



Analyzing Critical Thinking Skills of Grade VIII Students in Human Respiratory System Topics in Junior High School

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ABSTRACT

Critical thinking skills are essential 21st-century competencies that need to be developed in science education. This study aims to analyze the critical thinking skills of grade VIII students in a junior high school on human respiratory system topics. This research employed a qualitative descriptive method involving 27 students. The research instruments consisted of an essay test developed based on Ennis's critical thinking indicators (basic clarification, bases for a decision, inference, advanced clarification, and strategies and tactics) as well as semi-structured interviews with six students selected through purposive sampling. Data analysis was conducted using the Miles and Huberman model, which includes data reduction, data display, and drawing conclusions. The results showed that the majority of students possessed critical thinking skills in the low category: 22 students (81.48%) were in the low category, 3 students (11.11%) in the moderate category, and 2 students (7.41%) in the high category. These findings emphasize the need for implementing innovative learning strategies to enhance students' critical thinking skills in science learning.

INTRODUCTION

In the context of globalization, education faces rapid and complex changes, necessitating the development of skills that align with 21st-century demands. Zubaidah (2016) states that education should not merely emphasize the transfer of knowledge but must also equip learners with relevant skills to face contemporary challenges. Therefore, teachers need to shift instructional methods from teacher-

centered to approaches that place students at the center of learning activities (Zulfana et al., 2025) to foster critical thinking, collaboration, and creativity, which are essential in the modern era.

Effective education emphasizes not only the knowledge aspect but also students' ability to think critically. Natural Science is one of the vital fields as it helps students understand the phenomena around them. At the junior high school level, science learning encourages students to observe, evaluate information, and make evidence-based decisions, allowing critical thinking skills to develop optimally (Agnafia, 2019; Ramdani et al., 2020).

At the junior high school level, particularly in Grade VIII, students begin to enter a stage of cognitive development that enables them to analyze and evaluate information more deeply. This development cannot be driven by routine learning alone; it requires assessment tools capable of measuring the extent to which critical thinking skills are formed. This is particularly important because various studies have shown that students still struggle with higher-order thinking tasks (Isnawati et al., 2024). For teachers, understanding students' critical thinking levels is useful for designing learning strategies and evaluating the achievement of educational goals. Thus, education must move beyond rote memorization and encourage active engagement through interactive strategies (Muaziyah et al., 2023).

However, the critical thinking skills of students in Indonesia remain relatively low. Data from the 2022 Programme for International Student Assessment (PISA) indicates that Indonesia ranks 69th out of 80 countries, with less than 1% of students classified as proficient in evaluating information based on scientific evidence. This condition is reflected in various regional studies showing that students' critical thinking achievement in science subjects is still in the low category (Nuryanti et al., 2018; Solikhin & Fauziah, 2021).

One of the topics that can be utilized to train critical thinking skills is the Human Respiratory System. This material not only explains the structure and function of respiratory organs but also provides opportunities for students to evaluate various factors affecting respiratory health, such as air pollution and lifestyle habits (Handini et al., 2024). Other studies in science topics like biotechnology and the digestive system also suggest that connecting theory with real-world practice is essential for fostering analytical skills (Hidayati et al., 2021; Karen & Silitonga, 2024).

Based on the aforementioned description, the problem that arises is the extent to which the critical thinking skills of junior high school students, specifically in Grade VIII, have developed in understanding the human respiratory system material. Therefore, this study aims to analyze the critical thinking skills of Grade VIII students in human respiratory system topics in a junior high school.

METHOD

This study employs a qualitative descriptive approach to describe and analyze students' critical thinking skills in understanding the concept of the human respiratory system. According to Creswell (2019), a qualitative approach allows for an in-depth exploration of phenomena through direct observation and intensive interaction with research subjects.

The research was conducted at a junior high school in Southwest Sumba Regency, East Nusa Tenggara Province, from July 21–24, 2025, during the first semester of the 2025/2026 academic year, with Grade VIII students as the subjects. The research population consisted of 30 eighth-grade students who had studied the human respiratory system material. All students were given a critical thinking skills test, and the results were then classified into three categories: high, moderate, and low. From each category, two students were selected using a purposive sampling technique for interviews, resulting in six research subjects. The research instruments included: (1) an essay test of critical thinking skills to evaluate students' analytical and reasoning abilities based on Ennis's (2011) indicators; (2) semi-structured interviews to explore how students understand, answer, and evaluate their responses, as well as how they overcome difficulties in human respiratory system problems, involving the six selected students; and (3) documentation in the form of photographs, field notes, and interview recordings as supplementary data (Sugiyono, 2020).

Data were collected through written tests, interviews, and documentation. The test items were developed based on Ennis's (2011) critical thinking indicators, while the interviews focused on students'

strategies for understanding questions, determining answers, evaluating results, and facing difficulties. Documentation served to strengthen data validity through visual and audio evidence. Data analysis followed the Miles and Huberman (2019) model, which consists of three stages: (1) data reduction by filtering and focusing on relevant information; (2) data display in the form of tables, graphs, and narrative descriptions; and (3) drawing conclusions that highlight patterns of students' critical thinking skills in understanding human respiratory system material.

RESULTS AND DISCUSSIONS

Results

Based on the research findings, the critical thinking skills of Grade VIII students on human respiratory system material are still classified as low (see Figure 1). Out of a total of 27 students, 22 students (81.48%) were in the low category, 3 students (11.11%) were in the moderate category, and only 2 students (7.41%) reached the high category. This condition indicates that the majority of students have not been able to optimally utilize their critical thinking skills in understanding concepts, analyzing information, or solving problems related to the respiratory system.

