



Critical Thinking Skills in Solving Hots-Based Procedural Text Problems for Class X Students at Senior High School

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Article Info	Abstract
Received: 2026-04-07 Revised: 2026-05-19 Accepted: 2026-08-10 Keywords: Critical Thinking, HOTS, Procedure Text, Indonesian Language Education. DOI: 10.24256/ideas.v14i1.12144 Corresponding Author: Ramdayani Ramdayani390@gmail.com Indonesian Language and Literature Education, FKIP University Tadulako	<i>Higher-level thinking competencies are one of the main competencies in HOTS-oriented learning. However, studies on these competencies in high school students in solving text-based problems are still limited, especially those that relate student achievement to the causative factors. The procedural text was chosen as an assessment context because it demands an understanding of the logical sequence, cause-effect relationship, and correctness of steps, making it relevant to measure students' analytical, evaluative, and reasoning abilities. This study aims to describe these competencies in solving HOTS-based procedural text problems and identify the factors that affect them. The study used a qualitative descriptive approach with 23 subjects from class X B Senior High School. Data was collected through tests, interviews, and documentation, then analyzed using Miles and Huberman's interactive models. The instrument is adapted from the Facione framework of interpretation, analysis, inference, and evaluation with the addition of creation indicators as HOTS operational indicators. The results show that student achievement is generally in the good category, with analysis as the most dominant aspect, while interpretation, inference, evaluation, and especially creation still need to be improved. The difference in achievement was influenced by the understanding of text structure, reading literacy, and teacher learning strategies. These findings confirm the need for Indonesian language teachers to consistently integrate HOTS-based activities to develop students' ability to analyze, evaluate, and create, while contributing to the development of HOTS-oriented Indonesian</i>

1. Introduction

Critical thinking is one of the main competencies in HOTS-oriented learning, namely the ability to analyze information logically, evaluate evidence, and draw conclusions that are responsible for solving problems. In this study, these abilities were analyzed using a framework developed by Facione, which outlines the critical thinking process into cognitive skills in the form of interpretation, analysis, evaluation, inference, explanation, and self-regulation. This framework was chosen from the beginning as a theoretical foundation because it provides a systematic basis for identifying students' thinking processes when solving problems, as well as being operationalized according to the characteristics of the research instrument. However, studies that specifically examine the ability of high school students to solve HOTS-based procedural text problems and link them to the factors that cause differences in student achievement are still rare.

Previous studies have shown patterns that complement each other but also leave the same gaps. At the level of literature mapping, (Krisna et al., 2024) and Zikrullah and Azhari (2024) show that critical thinking research in Indonesian language education has developed widely, but both are in the form of literature reviews so they do not provide an empirical picture of students' abilities in certain materials. At the level of learning interventions (Moghadam et al., 2023) and Erlangga et al. (2025) both proved that the integration of critical thinking activities through a reading-based approach as well as Data-Driven Learning and Task-Based Language Teaching is effective in improving students' understanding and reasoning, in line with the findings (Chau & Seepho, 2026) who reported significant improvements in the ability to analyze, evaluate, and create EFL students in Vietnam after the implementation of HOTS-based assignments, and (AlBadi et al., 2025) which underscores the importance of HOTS-based questioning strategies to spark critical thinking in EFL students. Meanwhile, at the instrument development level, (Rivas et al., 2023) validate critical thinking assessment instruments at the higher education level, and (Akbar et al., 2025) measure EFL students' HOTS achievement in reading comprehension. These three research streams of literature mapping, learning interventions, and instrument development consistently show that HOTS-based critical thinking assessments are still rarely carried out in the context of procedural texts at the high school level, and Aprianti et al. (2025), who developed procedural text writing materials based on the Facione pattern, also focused on the development of teaching materials, not the mapping of students' abilities. This gap is the basis for this study.

The procedural text material was chosen as the context of the assessment because its characteristics naturally demand a high-level thinking process. Students not only need to understand the purpose, structure, and language rules of a procedure, but also analyze the interconnectedness between steps, evaluate the

suitability and logic of the procedure, and design new solutions or procedures according to a specific context. These three demands of analysis, evaluation, and creation are in line with the highest cognitive dimension in learning, so that procedural texts become relevant material to measure students' thinking processes gradually, from information understanding to solution production.

HOTS is generally referred to through the cognitive levels C4 (analyze), C5 (evaluate), and C6 (create) in the revised Bloom Taxonomy. In this study, the analysis and evaluation indicators on the Facione framework conceptually intersect with the C4 and C5 Bloom levels, as both require students to decipher the structure of information and assess the accuracy or logic of a procedure. Meanwhile, since the Facione framework does not cover a C6-equivalent production level, the study adds the creation indicator as an operational arrangement, not part of the Facione core indicator to represent the HOTS guidance at the highest level, i.e. the ability to develop alternatives or new solutions.

