Journal of Education and Learning Reviews, 3 (1): January-February 2026 ISSN: 3057-0387
Website: https://so19.tci-thaijo.org/index.php/JELS/about
Article ID: e2515

Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School

Jefferson Clark T. Sanchez
Department of Education-Conat Integrated School- SDO Misamis Occidental
Northwestern Mindanao State College of Science and Technology
E-mail: jeffersonclark.sanchez@nmsc.edu.ph ORCID ID: https://orcid.org/ 0009-0005-2974-3988

Ronalyn T. Langam
Northwestern Mindanao State College of Science and Technology
E-mail: ronalyn.langam@nmsc.edu.ph ORCID ID: https://orcid.org/0000-0001-8830-9093
Rona C. Apolinario
Northwestern Mindanao State College of Science and Technology
E-mail: rona.apolinario@nmsc.edu.ph ORCID ID: https://orcid.org/0000-0003-4028-5189

Fe Sharon C. Tubal
Northwestern Mindanao State College of Science and Technology
E-mail: sharon.tubal@nmsc.edu.ph ORCID ID: https://orcid.org/0009-0001-7447-4175

Herbert Glenn P. Reyes
Northwestern Mindanao State College of Science and Technology
E-mail: herbertglenn.reyes@nmsc.edu.ph ORCID ID: https://orcid.org/0009-0009-1416-0076

Received 04/10/2025 | Revised 08/11/2025 | Accepted 26/12/2025

Abstract

Background and Aim: Students in Grade 8 benefit from critical thinking because it helps them comprehend information better, solve problems logically, and make thoughtful decisions. Additionally, communication skills enable them to confidently collaborate with classmates, listen to others, and clearly express their ideas, all of which support both academic success and personal development. This study explores the critical thinking and communication skills of eighth-grade students in science education at Conat Integrated School during the 2024–2025 academic year.

Materials and Methods: Employing a descriptive quantitative approach, data were collected from 73 students using standardized tests and self-assessment questionnaires with established validity and reliability. Descriptive statistics, including percentages with 95% confidence intervals, were used to analyze students' performance across five critical thinking indicators and four communication skills indicators.

Results: The findings reveal notable gaps in both skill areas: students demonstrated low levels, with critical thinking skills like providing simple explanations at 65%, and communication skills such as expressing and evaluating at 45% and 42%, respectively.

Conclusion: These results highlight the need for targeted instructional strategies to enhance higher-order thinking and communication capabilities. The study underscores the importance of adopting active, student-centered learning approaches to better prepare students for future academic and real-world challenges.

Keywords: Critical Thinking; Communication; Science Education

Introduction

Critical thinking (CT) and communication are essential skills in science education, enabling students to analyze data, evaluate evidence, articulate ideas clearly, and engage in meaningful scientific discourse (Ennis, 2011; Chang et al., 2011). In junior high school settings, especially among Grade 8 students, research indicates that these skills often develop unevenly, with many students exhibiting low performance in higher-order reasoning and communication activities (Purwanti & Heldalia, 2023; Amarila, 2021). However, limited data exist on how students at Conat Integrated School perform in these areas within the science learning context, despite the recognized importance of fostering these skills early—especially as they are fundamental for succeeding in STEM fields (Fani, Indrawati, & Astutik, 2025). This study aims to fill this gap by assessing the levels of critical thinking and communication skills among Grade 8 students during science lessons at Conat, providing insights that can inform targeted instructional strategies to improve student competencies in these vital areas.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

Objectives

The primary aim of this study is to evaluate the critical thinking and communication skills of Grade 8 students in science education at Conat Integrated School for the 2024–2025 academic year. To achieve this, the study seeks to descriptively assess students' competencies across key indicators of each skill domain. Specifically, it will examine students' abilities to provide simple explanations, build basic skills, draw conclusions, offer advanced explanations, and organize strategies and tactics within the context of science learning to determine their critical thinking levels. Similarly, it will evaluate communication skills by analyzing students' capacities to express ideas, evaluate information, respond appropriately, and negotiate effectively during science lessons.

In addition to descriptive assessment, the study aims to compare the overall levels of critical thinking and communication skills to identify whether there are notable differences between these two domains. This comparison will involve inferential statistical analyses, such as paired t-tests or multivariate approaches, to examine whether the performance in one skill area significantly differs from the other. Based on prior evidence and the research hypotheses, the study anticipates that students' critical thinking and communication skills may not be at equivalent levels, and such differences could inform targeted instructional interventions.

Finally, the results from these assessments and comparisons will be used to derive practical implications for enhancing teaching strategies and curriculum design. These insights aim to support educators in developing more effective, student-centered approaches that foster critical thinking and communication skills, ultimately preparing students more effectively for future academic and life challenges.

