



## Analyzing the Critical Thinking Skills of 5th Grade Students on the Respiratory System Material Using a Qualitative Descriptive Method

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### Article History

Received: December 4, 2024; Revised: December 25, 2024; January 8, 2025; Published: January 31, 2025

### ABSTRACT

Critical thinking skills are crucial for preparing students to face complex real-world problems and are a key component of 21st-century learning. This study aims to identify the critical thinking skill profile of 5th-grade elementary school students on the respiratory system material. Critical thinking is an essential skill in 21st-century education, particularly for developing students' abilities in analysis, evaluation, and argumentation. However, it is often neglected in science education at the elementary level. This research employs a qualitative descriptive method with survey techniques. Data were collected through questionnaires, interviews, and classroom observations to assess students' critical thinking skills. The results indicate that among the 30 students tested, 15 were categorized as Fair, 12 as Low, and only 3 as Good. No student achieved the Very Good or Very Low category. The analysis of critical thinking indicators including analyzing, evaluating, composing arguments, and problem-solving reveals that while students possess a basic understanding, they struggle with more advanced critical thinking tasks. The study concludes that students' critical thinking skills remain limited to basic comprehension. This limitation is attributed to the dominance of rote learning methods and the lack of interactive and problem-solving-based instructional strategies. Future teaching approaches should prioritize active learning and the integration of critical thinking practices to enhance students' higher-order thinking skills.

**Keywords:** *Critical Thinking, Basic Science Education, Respiratory System, Qualitative Descriptive, Educational Methods*



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### INTRODUCTION

Critical thinking skills are an essential component of 21st-century education, especially in preparing a generation capable of facing various challenges with analytical, logical, and independent thinking (Arifin & Setiawan, 2020). In Indonesia, improving critical thinking skills has become an important part of the curriculum, emphasizing the development of students' ability to understand, analyze, and evaluate information critically (Sri Hanipah, 2023). One of the subjects with significant potential for developing these skills is Natural Sciences (IPA), which is designed to help students develop a critical understanding of nature and everyday life (Suryaningrum & Fiana, 2024).

In 5th Grade of elementary school, the respiratory system material is a relevant topic for enhancing students' critical thinking skills because it not only covers basic knowledge but also

provides opportunities for students to question, analyze, and make connections between concepts. However, although developing critical thinking skills is a key focus, many elementary school students still lack these skills (Alsaleh, 2020; Lapuz & Fulgencio, 2020; O'Reilly et al., 2022; Agustin et al., 2021). Students can generally identify parts of the respiratory organs, such as the lungs, trachea, and bronchi, and explain their basic functions. However, when asked to explain how these organs work together or evaluate what happens when one part is disrupted, many students struggle to provide logical and in-depth explanations. This suggests that they tend to rely on rote memorization rather than understanding the interconnectedness of the respiratory system components.

One of the factors contributing to the low critical thinking skills of elementary school students is the learning method, which focuses more on memorization than on in-depth conceptual understanding. Teachers often deliver information directly, and students are required to memorize and repeat the material without being encouraged to explore or question it further. While this method may be effective for short-term memory retention, it does not foster the analytical and evaluative skills required for critical thinking (Heard et al., 2020; Khoerunnisa & Aqwal, 2020). Furthermore, the lack of interactive learning resources also hinders the development of critical thinking skills. Limited use of learning media, such as static images or whiteboards, makes it challenging for students to grasp more complex concepts related to the respiratory system. Interactive visual media or simulations can facilitate a deeper understanding of how the respiratory system functions and how its components interact (Pratama, 2018). This enhanced understanding supports students in conducting critical analyses and ultimately improves their critical thinking abilities (Marudut et al., 2020).

In addition to learning methods and media, a lack of opportunities for discussion and inquiry within the school environment also affects students' critical thinking development (Diana et al., 2022). Learning activities often remain teacher-centered, with limited chances for students to ask questions or express opinions. As a result, students become passive and are unaccustomed to thinking critically or questioning the information they receive. This lack of engagement limits their ability to reflect on what they learn and to conduct deeper analyses. To improve the critical thinking skills of 5th-grade elementary school students, a shift in instructional approaches is urgently needed. Teachers can design more interactive and student-centered learning activities, such as group discussions, simple experiments, or simulations related to the respiratory system. By encouraging students to discuss and develop solutions to relevant problems, they will be trained to think critically and analyze various solutions independently (Isnaeni et al., 2022). Incorporating technology into the learning process is also an effective strategy for enhancing critical thinking skills. The use of digital media, such as educational applications or visual simulations of respiratory organs, can make it easier for students to understand complex processes and their relationships with real-life situations. This interactive approach stimulates student engagement and motivation, enabling them not only to memorize information but also to evaluate and analyze it (Cahyono et al., 2022). With a more interactive and student-centered learning approach, it is expected that 5th-grade elementary school students can develop better critical thinking skills. This improvement will not only enhance their understanding of the respiratory system but also provide a solid foundation for tackling more complex educational challenges in the future (Pare & Sihotang, 2023). Strengthening critical thinking skills will equip students to become individuals capable of logical, analytical, and independent thought in facing various life situations.