Thus, the five indicators used are interpretation, analysis, inference, evaluation, and creation. To analyze students' critical thinking skills, this study uses the critical thinking framework developed by Facione as a theoretical basis. The Facione framework explains that critical thinking involves a number of cognitive skills that allow a person to understand information, analyze relationships between information, assess evidence, draw conclusions, and provide reasons for decisions made. This framework includes interpretation, analysis, evaluation, inference, explanation, and self-regulation.

This framework is used in research because it can provide a systematic basis for identifying students' thought processes when solving problems. In this study, the concept of critical thinking was adjusted to the characteristics of HOTS-based procedural text questions. Preparations are made so that the indicators used can describe students' abilities more specifically in accordance with the guidance of the material and the form of questions given. Therefore, students' critical thinking skills are assessed through five indicators, namely interpretation, analysis, inference, evaluation, and creation.

Interpretation deals with the ability of students to understand and interpret the information contained in procedural texts. Analysis is concerned with the ability to decipher the structure, linguistic rules, and relationships between parts in a procedure. Inference is used to see the ability of students to draw conclusions based on available information and evidence. Evaluation is concerned with the ability to consider the accuracy, logic, and effectiveness of a procedure. Writing is used to see the ability of students to develop alternatives or find new solutions based on the problems presented.

The five indicators were chosen because they correspond to the characteristics of research instruments that not only require students to understand the content of the text, but also require them to process information and use it to solve problems. Thus, the interpretation, analysis, inference, and evaluation indicators are used to describe students' critical thinking processes,

while the create indicators are used to represent the demands of HOTS at the production or development level of alternative solutions. Using these five indicators, students' critical thinking skills are analyzed based on the results of problem solving and reinforced by the results of the interview.

This analysis is not only used to determine student achievement, but also to understand difficulties and factors related to their ability to solve HOTS-based procedural text problems. Thus, the Facione critical thinking framework that has been operationalized in this study can be the basis for obtaining an overview of students' abilities in understanding, analyzing, concluding, evaluating, and producing solutions to given problems.

The results of interviews with Indonesian language teachers at Senior High School show that the form of evaluation used in learning includes essays and multiple choices. However, the teachers revealed that students' critical thinking skills are still diverse. Some students are able to solve HOTS-based questions, but there are still students who are even less able to demonstrate optimal critical thinking skills in solving problems. To improve students' critical thinking skills, teachers apply various learning strategies, one of which is through reading activities before students work on the questions. In addition, HOTS-based questions are used as an assessment instrument to identify each student's critical thinking ability. The results of this research are the basis for teachers to implement differentiated learning according to the needs and characteristics of students.

Based on this description, the study aims to explain students' critical thinking skills in solving HOTS-based procedural text problems in grade X students of Senior High School. This research was driven by the low critical thinking ability of some students in solving problems that require high-level thinking skills. This condition shows that students' critical thinking skills need to be studied more deeply as a basis in an effort to improve the quality of Indonesian language learning. Through this study, it is hoped that it can obtain an overview of students' critical thinking skills based on critical thinking indicators in solving procedural text problems based on HOTS. The results of this research are expected to be evaluation materials for teachers in designing more effective learning strategies to develop students' critical thinking skills, as well as contribute to the development of Indonesian language learning oriented towards high-level thinking skills.

2. Method

3.1 Types and Research Approaches

This study uses a type of qualitative descriptive research with a qualitative approach. This approach is used because the research aims to describe and analyze in depth students' critical thinking skills in solving HOTS-based procedural text problems. This research focuses on the process of students in understanding, deciphering, assessing, drawing conclusions, and developing answers when solving HOTS-based procedural text questions. The research data was obtained

through the results of the HOTS essay questions, interview results, and documentation. The data was analyzed using Facione's critical thinking indicators, namely interpretation, analysis, evaluation, and inference. In addition to the four indicators, the study also paid attention to the ability to create and related to the cognitive level of C6 in HOTS. Thus, the Facione indicator is used as a basis for analyzing critical thinking skills, while the creative aspect is used to see students' ability to produce or compile new procedural texts according to the demands of HOTS questions.

3.2. Research Location and Time

This research was carried out at Senior High School which is located at Jalan Mokolembake No. 10, Lere, West Palu District, Central Sulawesi. The research was carried out from November to December 2025 on students in grade X B Senior High School. The selection of this research location is based on the suitability of the school with the focus of the research, namely the ability of students to solve HOTS-based procedural text problems.

3.3. Research Subjects

The subject of the study was 23 students in class X B Senior High School, consisting of 8 male students and 15 female students. All students of class X B who were the subjects of the research participated in the work on the HOTS-based procedural text essay questions. The data from the work is used to determine students' critical thinking skills based on predetermined indicators. The data is used as the basis for determining interview participants. PThe research is carried out based on the consideration that students of class X B have obtained procedural text material and can provide data in accordance with the purpose of the research. Therefore, the research uses the purposive sampling technique, which is the selection of students based on certain considerations that are in accordance with the needs of the research.