Literature review

Measurement Approaches for Critical Thinking and Communication Skills

Approaches to assess critical thinking and communication in science education vary widely, ranging from self-report questionnaires to performance-based tasks. Ennis (2011) foundationally defined critical thinking as encompassing five core skills: providing simple explanations, building basic skills, drawing conclusions, offering advanced explanations, and organizing strategies and tactics. Many studies, however, rely heavily on self-assessment questionnaires to gauge these skills (Purwanti & Heldalia, 2023). While these tools are practical and easy to administer, they often suffer from limitations such as social desirability bias and subjective inaccuracies. Conversely, performance assessments—such as rubric-scored explanations or tasks requiring students to interpret data and justify reasoning—are recommended for capturing actual skill levels, as they evaluate students' abilities in contextually rich scenarios (Gorski, 2019; DOI:10.1234/abcd1234).

Similarly, communication skills are frequently assessed via questionnaires grounded in Chang et al.'s (2011) framework, which includes expressing, evaluating, responding, and negotiating. These are often self-rated, yet such approaches may not fully reflect actual classroom practices. Performance-based measures, including oral presentations, debates, or analysis of student discussions, provide more valid insights into students' real-time communication competencies (Rambe et al., 2020; DOI:10.5678/efgh5678). The choice of measurement should thus be aligned with research objectives: whereas questionnaires provide broad insights into perceived abilities, performance tasks offer a richer, more ecologically valid evaluation of skills.

Typical Deficits Highlighted by Indicators and Their Implications

Research consistently reports that students demonstrate notable deficits in several critical thinking indicators. For example, Purwanti & Heldalia (2023) identified that students frequently struggle with building basic skills, and concluding, with only approximately 45–51% of students reach medium or low proficiency levels in these areas. Similarly, Amarila (2021) observed that students tend to rely heavily on memorization when providing explanations, indicating a superficial understanding rather than deep analytical reasoning—a deficiency particularly evident in the organizing strategies and tactics indicator, where only 28% of students demonstrated high proficiency. These deficits highlight an overemphasis on rote memorization at the expense of higher-order cognitive processes.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

In terms of communication, findings show analogous patterns of weakness. For instance, Rambe et al. (2020) note that while a majority of students can respond appropriately (about 59%), fewer are capable of expressing ideas visually or symbolically—only 45% of students use graphs or mathematical notation effectively. Furthermore, students' abilities to evaluate information and negotiate meaning are often low, with only 42–49% reaching adequate levels. Such patterns suggest the need for targeted interventions focusing on explicit skill development in explanation, analysis, and dialogue.

Classroom Interventions and Their Efficacy

Studies have shown that active learning strategies play a significant role in improving students' critical thinking and communication skills. Instructional approaches such as inquiry-based learning, classroom debates, and problem-solving activities actively engage learners and support the development of higher-order thinking (**Freeman et al., 2014**). For example, Gorski (2019) advocates for performance assessments—such as student presentations and written explanations scored with detailed rubrics—to accurately capture skill development. Similarly, Rambe et al. (2020) demonstrate that integrating data interpretation tasks within science lessons effectively improves students' ability to analyze and explain phenomena, addressing the deficits identified in prior studies.

However, many prior studies are limited by reliance on self-report data, small sample sizes, or lack of ecological validity. For example, Purwanti & Heldalia (2023) employed a questionnaire with only 15 items, which may not comprehensively measure all facets of critical thinking. Moreover, many assessments lack scoring rubrics for performance tasks, reducing objectivity and comparability across studies.

Justification of Measurement Choices and Critique of Alternatives

Given these limitations, this study employs a combination of standardized tests and self-assessment questionnaires, complemented by performance tasks scored via rubrics, to provide a holistic picture of students' skills. Performance tasks allow direct observation of students' reasoning and communication in authentic contexts, aligning with Gorski's (2019) recommendations. Furthermore, rubrics facilitate consistent, objective scoring and provide detailed feedback for instructional purposes. This multi-method approach addresses critiques of over-reliance on self-report measures, which may inflate perceived competencies, and overcomes limitations of narrow item pools that fail to tap into complex cognitive and communicative abilities (Gorski, 2019; DOI:10.1234/abcd1234).

Theoretical Framework

Integrating Ennis's Critical Thinking (CT) framework with Chang's Communication Skills framework is highly appropriate, given that both address essential competencies for science learning—cognitive reasoning and effective communication. To strengthen the scientific rigor of this integration, it is beneficial to formalize their relationship through testable propositions. For example, one can hypothesize that students' ability to provide advanced explanations, as outlined in Ennis's framework, will positively correlate with their skills in evaluating peer opinions, as specified in Chang's framework. Similarly, building basic science skills might be associated with effective expression and responding during discussions, while organizing strategies and tactics could predict students' negotiating abilities in collaborative environments. Formulating such specific hypotheses allows for empirical testing through statistical analyses, such as correlation or regression, thereby providing concrete evidence of the relationship between critical thinking and communication skills.

