

AN ANALYSIS OF STUDENTS' CRITICAL THINKING ABILITY IN SOLVING JUMPING TASK QUESTIONS BASED ON LEARNING STYLE

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ABSTRACT

Critical thinking ability is the ability that must be possessed by all students in order to solve the problems encountered. Research that can reveal the critical thinking skills of students needs to be done. This study aims to describe the critical thinking skills of junior high school students in Jember in completing the jumping task problem in terms of learning styles in the material system of two variable linear equations. This type of research is qualitative descriptive research. The data collection method used is a questionnaire for learning style, critical thinking ability test questions based on jumping tasks, and interviews. The subject consists of three subjects from the single learning force category. Based on data analysis, students with a visual style can complete three jumping task questions and are able to fulfill five critical thinking ability indicators, namely focus, reason, inference, situation, and clarity. Students with an auditorial style can complete three jumping task questions and are able to fulfill five indicators of critical thinking skills: focus, reason, inference, situation, and clarity. Students with a kinesthetic style can solve only one question and fulfill five indicators: focus, reason, inference, situation, and overview. Suggestions Further research can see the critical thinking skills of students with double learning styles.

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INTRODUCTION

Critical thinking is an essential ability applied in real life, learning, work, and it functions effectively in all aspects of life (Irawan, 2015). Critical thinking skills are essential and must be possessed by someone because everyone is often faced with problems and must make decisions that require reasoning, understanding, analyzing, and evaluating the information (Chukwuyenum, 2013). As technology develops, a person is required to do critical thinking. A person does not just accept information unquestioningly but must also be good at sorting and selecting the information he has received and presenting rational evidence (Firdaus et al., 2019). In mathematics lessons, critical thinking skills are needed to reason, find, and solve problems in a problem. Critical thinking skills are needed in learning in order to receive a deeper understanding of the concepts obtained by students (Ramlan, 2014). Critical thinking is used to evaluate the merits and truth of any statement, claim, or argument (As'ari, 2014). Therefore, students must possess critical thinking skills for the future.

A teacher must familiarize students with applying critical thinking skills in the learning process. One way that can be done is by giving Jumping Task questions. Jumping tasks are practice questions that apply the material so students feel more challenged and train their critical thinking skills (Ikhwani, 2021). Jumping Task questions can train students' critical thinking skills. The learning model applied also requires students to get used to critical thinking (Hobri, Oktavianingtyas, et al., 2020). Teachers not only provide informative learning but also provide real pictures that make students play a more active role in learning so that they can build critical thinking skills (Susanti et al., 2019).

In addition to using learning methods that familiarize critical thinking, learning style is one of the driving factors in student learning achievement. Learning styles are habits of how to absorb information and experience, as well as students' habits when dealing with the experiences they have (Sundayana, 2016). Learning style is the easiest way for someone to obtain, absorb, and analyze the information they get (Bire et al., 2019). Bobbi De Potter and Mike Hernacki distinguish learning styles into three parts: visual, auditory, and kinesthetic (Alhafiz, 2022). The visual learning style is a learning style that utilizes the sense of sight. The auditorial learning style is a learning style that utilizes the auditory senses. The kinesthetic learning style is a learning style that utilizes the sense of touch. Students who learn by using a more dominant learning style will get good results when compared to students who learn not in line with their learning style. Students' learning styles are closely related to the achievement of the average value of critical thinking skills and cognitive abilities of students (Nurbaeti et al., 2015). By combining learning styles and learning methods, students will enjoy learning more.

According to research, students with high mathematical thinking skills can fulfill the critical thinking aspects of focus, reason, situation, clarity, and overview but are still unable to fulfill the inference aspects (Mahardiningrum & Ratu, 2018). Students with moderate mathematical thinking skills can fulfill the critical thinking aspects of focus, situation, clarity, and overview but can still not fulfill the reasons and inference aspects. Students with low mathematical abilities can only fulfill the critical thinking aspects of focus and clarity. By conducting further research by giving jumping task questions, students with high critical thinking skills could fulfill the critical thinking aspects of focus, reason, inference, situation, clarity, and overview (Hobri, Oktavianingtyas, et al., 2020). Students with critical thinking skills can fulfill the aspects of focus, reason, inference, and situation. Students with low critical thinking skills can only fulfill the focus and situation aspects. From this research, it can be seen that giving the types of questions affects students' critical thinking abilities. This research used jumping task questions to assess students' critical thinking abilities.

The facts that occurred in the field when interviewing with one of the mathematics teachers at SMPN Jember stated that teachers still did not provide challenging questions above the curriculum, such as HOTS questions and Jumping Tasks. Teachers are used to giving questions whose level is at the learning indicator level. By getting students used to working on questions above the curriculum, it is hoped that students will become more accustomed to solving high-level questions and improve their critical thinking skills. Considering the above, students' critical thinking abilities in solving Jumping Task questions will be examined regarding learning style in the material Systems of Linear Equations in Two Variables. So the title was chosen, "An Analysis of Students' Critical Thinking Ability in Solving Jumping Task Questions Based on Learning Style."