Based on this background, this study aims to identify the critical thinking skill profile of 5th-grade elementary school students on the respiratory system material, analyze the level of critical thinking skills based on indicators of analysis, evaluation, argumentation, and problem-solving, and determine the factors contributing to the low level of these skills. The research

findings are expected to provide recommendations for improving students' critical thinking skills through interactive learning methods and the use of innovative media.

## METHODS

### Research Design

Research is a systematic process to find answers to questions or test hypotheses through data collection, processing, and analysis (Zakariah, 2020). This study uses a qualitative descriptive approach with a survey method to describe the profile of students' critical thinking skills in depth. This approach was chosen because it allows for a comprehensive understanding of the characteristics and levels of students' critical thinking skills on the respiratory system material in 5th grade of elementary school. Descriptive qualitative research is ideal for exploring and describing phenomena as they naturally occur, providing a clear picture of students' thinking processes without manipulating variables (Creswell, 2014).

The research data were collected through questionnaires, interviews, and classroom observations to identify the level of understanding, analytical skills, and difficulties students faced in critically thinking about the material (Prihatin et al., 2024). The questionnaire instruments were used to obtain quantitative data on aspects of critical thinking skills, such as analysis, evaluation, and problem-solving abilities. In-depth interviews provided qualitative insights into how students understood and processed the concepts related to the respiratory system, offering a deeper understanding of their cognitive processes and challenges. Classroom observations were also conducted to directly observe the learning process and student interactions, providing additional context for interpreting the data collected from the questionnaires and interviews.

To analyze the collected data, a combination of coding and triangulation techniques was used. Coding was employed to categorize and interpret the responses from the interviews and open-ended survey questions. This process involved identifying recurring themes and patterns related to the students' critical thinking abilities, allowing for a clear representation of their understanding of the material. Triangulation was used to enhance the validity and reliability of the findings by cross-verifying the data from different sources—questionnaires, interviews, and observations—ensuring that the results are consistent and accurate across various data collection methods (Flick, 2018). This approach allows for a more holistic and reliable analysis of the students' critical thinking profiles.

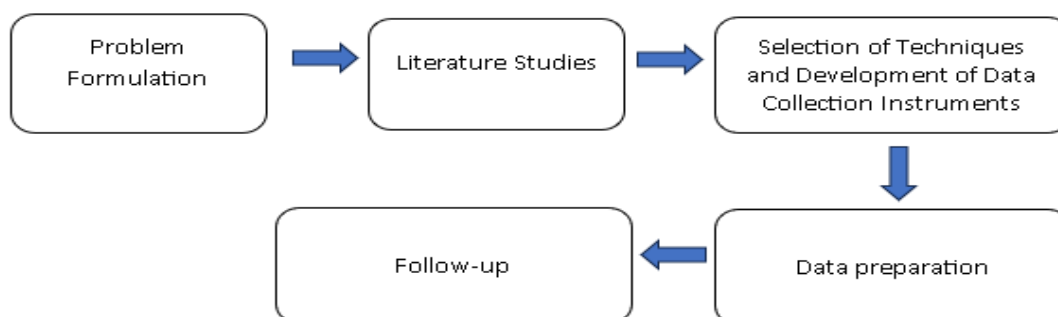


Figure 1: Research Flow

## RESULTS AND DISCUSSION

### Research Results

This research measured students' critical thinking skills on four main indicators: Analyzing Information, Evaluating Information, Drafting Arguments, and Solving Problems. Each indicator is rated on a scale of 1–5, where the highest score indicates excellent skill and the lowest score indicates very low skill. This category is used to classify the results of the critical thinking skills test of 5th grade elementary school students in this study.

