



Scientific Inquiry Skills and Performance in Regional Unified Quarterly Assessment in Science: A Correlational Study of Grade 9 Students Under the MATATAG Curriculum

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Received 01/06/2026

Revised 24/06/2026

Accepted 30/06/2026

Abstract

Background and Aim: Scientific inquiry is a fundamental component of science education and is strongly emphasized in the Philippine Department of Education's MATATAG Curriculum. However, concerns remain regarding whether standardized assessments accurately reflect students' inquiry competencies. This study examined the self-perceived scientific inquiry skills and science performance of Grade 9 students in the Regional Unified Quarterly Assessment (RUQA) at Ozamiz City National High School. Specifically, it determined the level of students' inquiry skills, assessed their science performance, and examined the relationship between these variables.

Materials and Methods: A quantitative non-experimental correlational research design was employed involving 123 Grade 9 students selected through stratified random sampling. Data were collected using a validated self-administered questionnaire measuring four dimensions of scientific inquiry skills: Formulating Questions, Planning and Conducting Investigations, Analyzing and Interpreting Data, and Drawing Conclusions. Official RUQA scores served as the measure of science performance. Descriptive statistics, including mean and standard deviation, were used to summarize the data, while Pearson Product-Moment Correlation was applied to determine the relationship between inquiry skills and science performance using JAMOWI software. Data normality was verified before analysis, and statistical significance was established at $\alpha = 0.01$.

Results: Students reported high levels of scientific inquiry skills across all four dimensions ($M = 2.95\text{--}3.02$), with Drawing Conclusions receiving the highest mean score and Formulating Questions the lowest. In contrast, science performance in the RUQA was only fairly satisfactory ($M = 38.9$ out of 50, equivalent to 77.8%), which fell below the Department of Education's 80% mastery benchmark. Correlation analysis revealed a statistically significant but very weak negative relationship between students' self-perceived inquiry skills and RUQA performance ($r = -0.245$, $p = 0.006$), indicating that higher self-ratings were associated with slightly lower standardized test scores.

Conclusion: The findings reveal a disconnect between students' perceived inquiry competence and their actual science achievement in standardized assessments. This discrepancy may reflect metacognitive bias, including overestimation of abilities, and suggests that current regional assessments remain predominantly content-oriented, limiting their ability to measure inquiry-based competencies promoted by the MATATAG Curriculum. The study underscores the need to strengthen alignment between inquiry-focused instruction and assessment practices to better evaluate students' scientific reasoning and process skills.

Keywords: Self-perceived Inquiry Skills, Science Performance, RUQA, MATATAG Curriculum

Introduction

Scientific inquiry is regarded as the heart of science education. It encompasses the ability to ask meaningful questions, plan systematic investigations, interpret data, and formulate evidence-based conclusions—competencies that go far beyond the mere memorization of facts (Santos & Villanueva, 2022). Under the MATATAG Curriculum, the Department of Education places significant emphasis on inquiry-based learning, with the goal of transforming learners into critical thinkers and problem solvers capable of applying scientific knowledge in real-life contexts (Department of Education, 2023).

However, a central concern among educators and policymakers is whether the skills developed through inquiry-based instruction are effectively measured or reflected in standardized assessment outcomes. While classroom instruction prioritizes hands-on activities and process skills, high-stakes assessments such as the





Regional Unified Quarterly Assessment (RUQA) predominantly utilize pen-and-paper formats, often criticized for focusing on factual recall rather than application or analysis (Lopez, 2021). This perceived discrepancy raises a critical question: Are current assessments truly aligned with the learning competencies intended by the new curriculum?

Observations from teachers indicate a consistent trend: students demonstrate competence and confidence during laboratory activities and projects, yet their performance in written examinations remains average or below mastery levels. This suggests a potential misalignment between what is taught—doing science—and what is tested—knowing science. Without empirical evidence regarding the relationship between these two domains, it remains unclear whether instructional strategies and assessment tools are working toward the same educational goals. Furthermore, it is crucial to distinguish between what students believe they can do versus what they actually demonstrate in formal evaluations, as research suggests a divergence between self-efficacy and measured performance (Calleja et al., 2023).