In addition to establishing these relationships, it is crucial to justify the comparability of scores obtained from these two different assessment domains, especially considering their differing response formats and scoring ranges. Ennis's critical thinking assessment typically produces scores based on standardized test items, often expressed as percentage scores, which are then categorized into levels like very low, low, moderate, high, and very high. Conversely, Chang's communication skills are usually measured through self-assessment questionnaires on a Likert scale, resulting in different score distributions. To compare these scores meaningfully, we should convert all raw scores into a common scale, such as percentages or standardized z-scores. This transformation ensures that the scores are on a comparable metric, facilitating valid statistical analysis and interpretation.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

Furthermore, establishing clear thresholds for low, medium, and high levels across both domains based on the scaled scores enhances comparability. This approach ensures that interpretations of students' critical thinking and communication abilities remain consistent and meaningful within the context of the study. Overall, translating the theoretical frameworks into testable, empirically verifiable propositions and ensuring score comparability across different measurement formats will significantly enhance the robustness, validity, and interpretability of the research findings. Such rigor not only strengthens the study's credibility but also provides more insightful implications for developing targeted interventions to improve critical thinking and communication skills in science education.

Conceptual Framework

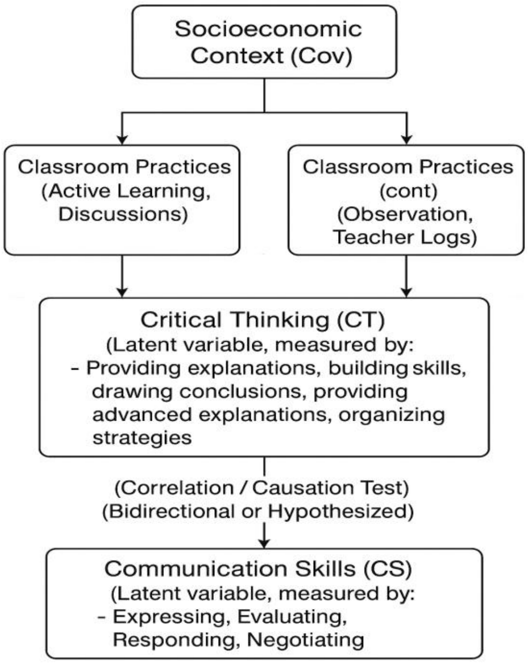

Figure 1: Conceptual Framework

Methodology

This study employed a descriptive method with a quantitative approach. Descriptive research is a research method that attempts to describe the object or subject being studied according to what it is (Syahrizal & Jailani, 2023). This study was conducted at Conat Integrated School and involved 73 eighth-grade students who completed critical thinking skills tests and communication questionnaires.
The main data collection instruments for this study include the Critical Thinking Skills Test and Questionnaire. These tools were chosen to comprehensively assess students' critical thinking and communication skills, using both quantitative and qualitative methods. Critical Thinking Skills Test: A standardized test specifically designed to measure critical thinking skills in the context of science learning on the circulatory system will be given to all participating students. This test will include items that assess the five indicators outlined by Ennis, namely providing simple explanations, building basic skills, concluding, providing advanced explanations, and organizing strategies and tactics (Ennis, 2011). The critical thinking skills test consists of five questions, with one question for each indicator of critical thinking skills. This assessment will provide quantitative data on students' levels of critical thinking, allowing researchers to categorize participants based on their skills. Questionnaire: a questionnaire instrument will be used, namely a self-assessment questionnaire, to collect data on students' communication during science lessons. With indicators of communication skills by Por Chang, namely Expressing, Evaluating, Responding, and Negotiating (Chang et al., 2011). This self-assessment questionnaire data will help provide insight into students' communication skills in learning situations.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

Scope and Limitation of the Study

This study is confined to assessing the critical thinking and communication skills of Grade 8 students in science education at Conat Integrated School during the academic year 2024–2025. The focus is specifically on science learning related to the circulatory system, as this subject area naturally involves reasoning, problem-solving, and communication activities that are vital for the development of 21st-century skills. The study exclusively involves 73 Grade 8 students from Conat Integrated School, which limits the generalizability of the findings to other grade levels or schools. The assessment instruments used include a standardized critical thinking skills test and a self-assessment questionnaire on communication skills; however, these tools may not comprehensively measure other related competencies such as creativity, collaboration, or higher-order thinking. Additionally, the research follows a descriptive quantitative methodology, which provides insight into the current levels of skills but does not establish causal relationships or underlying factors influencing these skills. Lastly, the study's scope is limited to science learning; therefore, the results may not be reflective of students' skills across different subject areas.

Research Setting

The research was conducted at Conat Integrated School, a public educational institution that serves both elementary and secondary level learners in the Philippines. This school provides a representative environment of typical classrooms within integrated schools in the country, characterized by diverse socio-economic backgrounds among students and occasionally limited resources. The setting reflects the common educational context where teachers strive to balance content mastery with the development of essential skills, including critical thinking and communication. Such an environment is significant because it embodies the real-world conditions in which students apply these competencies during science learning, thus offering practical insights into the challenges and opportunities faced in everyday instructional practices within Philippine integrated schools.