In the first stage, all 23 students of class X B took the HOTS-based essay test. In the second stage, test results were examined using an assessment rubric that had been compiled based on indicators of critical thinking ability and HOTS cognitive level. In the third stage, test results are used to group students based on their ability level, namely the categories of excellent, good, adequate, and poor. In the selection of interview informants, the researcher considered the representation of students with high, medium, and low abilities in order to obtain a diverse picture of the student's thinking process in solving the problem. Interview participants were selected purposively by considering the test results and the representation of each ability category. Students from the high ability category were selected to provide an overview of strategies and thought processes that have developed well. Medium category students are selected to describe abilities that have developed but still have some limitations, while low-category

students are selected to find out the difficulties experienced in understanding, analyzing, evaluating, and solving problems.

3.4 Types and Data Sources

3.4.1 Data Types

The type of data in this study is qualitative data. Qualitative data is in the form of student answers to HOTS essay questions, interview results, and documentation. The data is used to describe students' critical thinking skills in solving HOTS-based procedural text problems. Test result data can also be presented in the form of frequency and percentage to help illustrate the tendency of students' abilities in each category. The presentation of these numbers serves as a support for a qualitative description and not as the main basis for research.

3.4.2 Source data

The main data source in this study is 23 students in class X B Senior High School. Additional data sources are in the form of interview results, as well as documentation of research activities. In the research document, there were 23 students in class X B, consisting of 8 males and 15 females.

3.5 Data Collection Techniques

The data collection techniques used in this study include tests, interviews, and documentation

3.5.1. TESTS

The test was used to obtain data on students' critical thinking skills in solving HOTS-based procedural text problems. The test is in the form of five essay questions that are arranged based on the procedural text material and the HOTS cognitive level, namely C4 (analyzing), C5 (evaluating), and C6 (creating). The five questions are mapped with the ability to think critically. First question measuring interpretation, the second question measuring analysis, the third question measuring inference, the fourth question measuring evaluation, and the fifth question measuring the ability to create. Each question has a maximum score of 3 so the overall maximum score is 15. The grids have been listed in the research instruments.

3.5.2 Interviews

Interviews are used to obtain more in-depth information about students' thinking processes when solving problems. The interview is conducted after the student has taken the test so that questions can be directed to the answers that the student has given.

3.5.3 Documentation

Documentation is used to obtain research evidence in the form of student answer sheets, records of research activities, and documentation of the

implementation of tests and interviews. The student's answer sheet is the main document that is analyzed to identify critical thinking skills based on the indicators used. Previous research documents also stated that students' answers were analyzed based on indicators of critical thinking ability.

3.6 Research Instruments

The research instrument uses a qualitative approach. Researchers play a role in collecting, processing, analyzing, interpreting, and summarizing data. To assist the data collection process, supporting instruments are used in the form of HOTS essay test sheets, assessment rubrics, interview guidelines, observation sheets, and documentation.

3.6.1 HOTS Essay Test Sheet

The test sheet consists of five HOTS-based essay questions on procedural text material. The questions were developed by referring to the cognitive levels C4, C5, and C6 as well as indicators of critical thinking ability. The development of the question is carried out through several stages. The question grid in this study consists of five questions with a maximum score of 3 in each question. The first question measures interpretation on C4, the second question measures analysis on C4, the third question measures inference on C4, the fourth question measures evaluation on C5, and the fifth question measures creation on C6.

3.6.3 Rubik's Cubes

Score	Assessment Criteria
3	The answer is precise, complete, logical, and in accordance with the measured indicators.
2	The answer is quite precise and in accordance with the indicators, but the explanation or reason is still incomplete.
1	The answers are only partially according to the indicators, but there are very limited errors or explanations.
0	Not answering, not answering the question, or not showing the ability measured.

The Rubik's Cubes are used to assess the ability of each question. The overall score was obtained from a total of five questions with a maximum score of 15. The student's ability category is then determined based on the results of the score obtained.

3.7 Interview Guidelines

Interview guidelines are used to explore students' reasons and thought processes after completing the test. Interview questions are developed based on students' answers.

Table 3.7 Student Interview Guidelines

No	Question
1.	What do you understand about the question from the procedural text?
2.	How do you know the purpose of the text?
3.	Do you think that prior knowledge of the procedural text helps you answer questions better?
4.	How does the ability to read and understand instructions affect your success in answering questions?
5.	How do you determine the necessary steps
6.	What are the consequences if one of the steps is skipped?

Interview Results as Supporting Data

Interviews are used as supporting data to deepen and clarify the results of the HOTS essay test. Informants were selected purposively by representing three groups of ability, namely high, medium, and low groups. Interview data was analyzed thematically through the stages of reading the interview results repeatedly, identifying relevant statements, providing codes, grouping codes based on similarities in meaning, and then interpreting themes based on critical thinking indicators. Based on the interview data obtained, the indicators that can be analyzed directly are **interpretation, analysis, and inference**.