Existing literature has extensively discussed inquiry-based learning and academic performance separately, yet most studies were conducted under previous curriculum frameworks or focused on general academic achievement. There is a scarcity of research specifically examining how inquiry skills relate to standardized assessment results under the MATATAG framework, particularly for Grade 9 students. Furthermore, limited attention has been given to the distinction between students' perceived competence and their demonstrated performance in regional examinations.

This study addresses this gap by providing empirical data regarding the relationship between self-perceived scientific inquiry skills and RUQA performance. Specifically, it investigates whether students' self-assessment of their inquiry abilities corresponds with their scores in standardized tests. The findings serve as a basis for evaluating the validity of current assessment tools and offer insights for improving the alignment between curriculum, instruction, and evaluation.

Research Objectives

1. To determine the level of self-perceived scientific inquiry skills of Grade 9 students in terms of Formulating Questions and Hypotheses, Designing Investigations, Conducting and Analyzing Investigations, and Drawing Conclusions and Communicating Results.
2. To assess the level of performance of Grade 9 students in the Regional Unified Quarterly Assessment based on the Department of Education's descriptive rating scale.
3. To determine if there is a significant relationship between the level of self-perceived scientific inquiry skills and performance in the Regional Unified Quarterly Assessment.

Significance of the Study

This research provides empirical evidence that is valuable to various stakeholders:

For Teachers: It reveals whether assessment tools effectively measure the skills emphasized in inquiry-based instruction, guiding adjustments in lesson design and test construction.

For School Administrators: It offers data to evaluate the implementation of the MATATAG Curriculum and identify gaps between intended learning outcomes and assessment results.

For the Department of Education: It contributes to the body of knowledge regarding the validity of regional assessments and informs policy revisions to ensure assessments align with curriculum goals.

For Future Researchers: It serves as a reference for studies on curriculum-assessment alignment, metacognitive awareness, and science education reform in the Philippines.

Literature review

Scientific Inquiry Skills

Scientific inquiry is defined as the active process of questioning, investigating, and reasoning to develop scientific knowledge. It is the foundation of science education, allowing learners to move beyond passive reception of information toward active construction of meaning (Aquino & Ramos, 2022). Through inquiry, students learn to think critically, solve problems, and take responsibility for their own learning.

Hands-on investigations allow learners to experience how scientific knowledge is created and validated. These activities make learning meaningful and help develop curiosity and confidence in





exploring scientific ideas (Garcia et al., 2023). Asking relevant questions is a fundamental practice in scientific inquiry, as it initiates investigations and guides students in seeking evidence-based explanations for observed phenomena. Formulating hypotheses further enables students to generate testable predictions based on prior knowledge and available evidence (National Research Council, 2012; Bybee, 2013).

Designing experiments teaches students how to plan procedures and identify variables systematically. Equally important are the skills to interpret data and form conclusions, which strengthen logical thinking and decision-making. Research consistently shows that students with strong inquiry skills perform better in assessments that measure application and analysis, though results vary depending on the assessment format (Fernandez & Gomez, 2023). Importantly, inquiry skills in this study are measured via self-report, which reflects perception rather than actual ability—a distinction that influences the interpretation of results.

Science Performance

Science performance refers to how well students perform in exams, projects, and other academic tasks. It measures not just what they know, but how well they can apply that knowledge to solve problems and interpret information. Factors such as teaching methods, motivation, study habits, and mastery of skills greatly influence performance (Ramirez & Lopez, 2022).

The Regional Unified Quarterly Assessment (RUQA) serves as the standard tool to measure students' mastery of concepts and competencies within the region. It helps identify strengths and areas needing improvement, guiding teachers in providing appropriate support. Ideally, students who truly understand science and possess strong inquiry skills should obtain high scores in these evaluations (Navarro & Perez, 2023).

However, studies show that performance in standardized tests is heavily influenced by the format of the assessment. While inquiry-based learning improves deep understanding and retention, performance in multiple-choice tests often correlates more strongly with content knowledge and rote memorization strategies. Dela Cruz et al. (2023) noted that while inquiry-based learning improves engagement and conceptual understanding, its translation to test scores depends entirely on whether the test items are designed to measure those specific inquiry skills.