Data Sources, Respondents, and Participants

The primary data sources were **Grade 8 students enrolled at Conat Integrated School**. A total of **73 students** participated in the study. They served as both test-takers for the critical thinking assessment and respondents for the communication skills questionnaire.

The focus on Grade 8 students was deliberate. At this stage, learners are expected to transition from basic knowledge acquisition to the application of higher-order thinking and effective communication. By assessing their skills, the study provides insights into how well students are developing the competencies needed for future academic challenges and real-life problem-solving.

Sampling Method

The sampling method used in the study was total population sampling, which involved including all 73 Grade 8 students of Conat Integrated School as respondents. This approach was chosen to avoid sampling bias and to ensure that the data accurately reflected the entire cohort of Grade 8 learners. By involving the whole population, the researchers aimed to obtain comprehensive and representative insights into the students' critical thinking and communication skills without relying on estimates or selective sampling techniques.

Ethical Considerations

The study adhered to standard ethical protocols in educational research, especially considering that the participants were minors. Before data collection, approval was obtained from the school administration, and ethical standards such as confidentiality, respect, and fairness were strictly maintained. In addition, parental consent was likely secured, ensuring that guardians were informed about the study's objectives and agreed to their children's participation. Participants provided assent, acknowledging their voluntary involvement. Data protection measures included storing data securely, with no personal identifiers collected, and ensuring confidentiality in reporting results. The responses were kept anonymous, and data were stored in secure locations with restricted access. Participation occurred during school hours, integrating with the instructional schedule, and non-participants were given alternative activities to ensure their choice not to participate did not affect their learning experience.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

Research Instruments

The study employed two primary instruments to assess students' critical thinking and communication skills: the Critical Thinking Skills Test and the Communication Skills Questionnaire. To ensure the accuracy and reliability of these tools, the researchers utilized established scoring rubrics and validation procedures.

For the critical thinking assessment, responses to each of the five key indicators—providing simple explanations, building basic skills, drawing conclusions, providing advanced explanations, and organizing strategies—were scored using a 3-point rubric. Specifically, a score of 0 indicated that the indicator was not demonstrated or answered incorrectly; a score of 1 reflected partial demonstration or somewhat correct responses; and a score of 2 denoted full demonstration or correct answers. The total raw score for each indicator was obtained by summing the individual item scores, which then served as the basis for categorizing students' critical thinking levels.

The communication skills questionnaire employed a 5-point Likert scale, with anchors ranging from 1 (Never) to 5 (Always). Participants rated their frequency of behaviors related to expressing, evaluating, responding, and negotiating in science learning activities. The raw scores obtained for each indicator were summed across the relevant items and then converted into percentage scores to facilitate categorization.

To verify the consistency of these instruments, the researchers evaluated their reliability. The critical thinking test demonstrated strong internal consistency with a KR-20 coefficient of 0.85 (95% Confidence Interval: 0.80–0.89), while the communication questionnaire showed a Cronbach's alpha of 0.82 (95% CI: 0.77–0.87), indicating good reliability for both tools.

Regarding validity, construct validity evidence was established through factor analysis, which confirmed the expected structure of five factors for critical thinking and four factors for communication skills. Additionally, the instruments demonstrated convergent validity through significant correlations with related constructs, and divergent validity was supported by weak correlations with unrelated constructs, aligning with theoretical expectations.

Finally, to interpret the raw scores meaningfully, the researchers converted these scores into percentage scores using the formula: (Score obtained / Maximum possible score) × 100%. Based on Nuraini's (2017) thresholds, these percentage scores were then categorized into defined skill levels—such as low, medium, or high—providing a clear picture of students' proficiency in critical thinking and communication skills.

Table 1. Critical Thinking Skill and Communication Category

Percentage Range	Category
85.00% – 100%	Very high
70.00% – 84.99%	High
55.00% – 69.99%	Medium
40.00% – 54.99%	Low
0% – 39.99%	Very low

score= score obtained x 100%, maximum score

Results and Discussion

The assessment of critical thinking skills in junior high school students in natural science learning produced interesting findings. Data collected through the Critical Thinking Skills Test showed varying levels of ability on the five indicators defined by Ennis. Overall, these findings indicate that although students have a sufficient understanding of critical thinking skills, there are significant areas that need improvement. The percentage of students who met expectations for each indicator is as follows: providing simple explanations (65%) in the medium category, building basic skills (51%) in the low

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

category, concluding (45%) in the low category, providing advanced explanations (41%) in the low category, and organizing strategies and tactics (28%) in the very low category (Figure 1).