METHOD

The type of research in this research is descriptive research using a qualitative approach. Qualitative research is an activity that collects data through an event where the researcher is the first instrument, and the analysis is inductive (Gay & Mills, 2019). Descriptive research is intended to describe or explain a condition scientifically. The research aims to describe students' critical thinking abilities in solving Jumping Task questions for class VIII SMP students on SPLDV material in terms of learning style. The place of this research is at SMP Negeri 10 Jember. The subjects of this research were three students from single learning style students. Subjects were selected based on the learning style type questionnaire scores.

Critical thinking ability can be seen based on the fulfillment of indicators of critical thinking ability. The data collection method in this research is in the form of tests and interviews. The test questions consist of three Jumping Task questions at level C4 at Bloom's taxonomy level. The interview contains questions that are used to explore more in-depth information regarding the level of students' critical thinking abilities in mathematics that have yet to be obtained in the written test.

The research procedures carried out in this research are preliminary activities, data collection, data analysis, and conclusions. The analysis carried out in this research was an analysis of students' achievement of critical thinking ability indicators. The critical thinking ability indicators used in this research were adapted from research conducted by Hobri et al., (2020). The following indicators of critical thinking abilities are presented in Table 1.

Table 1. Indicators of Critical Thinking Ability

No.	Aspect	Indicator
1.	<i>Focus</i>	a) Students can write the information they know in the question
		b) Students can write the information asked in the question
2.	<i>Reason</i>	a) Students can explain (either verbally or in writing) strategies for solving mathematical problems with reasons
		b) Students can work on questions according to the specified strategy accompanied by reasons
3.	<i>Inference</i>	Students can make conclusions from the questions they have worked on
4.	<i>Situation</i>	Students can connect previous knowledge in solving questions

5.	<i>Clarity</i>	Students can explain step by step the method used in working on the questions
6.	<i>Overview</i>	a) Students can check the answers again from beginning to end b) Students can find other ways to solve the problem

RESULTS AND DISCUSSION

Results

Data collection was carried out on Tuesday, April 19, 2022, in class VIIIC by giving a learning style questionnaire to 29 students to determine the research subjects, namely three students with a single learning style. Subjects with a single learning style are students with a visual learning style (SV), students with an auditory learning style (SA), and students with a kinesthetic learning style (SK). The interview was conducted on Wednesday, April 20, 2022. The results of the learning style type questionnaire can be seen in Table 2.

Tabel 1. Types of learning styles of research subjects

No	Learning Style	Number of Student
1.	Visual	8 student
2.	Auditorial	10 student
3.	Kinesthetic	7 student

Based on the results of the data analysis, SV still needs to meet the six indicators of critical thinking ability. In the focus indicator, SV can find out the known information and what is asked about in the question. In the reason indicator, SV can determine the solution strategy and calculate correctly, but the mathematical symbols used need to be corrected. On the inference indicator, SV writes a conclusion on the answer results but with the wrong answer. In the Situation indicator, SV cannot connect previous knowledge to solve the problem. It can be seen in SV's way of finding answers in a non-coherent way. In the Clarity indicator, SV tells the steps for completion, but SV looks confused about explaining the results of the work. In the Overview indicator, SV does not recheck the steps that have been taken until it finds the answer. It can be seen that SV was only silent when being interviewed to find out the Overview indicator. SV also has no other way to solve the problem. Thus, SV has not met the Situation, Clarity, and Overview indicators of critical thinking ability for question number 1. The following is the answer sheet and interview results for SV fulfilling the indicators.

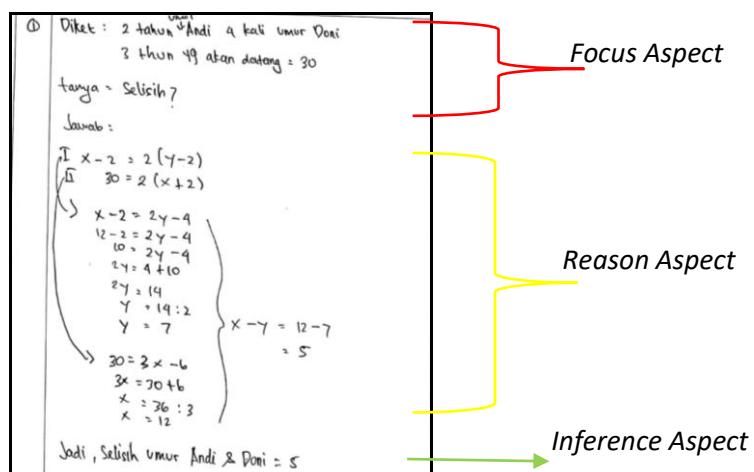


Figure 1. SV's answer to Question Number 1

The following is the interview process to meet the indicators of critical thinking ability towards SV.