**Table 1. Critical Thinking Skills Level Category**

Score Range	Category
4.1 – 5.0	Excellent
3.1 – 4.0	Good
2.1 – 3.0	Enough
1.1 – 2.0	Low
0 – 1.0	Very Low

From the results of the research, it can be seen that students generally showed limited critical thinking skills across the measured indicators. Most students (15 students) were placed in the Enough category, with a score range of 2.1 to 3.0. This indicates that they have a basic understanding of the material, but have not yet mastered in-depth analysis, evaluation, or logical argumentation.

A total of 12 students fell into the Low category, with scores between 1.1 and 2.0. This suggests that these students faced difficulties in applying critical thinking skills to the respiratory system material. They tend to memorize information rather than understanding the interconnections between concepts.

Only 3 students were in the Good category, with scores between 3.1 and 4.0, which means that they demonstrated a higher level of critical thinking compared to their peers. However, no students reached the Excellent category (scores between 4.1 and 5.0), indicating that while some students performed well, no one achieved the highest level of critical thinking.

Additionally, no students were placed in the Very Low category (scores 0 to 1.0), indicating that all students had at least a basic understanding of the material. However, these results suggest that critical thinking skills need significant improvement, particularly in the areas of argument formulation and information evaluation.

The findings indicate that although students have a basic understanding of the material, deeper learning methods and interactive learning media are needed to enhance their critical thinking skills. Most students could recognize parts of the respiratory system and explain their functions simply. However, they struggled when asked to analyze how these organs work together or evaluate the effects of disruptions in one part.

The primary cause of low critical thinking skills appears to be the lack of opportunities for higher-order thinking activities, such as discussions or experiments that could stimulate students' analytical abilities. Additionally, the predominant focus

on memorization rather than deep conceptual understanding also contributes to the limited critical thinking skills of the students.

Based on the results, it can be concluded that the critical thinking skills of 5th-grade students at SDN 05 Madiun Lor are still at a basic level and need further improvement. Therefore, it is recommended that the teaching methods be revised to incorporate more interactive learning strategies, such as group discussions, experiments, or visual media that can simplify complex concepts like the respiratory system.

By providing a more challenging and student-centered learning approach, students are expected to develop better critical thinking skills, which will not only help them understand the material on a deeper level but also prepare them for more complex educational challenges in the future.

**Table 2. Results of the Critical Thinking Skills Test for Grade 5 Elementary School Students**

Score Range	Category	Number of Students
4.1 – 5.0	Excellent	0
3.1 – 4.0	Good	3
2.1 – 3.0	Enough	15
1.1 – 2.0	Low	12
0 – 1.0	Very Low	0
Total		30

Based on the results of the critical thinking skills test conducted on 30 students, the score distribution indicates that most students fall into the Enough category, with a score range of 2.1 to 3.0. This suggests that these students have a basic understanding of the material related to the respiratory system, but their critical thinking skills are still limited. A total of 15 students fall into this category, indicating that while they can recognize the basic concepts taught, they have not yet mastered in-depth analysis, evaluation, or logical argumentation.

Another 12 students fall into the Low category, with scores ranging from 1.1 to 2.0. This result suggests that these students face greater difficulties in understanding and applying critical thinking skills. They tend to rely more on memorization rather than developing a deeper understanding of the concepts related to the respiratory system. This reflects the continued dependency on a learning approach that emphasizes rote learning rather than encouraging analytical and evaluative skills.

Only 3 students fall into the Good category, with scores ranging from 3.1 to 4.0. This indicates that these students demonstrate better critical thinking skills compared to their peers. However, no students reached the Excellent category (scores from 4.1 to 5.0), suggesting that while some students performed well, the highest level of critical thinking was not achieved by any student.

Interestingly, no students fell into the Very Low category (scores ranging from 0 to 1.0). This suggests that all students had at least a basic understanding of the material. However, it also means that while students were able to recognize parts of the respiratory system and explain their functions simply, they struggled to connect the concepts or analyze how the organs work together in a more in-depth manner.

From these results, it can be concluded that students' critical thinking skills still need significant improvement, particularly in the areas of argument formulation and information evaluation. While most students have a basic understanding of the respiratory system material, they struggle to conduct deeper analysis or assess the relationships between concepts. This indicates that students in this class are not yet accustomed to teaching methods that require them to think critically and reflectively.

It is important to note that teaching methods that focus more on conceptual understanding, rather than just memorization, would be beneficial in helping students develop their critical thinking skills. More interactive approaches, such as group discussions, simple experiments, and visual media, can help students understand the interconnections between concepts and strengthen their abilities to analyze and evaluate information.