Relationship Between Scientific Inquiry Skills and Science Performance

Research generally confirms a significant positive link between inquiry skills and academic success when assessments are performance-based or process-oriented. Students who are good at investigation and reasoning understand concepts better and solve problems effectively. Inquiry-based learning promotes participation and critical thinking, both of which directly contribute to higher grades and achievement in authentic assessments (Fernandez & Gomez, 2023).

However, recent studies present conflicting findings when standardized paper-and-pencil tests are used. Servado (2022) and Calleja et al. (2023) found that students may feel confident in their abilities but still get average or low grades because tests often focus on memorization rather than application or analysis. Chi (2023) also reported low scientific literacy among Filipino students despite curriculum reforms, suggesting a gap between what is taught and what is tested. Additionally, the Dunning-Kruger effect—a cognitive bias where individuals with low ability at a task overestimate their ability—provides a theoretical explanation for why high self-ratings might not correspond to high test scores.

Learners who can ask questions, design tests, and interpret data are better equipped to handle complex tasks, yet they may struggle with tests that prioritize isolated facts. This creates a scenario where strong inquiry skills do not automatically guarantee high scores in traditional exams. This study explores this tension, hypothesizing that a mismatch exists between the skills emphasized in the MATATAG Curriculum and the skills measured by the RUQA.

Synthesis of the Literature

Reviewed literature confirms that inquiry skills and science performance are closely connected when assessments align with instruction. Inquiry develops critical thinking and engagement, while performance reflects mastery of knowledge and skills. However, most previous research focused on older curricula or general performance. There is a limited study specifically regarding Grade 9 students under the MATATAG Curriculum and their performance in the Regional Unified Quarterly Assessment. Furthermore, few studies explicitly address the difference between perceived and actual competence. This study fills that gap by providing new, local data on this relationship, revealing whether current tests truly measure the process-oriented skills being taught in class.



Theoretical and Conceptual Framework

This study is anchored on two major theories:

Constructivist Learning Theory by Jean Piaget and Inquiry-Based Learning Theory by John Dewey. Both theories explain that students learn best when they actively explore, investigate, and solve problems rather than just receiving information passively.

Constructivist Theory states that learners build knowledge based on their experiences and what they already know. Learning becomes meaningful when students are involved in hands-on activities and discovery. Research supports this, noting that active learning develops critical thinking, reasoning, and a deeper understanding of scientific concepts (Santos & Villanueva, 2022).

Inquiry-Based Theory views learning as a process of investigation. Students act like scientists: they ask questions, gather evidence, and form conclusions based on findings. This method builds independence, curiosity, and problem-solving abilities. Studies show that students taught this way perform better in assessments and develop higher scientific literacy (Torres & Castillo, 2024).

These theories support the premise that inquiry skills should lead to better performance. However, they also acknowledge that the *measurement* of learning depends entirely on the assessment tools used. If assessments focus only on recall, the benefits of inquiry may not be reflected in scores.

Conceptual Framework

The framework illustrates the relationship between two key variables following the **Input-Process-Output (IPO)** model:

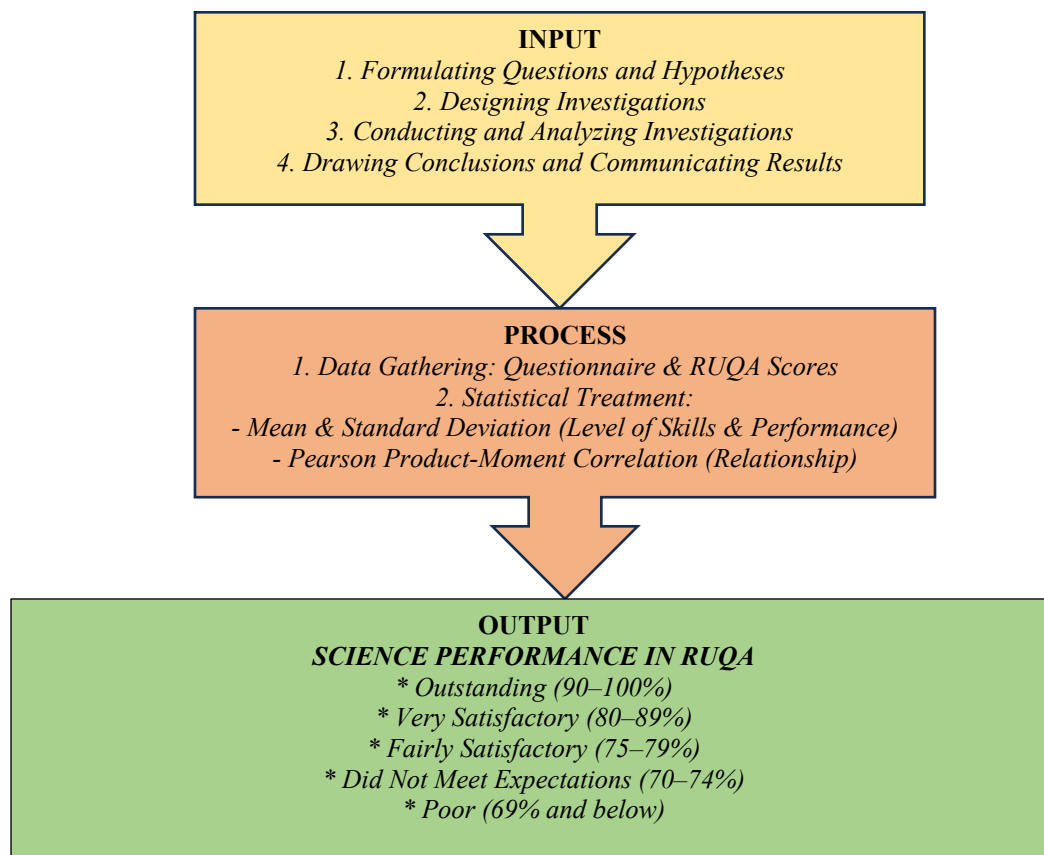


Figure 1. Conceptual Framework showing the Input-Process-Output model linking self-perceived inquiry skills to standardized assessment performance.

- **Input (Independent Variable): Self-Perceived Scientific Inquiry Skills**, including:
 - Formulating Questions and Hypotheses
 - Designing Investigations
 - Conducting and Analyzing Investigations
 - Drawing Conclusions and Communicating Results
(Measured via student self-assessment)
- **Process:**
 - Administration of Scientific Inquiry Skills Questionnaire
 - Retrieval of Regional Unified Quarterly Assessment (RUQA) scores
 - Statistical analysis (Descriptive and Inferential Statistics) to determine levels and relationships
- **Output (Dependent Variable): Science Performance**, measured through scores in the Regional Unified Quarterly Assessment (RUQA), categorized from Outstanding to Poor.

The framework assumes that inquiry skills should improve performance, but also recognizes that results may differ if assessments focus only on content knowledge instead of process skills. It also highlights that the independent variable is based on perception, which may differ from actual capability. This guides the study in determining the true relationship between what students think they know and how they are evaluated.

Methodology

Research Design

This study employed a quantitative, non-experimental correlational research design. This design was appropriate as it sought to determine the level of scientific inquiry skills, describe science performance, and examine the relationship between these two variables without any manipulation by the researcher (Creswell & Creswell, 2023). It allows for the measurement of the strength and direction of association between variables as they naturally occur.

Research Locale

The study was conducted at Ozamiz City National High School, Ozamiz City, Misamis Occidental, Philippines, during the implementation of the MATATAG Curriculum. This locale was selected because it is a public secondary school with a large student population actively transitioning to the new curriculum, providing a relevant context for the study.

Participants of the Study

Population: All Grade 9 students enrolled at Ozamiz City National High School during the Academic Year 2025-2026.

Sample Size: 123 Grade 9 students. The sample size was determined using Slovin's formula with a 5% margin of error to ensure representativeness.