P04: "From what is known, how do you make your mathematical symbols?"

SV04: "I symbolize Andi as x and Doni as y."

P05: "So what?"

SV05: "There are two equations; the first is because two years ago, so x and y are reduced by two, and the second is because three years in the future means plus three."

P06: "Where is this from?"

SV06: "From what is known in the question."

P07: "Oh, the second equation, okay. After knowing the mathematical symbols, what next?"

SV07: "Look for the x and y values."

P08: "What method do you use?"

SV08: "Usually, I use elimination, but I don't understand it."

P09: "But how come the values $x=12$ and $y=7$ have been obtained?"

SV09 : (silence)

Unlike the case with questions number 2 and number 3, SV was able to do the questions well. Looking at the answer sheet, SV wrote the information on the questions and the method in a coherent manner, as well as the conclusion at the end of the answer. During the interview, SV can also tell you the steps to solve it until you find the correct answer. However, SV did not double-check the completion steps he had taken. SV also does not have an alternative way to solve the problem. SV meets almost all indicators of critical thinking abilities except for the overview indicator. This is in accordance with research conducted by Setiana and Purwoko (2020), who found that visual-style students have critical thinking skills according to very good criteria.

Like SV, SA cannot fulfill all the indicators in the question. It can be seen on the answer sheet that SA writes down and understands what is known and asked in the question and writes down how to solve the problem, but the mathematical symbols used in the solution are not quite right. SA also writes conclusions on the answer sheet. During the interview, SA was often silent when asked about the method used to solve the questions and the steps taken to solve question number 1. SA also did not double-check the steps used. Thus, SA does not meet the situation, clarity, and overview indicators of critical thinking abilities.

SA was able to solve questions number 2 and 3 well. SA understands the information in the problem and can create mathematical symbols correctly from what is known. SA does the questions using the correct method and calculations. SA also wrote a conclusion to the answer. During the interview, SA can explain the strategies and methods used to solve the questions well. However, just like SV, SA cannot double-check the steps and answers. Thus, SA has met the five indicators of critical thinking ability but does not meet the overview indicator. The following is the answer sheet and interview results for fulfilling the SA indicators.

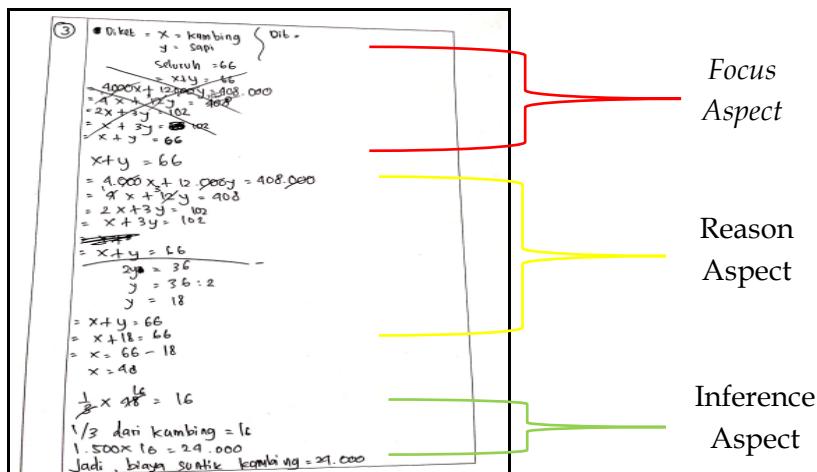


Figure 2. SA's answer to Question Number 3

The following are the results of the interview regarding the fulfillment of critical thinking ability indicators for SK.

- P25: "Then, what are the mathematical symbols?"
SA25: "Goats are x and cows are y. The equation is and ."
P26: "Then what do these two equations do?"
SA26: "Eliminated sis, met, then put into the equation, met."
Q27: "Are you able to use everything you already know to solve problem number 3?"
SA27: "Yes, you can, sis."
P28: "After meeting x and y, then what?"
SA28: "One-third of the goats were injected, so."
Q29: "How are you sure that the answer is correct?"
SA29: "I don't know, Sis."
P30: "Apart from this method, do you have any other way to solve question number 3?"
SA30: "Nothing, Sis."