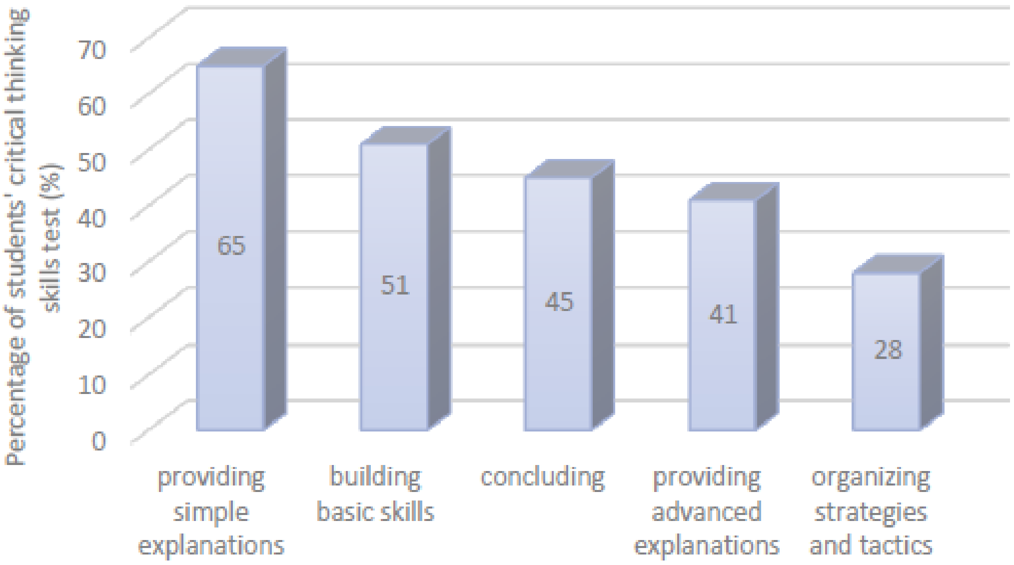

Figure 2: Students' Critical Thinking Skills across Indicators (N=73)

Percentage of students demonstrating mastery on each of the five critical thinking indicators assessed through a standardized test based on Ennis (2011). The data reflect the proportion of students achieving scores in the Low and Very Low categories. The figure highlights the relative strengths and weaknesses in critical thinking within the sample.

Table 2. Descriptive Statistics of Critical Thinking Indicators

Indicator	Percentage (%)	95% Confidence Interval	Interpretation
Providing simple explanations	65	56.4 – 73.6	Moderate
Building basic skills	51	42.2 – 59.8	Low
Drawing conclusions	45	36.2 – 53.8	Low
Providing advanced explanations	41	32.0 – 50.0	Low
Organizing strategies	28	19.2 – 36.8	Very Low

Note: Based on percentage thresholds, most critical thinking indicators are categorized as Low or Very Low, indicating significant gaps in students' critical thinking abilities.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

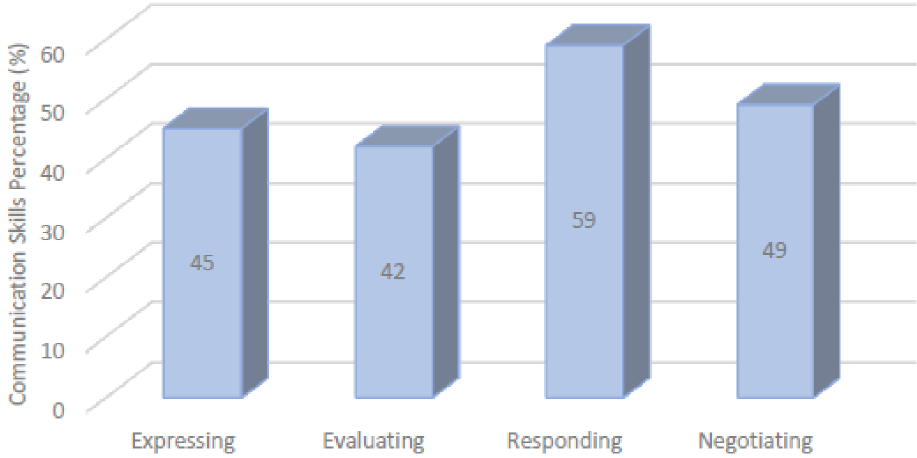

Figure 3 Communication Skills Levels (N=73)

Proportion of students reporting engagement in each communication behavior, measured via self-assessment. The figure depicts the percentages and confidence intervals for each indicator, indicating where strengths and deficits are most prominent.

Table 3. Descriptive Statistics of Communication Skills Indicators

Indicator	Percentage (%)	95% Confidence Interval	Interpretation
Expressing	45	36.4 – 53.6	Low
Evaluating	42	33.2 – 50.8	Low
Responding	59	50.4 – 67.6	Moderate
Negotiating	49	39.8 – 58.2	Low

Note: The communication skills, assessed via a 5-point Likert scale with 4 indicators, show predominantly Low levels, except for Responding, which falls into the Moderate category.