Sampling Technique: Stratified random sampling was utilized to ensure proportional representation across different class sections, minimizing selection bias and ensuring that all subgroups within the population were included.

Research Instruments

Instrument 1: Scientific Inquiry Skills Questionnaire

A self-administered survey questionnaire was adapted and modified based on existing instruments aligned with MATATAG competencies. It measured students' perceived scientific inquiry skills across four indicators: (1) Formulating questions and hypotheses, (2) Designing investigations, (3) Conducting and analyzing investigations, and (3) Drawing conclusions and communicating results.

Each indicator contained 5 items, for a total of 20 items. A 4-point Likert scale was used (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Agree*, 4 = *Strongly Agree*).

Validity: The instrument underwent content validation by three expert jurors in science education and measurement. Items were reviewed for clarity, relevance, and alignment with curriculum standards. A Content Validity Index (CVI) of 0.92 was obtained, indicating excellent validity.

Reliability: Pilot testing was conducted on 30 non-participant Grade 9 students. Analysis yielded a Cronbach's alpha of 0.85, indicating high reliability and internal consistency of the instrument.

Instrument 2: RUQA Science Scores



Students' actual performance data were obtained from their scores in the Regional Unified Quarterly Assessment (RUQA) in Science, a 50-item multiple-choice standardized test developed, validated, and administered by the Department of Education Regional Office. Scores were treated as quantitative data.

Data Collection Procedure

Ethical Clearance: The researchers secured a letter of permission addressed to the Schools Division Superintendent. Upon approval, they obtained informed consent from the school principal and from the parents/guardians of the Grade 9 students, as well as informed assent from the student participants.

Administration: A scheduled date with the Grade 9 science teachers was proposed. The questionnaire was distributed via Google Forms. The researcher explained the instructions and ensured that students understood each item. Students completed the questionnaire anonymously, using assigned codes instead of names to ensure confidentiality.

Data Gathering: Official RUQA scores of the same respondents from the most recent quarterly assessment were requested from the Science teachers.

Data Management: All data were encoded into a spreadsheet and verified for accuracy through a double-entry method to minimize encoding errors.

Statistical Treatment of Data

All statistical computations were performed using the JAMOV software. The following tools were used:

1. **Mean and Standard Deviation:** Used to determine the level of scientific inquiry skills and the level of science performance.

Interpretation of Mean Scores (Skills): 1.00–1.75 (Very Low); 1.76–2.50 (Low); 2.51–3.25 (High); 3.26–4.00 (Very High).

Interpretation of RUQA Scores (Official DepEd Scale): 45–50 (Outstanding / 90–100%); 40–44 (Very Satisfactory / 80–89%); 38–39 (Fairly Satisfactory / 75–79%); 35–37 (Did Not Meet Expectations / 70–74%); ≤34 (Poor / ≤69%). *Note: This scale is the official DepEd standard for regional assessments.*

2. **Pearson Product-Moment Correlation:** Used to test the significant relationship between scientific inquiry skills (composite mean) and RUQA performance (raw score).

Assumption Testing: The Shapiro-Wilk test was conducted before analysis; results confirmed normal distribution of data ($p > 0.05$), validating the use of parametric testing.

Significance Level: Set at $\alpha = 0.01$ (two-tailed).

Interpretation of r-value: < 0.30 (Very weak / None); 0.31–0.50 (Weak); 0.51–0.70 (Moderate); 0.71–0.90 (Strong); 0.91–1.00 (Very Strong).

Results

Level of Scientific Inquiry Skills

Table 1. Level of Scientific Inquiry Skills of Grade 9 Students

Variables	Mean	SD	Interpretation
Formulating Questions and Hypotheses	2.95	0.537	High
Designing Investigations	3.01	0.610	High
Conducting and Analyzing Investigations	3.00	0.635	High
Drawing Conclusions and Communicating	3.02	0.671	High
Overall Average	2.99	0.613	High

Note: Scale: 1.00–1.75 (Very Low); 1.76–2.50 (Low); 2.51–3.25 (High); 3.26–4.00 (Very High) (Scale adapted from Santos & Villanueva, 2022)