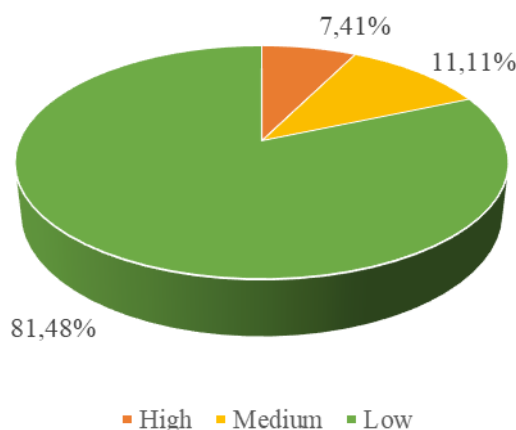


Fig 1. Percentage of Students' Critical Thinking Skills Categories

Upon further review based on Ennis's (2011) critical thinking indicators, almost all aspects showed low achievement. In the elementary clarification indicator, no students reached the high category (0%), 8 students (29.6%) were in the moderate category, and 19 students (70.4%) were in the low category. This indicates that students experience difficulties in providing simple explanations coherently and clearly, resulting in answers that are generally brief statements without additional elaboration. Furthermore, in the basic support indicator, only 1 student (3.7%) reached the high category, 7 students (25.9%) were in the moderate category, and the majority, 19 students (70.4%), were in the low category.

Similar results were observed in the inference indicator, where only 1 student (3.7%) achieved the high category, 7 students (25.9%) were in the moderate category, and 19 students (70.4%) were in the low category. In the advanced clarification indicator, student achievement was even lower, as none were in the high category (0%), only 5 students (18.5%) were in the moderate category, while 22 students (81.5%) were in the low category. Students' critical thinking skills in the strategies and tactics indicator showed that 16 students (59.3%) were in the low category, 8 students (29.6%) were in the moderate category, and only 3 students (11.1%) reached the high category.

Discussions

Based on the research findings, the critical thinking skills of Grade VIII students on human respiratory system material are still classified as low. Out of a total of 27 students, 22 (81.48%) were in the low category, 3 (11.11%) were in the moderate category, and only 2 (7.41%) reached the high category.

These results indicate that the majority of students have not been able to apply critical thinking skills effectively, which is a common challenge in science education where students often struggle to master basic concepts alongside analytical skills (Ramdani et al., 2020).

When examined based on Ennis's (2011) critical thinking indicators, almost all aspects showed low achievement. In the elementary clarification indicator, most students experienced difficulties in providing simple explanations that were coherent and clear. This finding aligns with Masitah et al. (2022), who found that junior high school students often provide short or irrelevant answers, highlighting weak clarification skills. Furthermore, Widarti et al. (2021) emphasize that difficulties in this indicator occur because students are not yet accustomed to breaking down the core of a scientific problem.

In the basic support indicator, results showed that students lacked rational argumentation. This is consistent with the findings of Maslakhatunni'mah et al. (2019), which noted that students often fail to provide reasons for their scientific statements. The low achievement here suggests that students are not yet accustomed to connecting their knowledge with logical reasoning, a condition also observed by Handini et al. (2024) regarding respiratory system material where answers provided lacked supporting evidence.

Furthermore, in the inference indicator, students struggled to draw logical conclusions. Facione (2015) states that inference capability is the core of critical thinking as it involves connecting evidence to produce valid conclusions. The low achievement confirms that student understanding remains at a surface level, as noted by Nuryanti et al. (2018), where students tend to stop at mastering factual knowledge. This is a broader issue in Indonesia, where Zubaidah (2016) argues that students are still at a basic thinking level and unable to make deep logical conclusions.

In the advanced clarification indicator, students were unable to assess the implications of an argument. This indicates that analytical skills are not well-developed, as Facione (2015) suggests that learning patterns emphasizing final answers prevent advanced skills from developing. This lack of depth in critical thinking is also evident when students face complex topics such as biotechnology (Hidayati et al., 2021), where students often fail to provide detailed reasoning.

Meanwhile, in the strategies and tactics indicator, only 11% of students showed an ability to devise strategies. Ennis (2011) asserts that this indicator is vital for problem-solving. This aligns with Karen and Silitonga (2024), who reported that low skills are influenced by teaching methods. Teachers who emphasize rote memorization tend to leave students untrained in developing thinking strategies.

Overall, the low achievement suggests that the science learning process still emphasizes concept memorization. This is consistent with the view that teacher-centered models hinder the development of analytical and reflective skills (Facione, 2015). These findings are strengthened by Handini et al. (2024) and Nuryanti et al. (2018), who found similar patterns of low critical thinking across different science topics.

Based on the points above, it is understood that low critical thinking skills are influenced by instructional strategies. Therefore, teachers need to design learning that emphasizes training, such as through Problem-Based Learning or Inquiry-Based Learning. Consistent implementation of these strategies is expected to improve students' skills so they can analyze, reason, and make logical decisions (Zubaidah, 2016).

CONCLUSION AND SUGGESTION

Based on the research findings, the critical thinking skills of Grade VIII students in a junior high school on human respiratory system material are generally categorized as low. Out of 27 students, 22 (81.48%) were in the low category, 3 (11.11%) in the moderate category, and 2 (7.41%) in the high category. These results suggest that the implementation of innovative learning strategies, such as problem-based learning and inquiry-based learning, is necessary to enhance students' critical thinking skills in science education.

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