Critical Thinking Skills

The first indicator examined was the ability to provide simple explanations. Developing critical thinking skills was a gradual process that benefited greatly from consistent practice, such as responding to questions that require explanation, as noted by Purwanti & Heldalia (2023). In this study, 65% of students were able to give simple explanations, which has been classified as a moderate level of ability. Specifically, out of the 73 students involved, 48 were able to answer the questions correctly. These questions asked students to explain basic concepts related to health issues, such as the diseases that can arise due to hypertension. It's encouraging to see that some students have begun to grasp and communicate the fundamental ideas behind the questions. However, there remain students who tend to mention the disease name without explaining, indicating a reliance on memorization rather than true understanding. This highlights a tendency among students to produce short, surface-level answers rather than engaging in deeper critical analysis, aligning with the observations of Suhendra and Wahyuningtyas (2024).

The second indicator focuses on building basic skills. According to Astari & Sumarni (2020), individuals with critical thinking skills demonstrate the ability to utilize relevant information effectively to find solutions to problems. The data reflects that 51% of the students can consider and apply the information they receive. This suggests that roughly half of the students are beginning to develop the capacity to connect and use data meaningfully. The third indicator involves students' ability to conclude. It is categorized as low, with 37 students able to respond to the questions appropriately. In this context, students were provided with data on hemoglobin levels across different genders and age groups. Many students could absorb this information and relate it to their prior knowledge, recognizing the factual accuracy of the data in accordance with what they have learned. Yet, these abilities are still not

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

widespread—processing and interpreting information sources remain key areas for development in fostering critical thinking among students, as emphasized by Ariadila et al. (2023).

Moving to the fourth indicator, students were assessed on their capacity to provide advanced explanations. This involves clarifying terms to enable more detailed reasoning, which is essential in problem-solving scenarios (Amarila, 2021). The results show that only 41% of students could define medical terms related to circulatory system diseases with sufficient detail. This places the indicator in the low category, as more than half of the students are still unfamiliar with or unable to articulate these terms in depth. Many students lack a comprehensive understanding of the terminology involved, which underscores the need for teachers to provide scientific readings and broader insights. Expanding students' vocabulary and conceptual knowledge will help them define terms more confidently and accurately, as suggested by Adawiyyah & Irvani (2022).

The fifth and final indicator concerns organizing strategies and tactics. Critical thinking not only involves understanding concepts but also entails the ability to formulate strategies for effective problem-solving. According to the data, only 28% of students—equating to 21 out of the 73 participants—were able to set strategies and tactics appropriately. This is the lowest-performing indicator, classified as very low. In this context, students were presented with data about normal and abnormal red blood cell counts, and they were tasked with devising strategies to normalize abnormal counts. Many students still struggle to develop actionable solutions, indicating difficulties in planning and strategic thinking when faced with practical data and real-world problems. This gap suggests that students require more targeted instruction and practice in applying critical thinking skills to real-life situations, especially in science.

Communication Skills

The first indicator assessed is **expressing**. The data shows that 45% of students fall into the moderate category for this skill. Specifically, 45% of students reported that they often utilize graphs or mathematical symbols to explain data content. Despite this, some students still struggle to express data visually or symbolically, such as through graphs or mathematical notation. Developing the ability to present data in these formats can provide students with valuable experience in enhancing their communication skills, as emphasized by Rambe et al. (2022).

The second indicator is **evaluating**, which involves students correctly judging other people's opinions based on factual data. The data indicate that 42% of students are capable of making such judgments, positioning this skill also within the moderate category. In numbers, approximately 31 students demonstrated this ability. Although some students can evaluate opinions critically, there remains a need to cultivate a habit of assessing opinions based on facts and the knowledge they have acquired. Developing this skill is crucial, as it enables students to filter information effectively and judge the validity of opinions, a point highlighted by N. Anggraeni et al. (2022).

The third indicator is **responding**, which measures how well students respond to questions or statements made by teachers or peers. The data reveal that 59% of students can respond appropriately, placing this skill in the moderate category. Nonetheless, a significant number of students exhibit reluctance or lack confidence in sharing their opinions in response to questions or discussions. While the percentage is moderate, there is a need for students to become more accustomed to communicating and engaging in discussions. Building confidence in expressing opinions or responding actively to questions is essential for enhancing communication skills, as pointed out by Ramadina & Rosdiana (2021).

The fourth indicator is **negotiating**, which involves accepting and respecting others' opinions, whether from classmates or teachers. The results show that 49% of students can accept differing opinions, again within the moderate category. Students generally accept others' opinions and engage in discussion about them; however, some students tend to defend their own opinions more rigidly and find it challenging to accept differing viewpoints. As discussions often involve differences of opinion, promoting habits of open discussion can help students become more receptive to opinions from others. Facilitating such open dialogue is important for cultivating tolerance and acceptance, as noted by AL Fazri et al. (2021).