Table 3.7.1 Thematic Results of the Interview

Indicator	High Group (FN)	Medium Group (CR)	Low Group (VA)
Interpretation	Understand text in a more structured way and be able to connect information with the purpose of the text.	Understand the basic information and purpose of the text, but the explanation is not yet in-depth.	Able to recognize basic information, but the explanation is still simple.
Analysis	Able to connect materials/tools, steps, and goals in determining steps.	Define steps based on the information available in the text.	Determine the steps based on the question prompts and available information.

Inference	Be able to estimate the consequences if one of the steps is skipped and explain the possible outcome.	Being able to estimate that the steps skipped may cause the results to be inconsistent.	Able to predict the consequences, but the explanation is still short.
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Analysis of Interview Results

Based on table 3.7.1, the results of the thematic analysis of the interviews show that there is a difference in the depth of the thinking process between the high, medium, and low groups. In the **interpretation indicator**, the students of the high group (FN) showed a more structured understanding of the procedural text and were able to relate the information to the purpose of the text. Medium group (CR) students were able to understand basic information about the procedural text, but the explanations provided were not in-depth. Meanwhile, low-income (VA) students are able to recognize basic information in the text, but are not yet able to explain the purpose and information of the text in more detail.

In the **analysis** indicator, FN shows the ability to connect materials or tools, steps, and objectives in determining the necessary steps. This shows that FN not only uses the available information, but also considers the relationships between elements in the procedural text. SM determines steps based on the information contained in the text, while VA is more guided by question commands. Thus, the ability to connect various information in text has not developed evenly in each group.

In the **inference indicator**, the three groups were able to estimate the consequences if one of the steps in the procedural text was skipped. FN is able to provide a more targeted explanation of possible outcomes that are not in accordance with the objectives. SM is also able to predict that the steps skipped could cause a result to be inconsistent, while the VA provides a simpler conclusion that the final result could be incorrect or inappropriate. These differences show that inference abilities have emerged in all three groups, but the depth of the reasons given is still different.

In addition to these three indicators, the results of the interviews also show that **the initial knowledge** of the procedural text helps students understand the instructions and the steps to solve the problem. The condition of **the learning environment** also appears as a supporting factor in the student's thinking process. High group students view a comfortable environment as helping to think more clearly, while lower group students state that a less conducive classroom atmosphere can interfere with concentration.

Overall, the interview results as supporting data reinforce the results of the HOTS essay test that students' critical thinking skills have not developed evenly. The high group of students showed a more in-depth and directed thinking process,

the medium group showed sufficient but inconsistent basic skills, while the low group tended to give a simple response in interpreting, analyzing, and drawing conclusions. Interview data was analyzed thematically through the transcription process, repeated reading of the data, coding, grouping of codes into themes, and interpretation based on Facione indicators. INT codes are used for interpretation, ANA for analysis, and INF for inference. Furthermore, the interview results were compared between high, medium, and low group informants to see the difference in the depth of students' thinking processes. Interviews are used as supporting data to reinforce and clarify the results of the HOTS essay test.

3.8 Data Analysis Techniques

The research data analysis used the Miles and Huberman interactive data analysis model which included data reduction, data presentation, and conclusion drawn.

3.8.1 Data Reduction

Data reduction is done by selecting, centralizing, simplifying, and grouping data relevant to the focus of the research. At this stage, the researchers:

1. selecting the results of student answers;
2. identify answers based on indicators of interpretation, analysis, evaluation, and inference;
3. identify the ability to create in the C6 problem;
4. selecting the results of interviews related to the student's thinking process;
5. coding interview data;
6. group data by theme;
7. group students based on ability level; and
8. Eliminate data that is not relevant to the focus of the research.

3.8.2 Presentation Data

The data is presented in the form of tables and narrative descriptions. Test results are presented based on scores, frequency, percentages, and ability categories. The results of the interviews are presented through narrative descriptions and excerpts of relevant student answers.

The presentation of data is carried out based on indicators of critical thinking ability so that the pattern of students' abilities in each indicator can be known. Interview data is used to clarify the reasons behind students' answers to the test.

3.8.3 Withdrawal Conclusion

Conclusions are drawn after all data has been analyzed. Conclusions were drawn based on test results, interviews, observations, and documentation. The results are compared and interpreted based on Facione's indicators.

Conclusions are not only based on the student's score, but also on the quality of the answers, the reasons given, the thought process shown in the interview, and the suitability between the test and interview data.

3.9 Data Collection Procedure

Data collection is carried out through several stages.

