence can be improved through self-awareness of their social environment, and teachers are expected to create a comfortable and enjoyable learning atmosphere so that students can follow the learning well (Purnama, 2016).

4 Conclusion and Suggestions

4.1 Conclusion

Based on the results of data analysis and discussion regarding students' critical thinking skills in solving jumping task questions on SPLDV content based on their emotional intelligence, the following conclusions are drawn:

1. The critical thinking ability of students with low emotional intelligence levels in solving mathematical jumping task problems on SPLDV content is in the low category. Where students with low emotional intelligence levels meet 2 criteria for critical thinking, namely focus and situation.
2. The critical thinking ability of students with moderate emotional intelligence in solving mathematical jumping task problems on SPLDV content is in the moderate category. Students with a moderate level of emotional intelligence meet four criteria for critical thinking: focus, reason, inference, and situation.

The critical thinking ability of students with high emotional intelligence levels in solving mathematical jumping task problems on SPLDV content is in the high category. Students with high emotional intelligence levels meet five criteria for critical thinking: focus, reason, inference, situation, and overview.

4.2 Suggestion

Based on the analysis of research data that has been conducted, the following suggestions can be given:

1. Teachers are expected to train students to think critically about the clarity criteria by explaining the importance of the meaning of each term/symbol/notation used in the known part of the answer sheet.
2. For other researchers, the question instrument can be further developed or used as a reference for making similar questions in different contents. The number of research subjects with emotional intelligence levels can be increased to make the data obtained more optimal.

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