Students rated their scientific inquiry skills as high across all indicators, with an overall mean of 2.99. The highest rating was observed in drawing conclusions and communicating results, while formulating questions and hypotheses obtained the lowest score. This indicates that learners generally feel confident in performing inquiry tasks, though they find initiating investigations more challenging than completing them. The consistent perception suggests that inquiry-based learning under the MATATAG Curriculum is being recognized and internalized, though additional activities focused on questioning and





hypothesis-making are recommended. This finding aligns with Garcia et al. (2023), who noted increased confidence through hands-on experiences, and Cruz and Mendoza (2024), who identified question formulation as a common difficulty among students.

Level of Science Performance in RUQA

Table 2. Level of Science Performance in the Regional Unified Quarterly Assessment

Variable	Mean	SD	Minimum	Maximum	Interpretation
Science Performance in RUQA	38.9	5.12	28	49	Fairly Satisfactory

Note: Scale based on Department of Education (2023): Outstanding (45–50); Very Satisfactory (40–44); Fairly Satisfactory (38–39); Did Not Meet Expectations (35–37); Poor (≤34)

The students obtained a mean score of 38.9 out of 50, interpreted as Fairly Satisfactory. While this is above the passing requirement, it falls below the Department of Education's 80% mastery standard. The wide range of scores shows inconsistent performance across the group, revealing a noticeable gap between learners' high self-assessment of their skills and their actual test results. This implies that current assessments may focus more on factual recall rather than the process-oriented skills emphasized in class, confirming that confidence does not always equate to demonstrated competence. This observation is supported by Lopez (2021), who explained that standardized tests often measure content knowledge over inquiry abilities, and Calleja et al. (2023), who noted similar discrepancies between self-perception and actual achievement among Filipino learners.

Relationship Between Scientific Inquiry Skills and RUQA Performance

Table 3. Correlation Between Self-Perceived Scientific Inquiry Skills and RUQA Performance

Variable	Pearson's <i>r</i>	<i>p</i> - value	Interpretation
Scientific Inquiry Skills vs. RUQA Performance	-0.245	0.006	Very Weak Negative, Significant

Interpretation adapted from Creswell & Creswell, 2023

Analysis revealed a very weak but significant negative relationship between self-perceived inquiry skills and RUQA performance. This means that as students rated their own skills higher, their test scores tended to decrease slightly. This unexpected trend may be attributed to misalignment between what is taught and what is tested, or to metacognitive bias, where learners with limited content knowledge tend to overestimate their own abilities. Consequently, self-reported competence cannot be relied upon as a true measure of learning outcomes, and there is a need to review assessment tools to ensure they accurately reflect inquiry-based competencies. This result is consistent with Servado (2022), who found a similar inverse relationship, and Dela Cruz et al. (2023), who emphasized that the link between skills and performance depends largely on how assessments are constructed.

Discussion

The high self-assessment of inquiry skills implies that the MATATAG Curriculum's emphasis on inquiry-based learning is being internalized at the affective level; students believe they possess the competencies outlined (Department of Education, 2023). However, high confidence does not automatically equate to actual proficiency in performance-based assessments or written tests. The disconnect between perception and actual performance must be addressed because overconfidence in skills without corresponding achievement may lead to poor study habits and low test results. These findings align with Servado (2022), who found that Filipino learners often rate their skills highly yet struggle to demonstrate them in formal evaluations.



The "Fairly Satisfactory" RUQA result becomes more concerning when juxtaposed with the "High" self-rated inquiry skills. This gap aligns with national findings reported by Chi (2023), where only 23% of Filipino students reached the baseline level of proficiency in scientific literacy. Calleja et al. (2023) further argued that this discrepancy highlights that standardized tests may not fully capture the skills developed in class but are heavily influenced by content knowledge and test-taking strategies.

The significant negative correlation ($r = -0.245$, $p = 0.006$) is the most notable finding. This inverse relationship supports the observation by Lopez (2021) and Bagay et al. (2023) that Filipino students often struggle to translate practical process skills into high scores on rigid, traditional examinations. Several explanations account for this result:

Assessment Misalignment: The RUQA is likely content-heavy and focuses on lower-order thinking skills, while inquiry learning emphasizes higher-order thinking and processes. Students skilled in investigation may be less prepared for memory-based questions.