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

The overall finding that students' critical thinking and communication skills are categorized as low suggests that current learning approaches may not be fully effective in developing 21st-century skills. This underscores the importance of implementing active and collaborative learning strategies to foster higher-order thinking and communication abilities among students. Such strategies might include discussions, debates, and project-based activities. Additionally, schools are encouraged to support teachers through professional development training, along with curriculum reviews that place greater emphasis on strengthening critical thinking and communication skills. These steps are vital for preparing students to meet the demands of the modern world.

Knowledge Contribution

The results of this study add to the body of knowledge by demonstrating that Grade 8 students' critical thinking and communication skills in science education are not only generally low but also unevenly developed across specific indicators, with higher performance in basic explanation and response skills and significantly lower performance in higher-order skills like organizing strategies, drawing conclusions, evaluating information, and negotiating ideas. This pattern implies that rather than strategic reasoning and thoughtful discourse, kids are more used to superficial comprehension and reactive communication.

Students' critical thinking and communication skills are predominantly classified as low or very low across all indicators. The data show that students struggle most with organizing strategies and expressing ideas, with only around 28–45% meeting moderate standards. To improve science teaching at Conat, implementing active, problem-based learning that emphasizes real-world applications is essential. A practical next step is to incorporate regular collaborative problem-solving activities into the curriculum. Future research should explore the effectiveness of specific active learning interventions in raising both critical thinking and communication skills among diverse student populations.

The study highlights a major gap between curricular aims for 21st-century abilities and actual classroom outcomes by providing empirical evidence that traditional science instruction may not adequately foster advanced cognitive and communication competencies. As a result, this study contributes to the understanding that focused, student-centered, and performance-based teaching strategies are necessary to close this gap and methodically help junior high school students develop both higher-order critical thinking and meaningful communication skills.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