1. The researcher takes care of the research permit to the school.
2. The researcher determines the class and the research participants.
3. The researcher explains the objectives and procedures of the research to the students.
4. Students worked on five HOTS-based procedural text essay questions.
5. The researcher collected and examined the students' answer sheets using rubrics.
6. Test results are analyzed and students are grouped based on ability level.
7. The researcher selected the interview informants according to the representation of the ability group.
8. Interviews are conducted to explore the thinking process and factors that affect students' abilities.
9. The results of the interviews are recorded/recorded and transcribed.
10. Observation and documentation data were collected as supporting data.
11. All data were analyzed and compared based on Facione indicators.

3.10 Conceptual Framework of Data Analysis

To clarify the flow of the analysis, Figure 1 illustrates how the essay and interview test data is processed—from coding, categorization to the five Facione indicators, triangulation, to drawing conclusions about students' critical thinking skills.

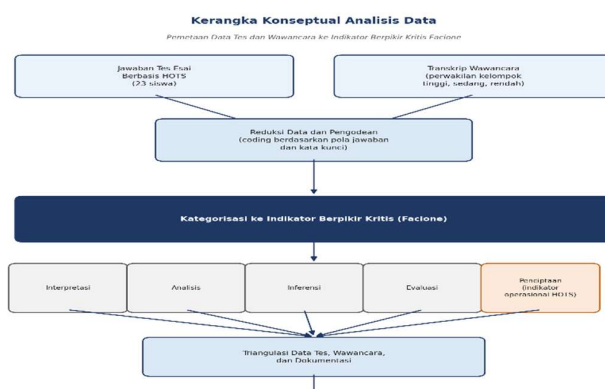


Figure 3.10. Conceptual Framework of Data Analysis

3. Result

The research data was obtained through HOTS-based essay tests, interviews, and documentation. The test was given to 23 students of class X B Senior High School and consisted of five essay questions prepared based on procedural text material. The five questions were used to identify students' ability to understand information, analyze text elements, draw conclusions, evaluate procedural accuracy, and generate new procedural texts. After the test is analyzed, interviews are conducted with students representing high, middle, and low ability groups to get a more in-depth explanation of the student's thought process in solving the HOTS questions.

4.1 Results of the Student Critical Thinking Ability Test

The test results showed differences in achievement in each indicator of critical thinking ability. It should be emphasized that the percentages reported in this section represent the distribution of students based on the most dominant indicator in their answers which is the indicator with the highest score on each student's test results, not the percentage of class achievement in each indicator or the percentage of the number of questions answered correctly. With this reporting method, each student is calculated exactly once on his dominant indicator, so that the total frequency of the five indicators is 23 students (100%). This method of reporting differs from conventional indicator achievement reporting, which typically reports the percentage of students who meet the minimum criteria on each indicator independently (so the total percentage can exceed 100%).

Based on these results, the analysis indicator was the most dominant achievement (11 students, 47.83%), while the interpretation indicator was the achievement with a low proportion (2 students, 8.70%). The full distribution is presented in Table 4 and visualized in this table.

Table 4.1. Distribution of Students Based on Dominant Critical Thinking Indicators

Yes	Indicator	Frequency	Percentage
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1	Interpretation	2	8,70%
2	Analysis	11	47,83%
3	Inference	4	17,39%
4	Evaluation	3	13,04%
5	Create	3	13,04%
Quantity		23	100%

The interpretation, analysis, inference, and evaluation indicators are used as indicators of critical thinking processes based on the Facione framework, while the create indicators are used as additional operational indicators to represent the demands of HOTS at the C6 level.

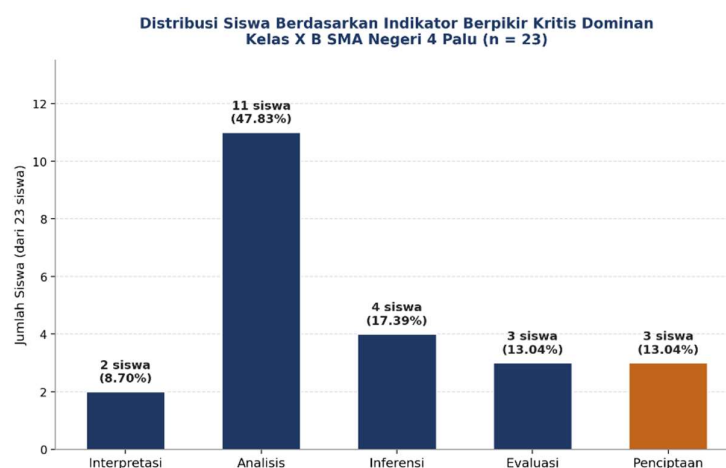


Figure 4.1 Distribution of Students Based on Dominant Critical Thinking Indicators

4.1.1 Description of the Achievements of Each Indicator

The following description describes the characteristics of the student's performance in each indicator, reinforced with direct excerpts from the test answers and interview results.

1. Interpretation (2 students, 8.70%)

Students in this indicator are able to recognize the objectives, materials/tools, and steps in the prisedur text, but their ability is still at the information introduction stage and has not consistently explained the relationships between structures in depth.