Based on these findings, there is a need for changes in teaching strategies that emphasize understanding concepts and providing opportunities for students to think critically. Teachers can design more challenging learning activities, such as group projects, case discussions, or relevant simulations, to encourage students to think more deeply and independently.

Additionally, the use of interactive learning media, such as digital applications or visual simulations that demonstrate the respiratory system, could help students understand more complex concepts in a way that is easier to grasp and more engaging. With improved teaching quality and the use of more dynamic methods, it is hoped that students' critical thinking skills can be enhanced, allowing them not only to memorize information but also to evaluate, analyze, and draw conclusions based on the evidence and data they learn. The test results showed that most of the students (15 students) were in the Moderate category with a score range of 2.1–3.0, indicating that they had basic but still limited critical thinking skills. A total of 12 students are in the Low category, and only 3 students are in the good category. No student achieved the Very Good or Very Low category. This distribution indicates that overall, the critical thinking skills of grade 5 elementary school students on respiratory system material still need to be improved, especially in the aspect of the ability to compose arguments and evaluate information.

## **Discussion**

The results of this study indicate that most of the 5th-grade students at SDN 05 Madiun Lor fall into the Moderate category, with a score range of 2.1 to 3.0. This suggests that the students have a basic understanding of the material but struggle to apply critical thinking skills in more complex contexts. A total of 12 students were in the Low category, showing limited critical thinking skills. Only 3 students scored in the Good category, and none reached the Very Good or Very Low categories. This Sufficient category describes that students are not fully capable of analyzing and evaluating information properly, as well as difficulties in formulating logical arguments and solving problems related to the respiratory system (Agnafia, 2019). 12 students were included in the Low category, showing limited critical thinking skills. This can be caused by a teaching approach that does not prioritize analytical and evaluative aspects and a lack of stimulation to practice critical thinking in the classroom. 3

students achieved the good category, and none were included in the Very Good or Very Low category (Tanjung, 2019). The existence of students who did not reach the highest category emphasized the need for a deeper evaluation of the teaching methods applied at SDN 05 Madiun Lor.

According to Paul and Elder, who emphasized that critical thinking involves a series of important elements, such as purpose, information, inference, and argument. Students who cannot analyze information or evaluate arguments well, tend to have difficulty understanding more complex concepts (Alsaleh, 2020). In this study, the Drafting Arguments indicator recorded the lowest score, reflecting that students were not only lacking in formulating good arguments, but also in explaining their ideas in a logical and systematic way. This suggests that they may not have gained enough experience or learning focused on developing structured speaking and writing skills. The theory of constructivism, pioneered by Piaget and Vygotsky, emphasizes the importance of active involvement of students in the learning process. Learning that involves social interaction, group collaboration, and project-based learning can improve students' critical thinking skills. When students are encouraged to discuss, question, and relate new knowledge to their experiences, they tend to understand the material better and are better able to apply critical thinking skills (Nabila Nufaiza Yusuf et al., 2024). In this case, a more interactive and collaborative approach needs to be applied in the classroom to improve students' understanding of the respiratory system, as well as develop their ability to think critically.

In learning science, such as the respiratory system, it is important for students to not only understand the facts, but also to be able to apply that knowledge in real-life situations (Auliyah et al., 2024). This is in line with an educational approach that focuses on developing 21st century competencies, where critical thinking skills and the ability to solve problems are essential. Learning that only focuses on memorizing information will hinder students' ability to think critically and creatively (Marwah & Pertiwi, 2024). Therefore, the results of this study show the need for improvement in the teaching methods used at SDN 05 Madiun Lor. Educators must create a more challenging and engaging learning environment, by assigning assignments that encourage students to think critically, conduct research, and collaborate with their peers. This approach will not only improve students' critical thinking skills but also prepare them to face greater challenges in the future (Lestari, 2022). With changes in teaching methods and an emphasis on critical thinking skills, it is hoped that students can develop a deeper and more applicable understanding of the material being taught and become more critical and analytical individuals in daily life.

One of the primary factors influencing students' learning outcomes is the teaching method used. Based on the findings, it can be assumed that the teaching approach at SDN 05 Madiun Lor leans towards a passive learning model, where students primarily receive information without having many opportunities to actively participate in the learning process. This is reflected in the critical thinking test results, which show low scores in areas such as Drafting Arguments and Evaluating Information.

Previous research indicates that student-centered learning methods, such as Project-Based Learning (PBL) and Inquiry-Based Learning (IBL), can improve students' critical thinking skills. These approaches encourage students to actively identify

problems, develop solutions, and present arguments, which directly involves higher-order thinking skills (Sari et al., 2020). Project-based learning, which requires students to work in groups to complete tasks related to real-life issues, has been shown to be effective in developing critical thinking skills (Sarwanto et al., 2021).