SK subjects can only solve question number 2. It can be seen on the SK answer sheet that you write down what is known and what is asked in the question, write down the strategy or method of solving it correctly, and make a conclusion at the end of the answer correctly. During the interview process, SK can tell you step by step until you get an answer. However, like SV and SA, SK also did not double-check the steps he took when answering the questions. SK also does not have an alternative way to solve question number 2. Thus, SK is able to fulfill the five indicators of critical thinking ability but not the Overview indicator of critical thinking ability. In accordance with research by Hidayati and Jahring (2021), the mathematical connection abilities of kinesthetic children are in the deficient category. The following is the answer sheet and interview results for compliance with the SK indicators.

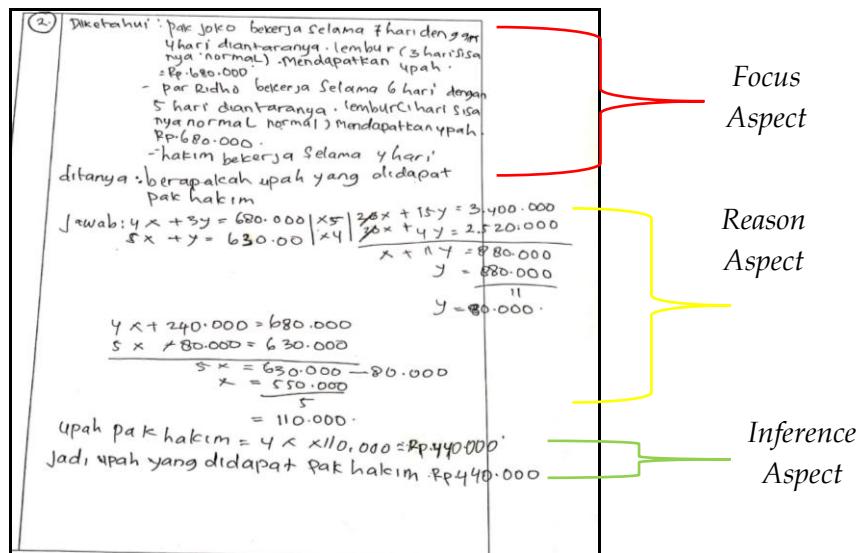


Figure 3. SK's answer to Question Number 2

The following are the results of the interview regarding the fulfillment of critical thinking ability indicators for SK.

- P12: "From what you know, how do you convert it to mathematical symbols?"
 SK12: "My overtime salary is symbolized by x, my normal salary is symbolized by y."
 P13: "So what?"
 SK13: "That means the first equation and the second equation."
 P14: "Okay, now that you know the equation, what's the next step?"
 SK14: "The equation is eliminated sis, found it."
 P15: "So what?"
 SK15: "The value of y is entered into the equation and found."
 P16: "Where did this value of 440,000 come from?"
 SK16: "From what you asked Sis, what you asked was that the Judge worked overtime for four days, so."

Discussions

Research conducted by Ismiati et al. (2021) says that learning style influences mathematical critical thinking abilities. It can be seen in acquiring critical thinking indicators for each learning style. The visual learning style can solve all questions and fulfill the five indicators of critical thinking ability. Similar to the visual learning style, the auditory learning style can solve problems and fulfill the five indicators of critical thinking ability. The kinesthetic learning style can only solve one problem and fulfill five indicators of critical thinking ability. However, each student with different learning styles has a strong potential to develop critical thinking skills in mathematics through stimulation from teachers (Setiana & Purwoko, 2020). Giving Jumping Task questions also affects students' critical thinking abilities. This is based on research by Hobri, Ummah, et al. (2020), who state that giving jumping task questions is more effectively applied to determine students' problem-solving abilities compared to applying sharing tasks and conventional models.

The results of this study are also have differences with several studies that have been conducted. Research conducted by Amir (2015) shows that the thought process of auditory students is better than visual students because visual students tend to see more focus on the problem and analyze answers based on images. At the same time, auditory students are more

likely to re-read the problem and answer to mention the problem's focus and each step of the solution. In addition, the research results by Hidayati & Jahring (2021) showed that kinesthetic students have better critical thinking skills than students with visual and auditory learning styles. The results of this analysis show the implication that learning styles have an essential role in maximizing performance. This follows the research of Makhlof et al. (2012), who found that teaching and learning styles play a significant role in students' maximizing performance in the classroom.

CONCLUSION

Based on the results of data analysis and discussion, visual style students were able to complete three Jumping Task questions and were able to fulfill five indicators of critical thinking ability, namely Focus, Reason, Inference, Situation, and Clarity. Students with an auditory learning style can complete three Jumping Task questions and fulfill five indicators of critical thinking ability: Focus, Reason, Inference, Situation, and Clarity. Students with a kinesthetic learning style can solve just one problem and meet five indicators: Focus, Reason, Inference, Situation, and Overview. This study focused on students with only one learning style, so it focused on the auditoria, visual, and kinesthetic learning styles. It would be better for further research to discuss related to the ability to think critically with a double learning style.

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