"A procedural text is a text that provides detailed information through easy-to-understand and structured steps to achieve a goal."

The results of the interviews showed that FN had a relatively good ability to understand the text of the procedure. In the interpretation aspect, FN not only recognizes the procedural text as a text containing

steps, but also understands that the steps are structured to achieve a specific goal. FN is also capable of connecting objectives with parts of the text.

2. Analysis (11 students, 47.83%)

Eleven students achieved this indicator relatively well, especially on the ability to identify imperative verbs in procedural texts and relate them to the instructional functions of the text. Students are more accustomed to deciphering text elements than giving assessments or coming up with new solutions.

"Students are able to decipher the function of verbs in the procedural text. Students explain that words such as "heat", "insert", "stir", "give", "add", and "lift". It is a command word or verb used in the steps to make fried rice. In addition, Shiva also explains the function of each verb. This ability shows that he is able to analyze elements of diversity and relationships between parts in the procedural text. UA states that he knows the purpose of the text by looking at the text with a title that explains what will be made, this shows that he is able to connect the title with the content of the text so that he can understand the writing of the procedural text.

3. Inference (4 students, 17.39%)

In this indicator, students are able to give an assessment of the results of the process of making fried rice by stating that the taste can change because the spices are not mixed evenly. The statement shows the ability of students to assess the quality of results based on logical reasons, but the explanation given is still simple.

4. Evaluation (3 students 13.04%)

In this indicator, students are able to identify the shortcomings of the procedural text, such as *"Because, the steps are too short and lack of detail, there is no description of the length of cooking"*) students are able to give an assessment of the procedural text read. This can be seen in the student's answer which states that the steps in the text are too short and lacking in detail because there is no description of the name of the cooking point of the assessment point indicating that the student is capable of having a lack of procedural text based on the clarity of the information conveyed.

5. Creating (3 students, 13.04%)

In this indicator, students are able to rearrange the procedural text, this can be seen when students explain that the steps in the procedural text must be done in order so that the results of the dishes are good and the seasoning is evenly distributed. He can also conclude that the use of the word command helps the reader understand the cooking stages clearly.

It is important to emphasize that the create indicator is used consistently in this study as an additional operational indicator that represents the demands of HOTS at the C6 level, and is not part of the core indicators of the Facione framework, which includes interpretation, analysis, inference, and evaluation.

Table 4.2. summarize strengths, weaknesses, representative evidence, and instructional implications for each indicator, to make it easier for readers to grasp the core findings as well as practical follow-up for learning

Table 4.2. Synthesis of Strengths, Weaknesses, Representative Evidence, Instructional Implications

Indicator	Strength	Disadvantages	Representative Evidence	Instructional implications
Interpretation 8,70%	Students can recognize the objectives, materials/tools, and steps in the procedural text	Students have not consistently explained the function of each structure and its relationship to the success of the procedure.	"A procedural text is a text that instructs us to achieve a goal."	Provides problematic questions about the purpose, function, and relationships between parts of the text.
Analysis 47,83%	Students are able to identify linguistic elements, especially imperative verbs, as well as explain their basic functions as instructions.	Some students are unable to connect linguistic elements to the effectiveness of the text in more depth.	CR explained that the steps are determined by reading and paying attention to the necessary steps.	Provide problematic/alternative texts and ask students to define and give reasons.
Inference 17,39%	Students can relate the information	The conclusions given	FN explained that if one	Provide prediction and causation exercises and ask

	in the text to the possible consequences posed by a step change	remain simple and are not always accompanied by profound reasons.	of the steps is skipped, the results obtained are not good and not in accordance with expectations.	for reasons for conclusions.
Evaluation 13,04%	Students may find flaws in the text, such as steps that are too short or lack of detail.	Assessments are not always supported by strong evidence and reasons based on specific criteria	"I think it is less effective with just 3 steps because it is not clear and precise with the materials and steps."	Provide two texts to compare and ask for an assessment based on evidence and reason.
Create 13,04%	Students can draft new procedural texts with objectives, materials, and	Most students still have trouble developing coherent materials, measurements, and steps.	Students were able to rearrange the text of the new procedure for five people by adding more detailed materials and steps than the previous text.	Assign the task of developing or drafting a new procedural text with changes in materials, steps, or portion counts.

Interviews are used as supporting data to deepen the findings of the test results. Interviews are mainly used to clarify students' thinking processes on the aspects of analysis and inference. Meanwhile, the evaluation and creation

indicators were analyzed based on students' responses to the HOTS essay test because the two indicators were not explored directly in the interview.