However, at SDN 05 Madiun Lor, the use of traditional teaching methods that focus more on memorization and basic understanding of concepts may have limited students' opportunities to develop critical thinking skills. Memorization-based learning does not provide space for students to apply concepts in real-world situations or engage in analysis and evaluation of information critically. This aligns with the findings of Fajari (2021), who states that students' critical thinking skills are often hindered when teaching methods do not involve higher-order thinking processes or in-depth discussions.

This study emphasizes the importance of transitioning from traditional memorization-based learning to more interactive, inquiry-based learning models. The use of models like Guided Inquiry-Based Learning (Sari et al., 2020) has proven effective in enhancing critical thinking skills. Such approaches promote the application of knowledge through experimentation, questioning, and discovery, which is crucial for the development of analytical and evaluative skills. As evidenced in the research by Sukmawati et al. (2020), inquiry-based models are particularly effective in teaching complex systems such as the human respiratory system, where students can experiment, observe, and relate theoretical knowledge to real-life situations.

Additionally, technology-based learning tools have shown promise in improving students' critical thinking skills. Wardani and Widodo (2024) found that the use of smartphones and digital media in the classroom can significantly enhance students' ability to analyze and evaluate information. In this study, the lack of interactive learning media at SDN 05 Madiun Lor may have contributed to the limited development of critical thinking skills. By integrating e-modules and interactive apps, educators could foster a more engaging learning environment that encourages critical analysis (Isnaeni et al., 2021).

The need for an educational model that emphasizes critical thinking and problem-solving has been highlighted by several studies, including those by Fajari (2021) and Sarwanto et al. (2021), who argue that fostering these skills in elementary students is essential for preparing them to face future academic and personal challenges. In particular, a shift towards models such as Project-Based Learning (PBL) and Flipped Classrooms could be beneficial. These models allow students to apply knowledge in authentic contexts, thereby deepening their understanding and honing their critical thinking abilities (Paristiowati et al., 2022).

Moreover, providing students with opportunities to engage in group discussions and cooperative projects will also encourage them to analyze information, formulate arguments, and develop solutions to problems collaboratively. As Saphira & Prahani (2022) note, such collaborative learning methods significantly enhance students' critical thinking by providing them with multiple perspectives and promoting deeper engagement with the content.

This study reveals that students at SDN 05 Madiun Lor still struggle with advanced critical thinking skills, particularly in areas of argumentation and evaluation. To address



these gaps, a shift in teaching methods is urgently needed. Educators must integrate more interactive and collaborative learning activities, utilize digital tools and media, and focus on developing higher-order thinking skills through inquiry-based approaches. By making these adjustments, students will be better prepared to tackle complex challenges and apply their knowledge in meaningful ways, both inside and outside the classroom.

## CONCLUSION

The findings of this study indicate that the critical thinking skills of 5th-grade students remain at a basic level, with most students struggling to apply higher-order thinking skills such as argument formulation and information evaluation. This suggests the need for educational policy changes to prioritize not only content knowledge but also the development of critical thinking abilities. Current teaching methods that emphasize memorization and basic understanding are insufficient to prepare students for more complex challenges. Therefore, it is crucial to adopt instructional approaches that foster deeper cognitive processes, including analysis, evaluation, and problem-solving, rather than relying solely on rote learning. A shift towards a curriculum and teaching strategies that position critical thinking as a core competency is essential for equipping students with the skills needed to succeed in the 21st century. To address these challenges, it is recommended that schools implement more interactive and student-centered learning approaches, such as Project-Based Learning (PjBL) and Inquiry-Based Learning (IBL). These methodologies actively engage students in problem identification, solution development, and collaborative argumentation. For example, when teaching the respiratory system, teachers could design group projects where students conduct experiments, analyze observations, and present their findings while exploring the implications of system disruptions. Additionally, integrating digital learning tools, such as interactive e-modules and educational applications, can facilitate a better understanding of complex concepts and encourage independent learning. Collaborative learning activities, where students work together to solve problems, can further enhance their critical thinking skills by providing opportunities to evaluate information, develop coherent arguments, and engage in deeper discussions. By incorporating these strategies and fostering a learning environment that emphasizes critical thinking, schools can better prepare students to tackle future academic and real-world challenges that demand advanced problem-solving and analytical abilities.

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