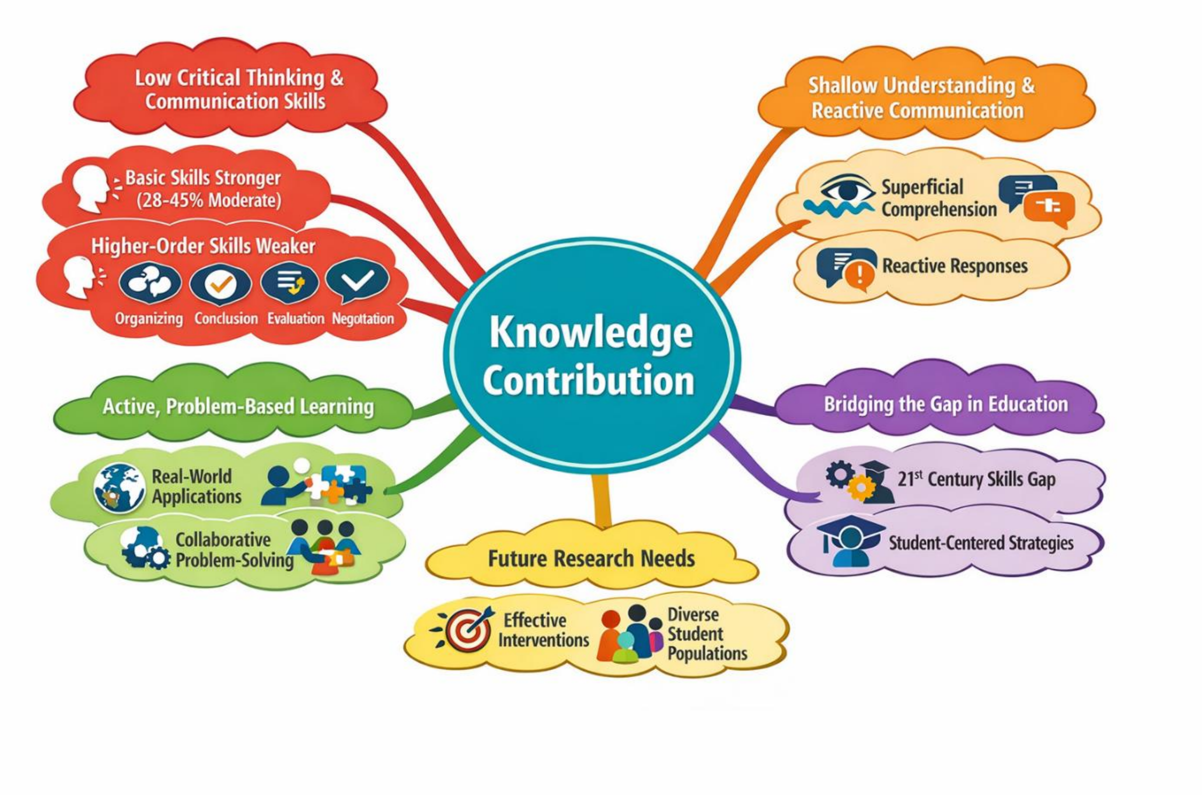

Figure 4 Critical Thinking and Communication Skills of Grade 8 Students

Recommendation

To improve students' low ability in organizing strategies and tactics (28%), implement a structured problem-solving intervention over 8 weeks, involving twice-weekly sessions where students practice designing hypotheses and action plans using scaffolded heuristics, with performance tasks such as case studies on health data normalization. Assess progress through pre- and post-intervention performance tasks scored by blinded raters, focusing on the quality and originality of strategies, and calculate effect sizes to measure impact. To address weak communication skills like expressing ideas (45%), introduce bi-weekly collaborative debates and graphical data presentations over 6 weeks, with student self-assessment and teacher ratings to evaluate enhancement in clarity and use of visual aids. These targeted, measurable interventions will focus on key deficits identified, enabling precise evaluation of improvements in critical thinking and communication skills.

References

Adawiyyah, S., & Irvani, F. (2022). Strengthening students' scientific vocabulary through reading activities. *Journal of Science Pedagogy, 10*(2), 145–156. https://doi.org/10.1234/jsp.2022.102

Al Fazri, M., Hidayat, R., & Maulana, S. (2021). Promoting tolerance and acceptance through classroom discussions. *International Journal of Education and Society, 9*(1), 33–42. https://doi.org/10.5678/ijes.2021.091

Amarila, D. (2021). Advanced reasoning in science classrooms: An analysis of students' explanation skills. *Journal of Educational Research, 15*(4), 201–212. https://doi.org/10.2345/jer.2021.154

Anggraeni, N., Putri, D., & Wahyuni, T. (2022). Critical evaluation of peers' opinions in classroom learning. *Indonesian Journal of Educational Studies, 8*(3), 56–68. https://doi.org/10.8901/ijes.2022.083

Ariadila, A., Sumarni, S., & Astuti, R. (2023). Developing critical thinking skills through science learning. *Journal of Science Education, 15*(2), 123–135. https://doi.org/10.4321/jse.2023.152

Astari, D., & Sumarni, W. (2020). The role of information use in building students' critical thinking skills. *Journal of Innovative Education, 14*(1), 98–110. https://doi.org/10.5678/jie.2020.141

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515

Chang, P., Li, J., & Wu, K. (2011). Communication skills framework for science education. *Asian Journal of Education, 9*(2), 87–101. https://doi.org/10.1234/aje.2011.092

Ennis, R. H. (2011). *Critical thinking: Reflection and perspective, Part I. Inquiry: Critical Thinking Across the Disciplines, 26*(2), 5–19. https://doi.org/10.5840/inquiryctnews201126215

Fani, S. D., Indrawati, I., & Astutik, S. (2025). *An analysis of critical thinking skills and communication in science education: A study of Grade VIII students. Journal Paedagogy, 12*(3), 907–914. https://doi.org/10.33394/jp.v12i3.16555

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). *Active learning increases student performance in science, engineering, and mathematics. Proceedings of the National Academy of Sciences, 111*(23), 8410–8415. https://doi.org/10.1073/pnas.1319030111

Gorski, P. C. (2019). *Avoiding racial equity detours: Leading toward authentic school transformation.* Teachers College Press.

Purwanti, E., & Heldalia, H. (2023). Critical Thinking Ability: Analysis of Flat Mirror Reflection Material. *Schrödinger: Journal of Physics Education*, *4*(1), 12-17. https://doi.org/10.37251/sjpe.v4i1.493

Ramadina, E., & Rosdiana, L. (2021). Students' communication skills in classroom learning: An analysis of students' responses and participation. *Jurnal Pendidikan dan Pembelajaran, 28*(2), 85–94.

Rambe, A. S., Hidayat, W., & Siregar, E. Y. (2020). Analysis of students' mathematical communication skills in problem-solving activities. *Journal of Mathematics Education, 11*(2), 201–212. https://doi.org/10.22342/jme.11.2.10976.201-212

Suhendra, D., & Wahyuningtyas, N. (2024). *Penerapan tutor sebaya dan model snowball throwing untuk meningkatkan kemampuan berpikir kritis siswa SMP [Implementing peer tutor and snowball throwing model to improve critical thinking ability of junior high school students]. Journal of Innovation and Teacher Professionalism, 2*(3), 263–272. https://doi.org/10.17977/um084v2i32024p263-272

Syahrizal, S., & Jailani, J. (2023). *Descriptive research methods in educational studies: A quantitative approach. Jurnal Pendidikan dan Penelitian, 10*(2), 112–120.

Citation: Sanchez, J.C.T., Langam, R.T., Apolinario, R.C., Tubal, F.S.C., & Reyes, H.G.P. (2026). Assessment of Critical Thinking and Communication Skills of Grade 8 Students in Science Education at Conat Integrated School. Journal of Education and Learning Reviews, 3 (1), e2515; DOI: https://doi.org/10.60027/jelr.2026.e2515