4.2. Factors Affecting Critical Thinking Skills

4.2.1. Initial Knowledge Factor

Students who have an initial understanding of the characteristics of procedural texts find it easier to recognize the purpose, structure, and steps of the text before conducting further analysis. **"A procedural text is a text that instructs us, structured through easy-to-understand Step-by-Step Instructions and a structured process, to achieve a goal"**Based on initial knowledge, it can be concluded that students who have a prior understanding of procedural texts have an easier time recognizing the text's purpose, structure, and steps. One of the students explained that a procedural text is a text that provides step-by-step instructions in a structured manner to achieve a specific goal. This finding is in line with the constructive view, which emphasizes that didk participants do not come to class with empty eyes, but have brought prior knowledge and experience that teachers need to facilitate to develop into new understanding. (Hasanuddin, 2020).

4.2.2. Factors of Reading and Understanding Instructions

"Capturing what is actually being asked about determining important information". Students who do not read instructions carefully tend to have difficulty determining relevant information and answering according to the demands of the questions. Thus, critical thinking in this context depends not only on mastery of the procedural text material, but also on the ability to understand the demands of the question itself, in line with the finding that literacy skills contribute to students' high-level thinking abilities (Wahyudi et al., 2022).

4.2.3. Literacy and Habituation Practices

"Yes, with knowledge of the procedural text, it is easier for us to understand the instructions and achieve a good goal". Students who are used to reading and working on HOTS questions show a greater chance of developing the ability to analyze, evaluate, and compose answers, while a lack of practice tends to make students rely on memorization. HOTS-oriented learning encourages students to analyze information, solve problems, evaluate alternatives, and find creative solutions, so teachers need to design innovative learning with continuous practice (Dwijayanti, 2021).

Overall, the critical thinking ability of students in grade X B Senior High School in completing HOTS-based procedural texts is at varying levels, with analysis as the most dominant indicator, while interpretation, inference, evaluation, and creation still need strengthening. This difference in achievement is related to students' initial knowledge, ability to understand instructions, and literacy experience and practice HOTS questions. These findings confirm that

Indonesian language learning needs to gradually steer students from understanding and analyzing information to the ability to reason, evaluate, and create new procedures, through the continuous integration of HOTS activities.

4. Discussion

4.3.1 *Patterns of Students' Critical Thinking Skills in Theoretical Perspectives and International Comparisons*

The results of the study show that students' abilities develop unevenly throughout the critical thinking process, with analysis as the most prominent achievement and interpretation, evaluation, and creation lagging behind. This pattern can be explained through the differences in cognitive demands between indicators in the framework of Facione: analysis demands that students outline elements that are explicitly available in the text (e.g. imperative verbs and step structures), so that the processed information is relatively concrete and direct to be observed. In contrast, evaluation and creation demand that students go beyond available information to construct their own assessment criteria, defend arguments with evidence, or reorganize knowledge into new products.

The higher the demands on cognitive self-regulation of a task, the greater the need for prior knowledge, problem-solving strategies, and experience in facing open-ended tasks. This pattern of dominance of analysis over evaluation and creation is consistent with the latest international findings. (Chau & Seepho, 2026), for example, reported that EFL students in Vietnam were also faster to show progress in analytical skills than in evaluating and creating after receiving HOTS-based assignments, indicating that C4 cognitive levels are consistently more attainable than C5–C6 across language and cultural contexts. In line with that, (AlBadi et al., 2025) found that EFL teachers' questioning strategies were still dominated by questions that provoked identification and analysis of information, while questions that explicitly demanded critical evaluation or the production of new ideas were much less likely to be asked in the classroom a learning pattern that could potentially explain why students' evaluation and creation skills tend to lag behind, including in the context of this study. Thus, the gap between analysis and evaluation/creation does not seem to be a mere characteristic of Indonesian students, but rather a broader pattern of how HOTS-based learning is designed and implemented in the classroom.

4.3.2 *Why Interpretation Is the Lowest Achievement Indicator*

This explanation is in line with the findings (Akbar et al., 2025) in the context of reading comprehension, EFL, which shows that the ability to interpret the implicit functions and purposes of a text is one of the most difficult aspects of HOTS for students to master, precisely because it is rarely explicitly trained in learning compared to the skill of identifying surface information. This conjecture is also reinforced by the learning patterns identified in the interviews in this study (see

Subchapter 4.2), where students are more accustomed to being trained to recognize linguistic elements explicitly than to be invited to discuss why a text structure is structured in such a way. In other words, low interpretation achievement is most likely to reflect a learning exposure gap, rather than simply the indicator's intrinsic level of cognitive difficulty.

4.3.3 Implications for Learning Practice: Strategies for Strengthening Evaluation and Creation

The achievement of interpretation indicators of 8.70% shows that students' ability to interpret information and explain the function of text elements is still very limited. In fact, this achievement is the lowest among all critical thinking indicators measured in this study, including when compared to the creative indicators (13.04%). This condition is important to discuss because interpretation is the basis for students to understand information before carrying out the critical thinking process at the next stage.