Metacognitive Bias (Dunning-Kruger Effect): Students with lower content knowledge or limited experience may overestimate their abilities, resulting in high self-ratings but low test scores. Conversely, students with higher knowledge may be more critical and realistic in their self-assessment.

Different Skill Sets: Inquiry skills involve manipulation and analysis, while RUQA requires reading comprehension, interpretation of diagrams, and recall of facts. Success in one does not guarantee success in the other.

This confirms that the current assessment tools may not effectively measure the analytical and process-oriented skills that students develop in the classroom, highlighting a clear misalignment between curriculum goals and evaluation methods. It also highlights the limitation of self-report data: what students think they can do is not always what they can actually do in a formal testing environment.

Conclusion

Based on the findings of the study, it is concluded that Grade 9 students of Ozamiz City National High School possess a high level of confidence and perceived competence in scientific inquiry skills, reflecting the internalization of inquiry-based learning under the MATATAG Curriculum. However, this positive self-assessment does not correspond with their actual academic performance, which remained only fairly satisfactory and below the national mastery standard.

The significant negative relationship further confirms a disconnect between what students learn and practice during inquiry activities and how their learning is measured in the Regional Unified Quarterly Assessment. It appears that current standardized tests are heavily focused on content recall and factual knowledge, which may not fully capture the critical thinking, problem-solving, and process skills that students are expected to acquire. Furthermore, the negative correlation suggests that students who are less proficient in content knowledge tend to overestimate their inquiry skills, likely due to metacognitive limitations.

Consequently, the assessment tools currently in use may not accurately reflect the true scientific proficiency and potential of the learners. Self-perception is not a reliable proxy for actual performance in standardized tests.

Therefore, to bridge this gap, there is a critical need to realign assessment practices with curriculum goals. Evaluations should be revised to include more performance-based, process-oriented, and inquiry-focused items that truly reflect the skills students are developing. Without this alignment, the full benefits of the MATATAG Curriculum may not be fully reflected in student assessment results, and the intended outcomes of science education may not be fully achieved.





Recommendation

Based on the findings and conclusions, the following actions are recommended:

For Schools and Administrators:

Provide a learning environment that critically examines the mismatch between students' highly self-rated inquiry skills and their fairly satisfactory performance. Design intervention programs that address not only skill development but also test-taking strategies, content mastery, and alignment of classroom instruction with RUQA competencies.

Conduct symposia or workshops to improve teacher competence in constructing assessment tools that measure inquiry skills, moving away from purely factual questions toward items that require analysis, application, and reasoning.

Integrate activities that improve students' metacognitive skills, helping them assess their own abilities more accurately.

For the Department of Education:

Revisit the assessment framework of the Regional Unified Quarterly Assessment. Review policies and determine why students who perceive themselves as highly skilled in scientific inquiry obtained lower RUQA scores. Particular attention should be given to the validity of the test items and whether they truly align with MATATAG standards.

Consider integrating performance-based assessments or items utilizing the Claim-Evidence-Reasoning (CER) framework into regional evaluations to better capture inquiry competencies.

For Teachers:

Guide students in developing accurate self-assessment and metacognitive skills to reduce overconfidence. Explicitly teach students how inquiry skills apply to written assessments and how to translate practical knowledge into test success.

Balance instruction between process skills and content knowledge to ensure students are prepared for both hands-on tasks and written examinations.

For Parents:

Participate in orientations to understand the relationship between inquiry skills and science performance. Support home learning by reinforcing content review and practice with RUQA-type questions, helping students ensure their self-perception matches actual competency.

For Future Researchers:

Extend this study by investigating other variables that may explain the negative relationship, such as test anxiety, learning styles, or the Dunning-Kruger effect.

Crucially, future studies should employ direct observation or performance tests of inquiry skills rather than just self-reports to validate these findings and provide a more accurate measure of actual competence.

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