Low interpretability may be related to the characteristics of the task being given. In the procedural text, students find it relatively easy to find information that appears explicitly, such as objectives, materials, tools, and steps. However, interpretation demands that students go beyond the introduction of such information by explaining **the functions, meanings, and relationships between parts of the text**. In other words, students are not only asked to know that a structure is contained in the text, but must be able to explain why it is necessary and how its existence supports the achievement of the objectives of the procedure. This condition can explain why the interpretation achievement in this study is low even though conceptually the interpretation is in the early stages of the critical thinking process.

Students' difficulties are not solely due to the high cognitive level of the indicators, but also because students may be more accustomed to working on tasks that ask them to find information directly rather than explaining the functions and relationships of that information. Thus, low interpretation may reflect a gap between **literal and functional understanding** of the text.

The above findings suggest that improving evaluation and creation skills requires explicit learning interventions, not just giving HOTS questions without scaffolding. Some of the classroom strategies that Indonesian teachers can implement include the following.

Table 6. Classroom Strategies to Strengthen Evaluation and Creation Skills

Indicator	Class Strategy	Application Examples
Evaluation	Rubric-based assessment peer	Students assess the companion procedural text based on the completeness of the material, the collapse of the steps, clarity, and

		effectiveness, and then give reasons for their assessment.
Evaluation	Modeling thinks hard (thinks hard to model)	The teacher shows directly how to assess a procedural text by mentioning the criteria, evidence, and reasons used in determining the assessment.
Evaluation	Sentence starter for argumentation	Provide a sentence framework such as "I think this step is less effective because... evidenced by ..." to get students used to including reasons and evidence, not just general assessments.
Create	Gradual writing of procedures with scaffolding	Students determine goals, choose materials and tools, arrange steps, check the sequence, and then make revisions.
Create	Draft-feedback loop	Students draft a procedural text, get feedback from teachers or friends, and then improve the text based on predetermined criteria.
Create	Authentic procedure project	Students create procedural texts for real needs, such as school activity guides or instructions on creating a product, taking into account the purpose and potential readers.

These strategies can help transform learning and create from activities that simply ask for answers to a thinking process that is carried out gradually. In evaluation, students need to be accustomed to using criteria and evidence before giving assessments. In creating, students need to be given space to generate more than one possible answer and gain the opportunity to revise. Thus, students not only generate answers, but also understand the process that underlies the formation of those answers.

This implication also applies to interpretation and analysis skills. Teachers can build learning gradually starting from the meaning of information, connecting between elements, predicting consequences, assessment based on criteria, to the creation of new products. The sequence can help students acquire *cognitive scaffolding* before facing more open-ended HOTS tasks.

4.3.4 Research Limitations

This study has a number of limitations that need to be considered in interpreting the findings. First, the number of study subjects was relatively small

(23 students from one class), so the pattern of achievement found reflected the characteristics of this specific group and did not necessarily represent the population of high school students more broadly. Second, the research was conducted in only one school (Senior High School), so contextual factors such as teaching quality, local curriculum, and characteristics of students in that school also limited the generalization of findings to other schools or regions with different conditions. Third, the qualitative descriptive approach used aims to describe phenomena in depth, not to test causal relationships statistically; Thus, the factors identified to affect critical thinking skills (initial knowledge, ability to read instructions, and literacy) are exploratory and the strength of their influence cannot be quantitatively ascertained.

Based on these limitations, further research is recommended to involve several schools with different characteristics, both in terms of location, school conditions, and student characteristics. The involvement of several schools can provide a broader picture of students' critical thinking skills in solving HOTS-based procedural text problems and allow comparisons between learning contexts. Further research can also use mixed **methods** design by combining quantitative and qualitative data.

Quantitative data can be used to measure the level of achievement of each critical thinking indicator in a larger number of participants, while qualitative data can be used to explain the reasons, strategies, and thought processes behind students' answers. The use of *mixed methods* involving several schools will provide a more comprehensive picture of the development of interpretation, analysis, inference, evaluation, and creation skills.

In addition, subsequent research may develop or test learning interventions specifically designed to improve indicators that are still weak, especially interpretation, evaluation, and creating. The effectiveness of strategies such as *think-aloud*, *peer evaluation*, *scaffolding*, and project-based learning can be systematically tested to find out the most effective strategies in developing students' critical thinking skills.

5. Conclusion

Based on the results of research conducted at Senior High School, it can be concluded that students' critical thinking skills in completing HOTS-based procedural texts are influenced by several main factors, namely initial knowledge, reading and comprehension instruction, and literacy and practice habits. Previous knowledge helps students understand the structure and content of procedural texts, making it easier for them to analyze and answer questions. The ability to read and understand instructions is also an important factor because accuracy in reading can help students understand the meaning of questions correctly, in addition, literacy and practice habits affect students' ability to develop reasoning, analyze problems, and apply knowledge in real-world situations. Thus, students' critical thinking skills will develop better if they are supported by a good basic

understanding, careful reading skills, and constant practice of HOTS questions.

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