

Explicating the Comprehension Skills Based on the Strategies on the Instruction of the Core Subjects of Junior High School Students

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Abstract

This study examined the relationship between teachers' instructional strategies and the comprehension skills of junior high school students in English, Mathematics, and Science, with the goal of providing an empirical basis for the development of an enhanced self-learning module. Anchored on cognitive, socio-cultural, sequential, and learning theories, the study employed a descriptive-correlational research design. Quantitative data were gathered using two researcher-developed survey questionnaires administered to junior high school students and teachers in Minglanilla District II. Descriptive statistics were used to determine respondent profiles, the extent of strategy utilization, and levels of student comprehension, while robust regression analysis was applied to examine relationships between instructional strategies and comprehension skills. Results showed that teachers in all three subjects demonstrated a high extent of instructional strategy utilization, particularly cooperative learning, practice exercise sessions, and structured activities. However, students' comprehension skills varied across subjects, with English at a low level and Mathematics and Science at moderate levels. Regression analysis revealed significant positive relationships between instructional strategies and comprehension skills in English and Mathematics, with cooperative learning emerging as the strongest predictor, while results in science were mixed, indicating that effectiveness depends on appropriate implementation and contextual alignment. The study identified language proficiency, resource allocation, and student motivation as key barriers to effective learning. The findings support Sustainable Development Goal 4 (Quality Education) by emphasizing effective instructional practices that improve learning outcomes and contribute to educational sustainability through informed curriculum enhancement and teacher professional development.

Keywords: Comprehension Skills; Instructional Strategies; Junior High School Students; Mathematics Education; Science Education; Self-Learning Module; Teaching Effectiveness

1. Introduction

Comprehension skills are foundational cognitive abilities that enable learners to construct meaning, evaluate ideas, and apply information across academic disciplines and everyday contexts. In junior high school education, these skills are particularly critical in English, Mathematics, and Science, where students must make sense of complex texts, interpret abstract concepts, and respond to problem-based tasks. In practice, comprehension outcomes are shaped not only by learners' capacities but also by the quality of instructional design, classroom support, and the availability of learning resources—factors that can either deepen understanding or widen learning gaps. Evidence from Philippine and local educational contexts suggests that learning effectiveness is closely linked with how teaching practices are implemented and supported institutionally, especially during periods of disruption and transition (De Lara & Santos, 2024; Santiago et al., 2023). In addition, teachers' competence, profiles, and professional conditions may influence instructional consistency and student learning progress, reinforcing the need to examine learning outcomes within authentic school settings (Hipolito & Santos, 2025; Yu & Santos, 2025). Technology-mediated learning also remains a relevant dimension of student comprehension support, particularly when mobile access and digital resources are used to supplement instruction and independent learning (Tuliao et al., 2024; Jacoba et al., 2025). Within this context, curriculum-support mechanisms—such as remediation tools and structured learning materials—are increasingly emphasized as practical responses to persistent learning gaps and uneven mastery across competencies (Cara et al., 2025; Gamit, 2024). At the system level, quality management and performance-oriented frameworks offer useful perspectives for strengthening instructional delivery and monitoring learning outcomes in educational institutions (Gamit et al., 2024; Armas et al., 2025). Hence, this study examines the relationship between teachers' instructional strategies and junior high school students' comprehension skills in English, Mathematics, and Science, providing an empirical basis for developing an enhanced self-learning module responsive to learners' demonstrated needs.

1.1 Comprehension Skills and Instructional Strategies in English, Mathematics, and Science among Junior High School Students

Comprehension develops from early language exposure and progresses as learners engage with increasingly complex academic materials (Oxford English Dictionary, 2000; Butterfuss, Kim, & Kendeou, 2020). Strong comprehension skills support knowledge integration, problem-solving, and application across contexts, while weak comprehension impedes students' ability to identify key ideas, interpret information, and solve academic problems (Uccelli et al., 2015; Lindamood-Bell, 2022). In English, comprehension enables learners to analyze texts and communicate meaning effectively; in Mathematics, it supports the interpretation of word problems and conceptual reasoning; and in Science, it underpins the understanding of principles, data, and scientific inquiry (Akbaşlı & Şahin, 2016). Despite its centrality, comprehension development in the Philippine education system is constrained by limited early literacy foundations, language barriers associated with English as the medium of instruction, inadequate teacher training, and practices such as social promotion (The Glossary of Education Reform, n.d.; Manlapig, 2020). These challenges are reflected in international assessments, where Filipino learners performed substantially below global averages in reading comprehension (PISA, 2018).

1.2 Empirical Themes on Teacher Instructional Strategies and Student Comprehension in Core Subjects

Research consistently highlights comprehension as a multidimensional process involving decoding, analysis, synthesis, and application of information (Oakley, 2005; Willingham, 2008). Cognitive psychology emphasizes that instructional strategies aligned with how learners process information significantly influence comprehension outcomes (Marzano, 2007; Hogan, 2007; Demetriou et al., 2020). Studies show that instructional approaches such as scaffolding, cooperative learning, metacognitive strategies, explicit vocabulary instruction, and multiple representations enhance comprehension across English, Math, and Science (Baroody et al., 2020; Dwiningtiyas, Sofyan, & Puspita, 2020; Elleman & Oslund, 2019). Language proficiency is also strongly associated with mathematical and scientific comprehension, particularly in tasks requiring interpretation of verbal information and abstract reasoning (Singer & Strasser, 2017; Hickendorff, 2013; Peng & Lin, 2019; Ahmed & Pollitt, 2021).

1.3 Comprehension Skills in Junior High School Education: Local, National, and Global Perspectives

International large-scale assessments, such as the Programme for International Student Assessment (PISA), have documented significant disparities in students' comprehension skills across countries. The Philippines' low performance in reading comprehension highlights systemic challenges in instructional quality and curriculum alignment (Santos & Reyes, 2020). Nationally, educational reforms such as the K–12 curriculum and the MATATAG curriculum seek to strengthen foundational skills and improve instructional effectiveness in response to these gaps (DepEd Memorandum No. 054 s. 2023). At the local level, schools in Minglanilla District II exhibit diverse socio-economic and instructional conditions that influence students' learning experiences. These contextual realities underscore the importance of examining teacher strategies and student comprehension within specific educational environments.

1.4 Cognitive, Sequential, and Socio-Cultural Foundations of Comprehension Skills Development

This study is grounded in cognitive psychology, which explains how learners acquire and process information and how instructional strategies can enhance comprehension (Marzano, 2007; Hogan, 2007). Visible Learning Theory emphasizes making learning processes explicit through feedback, modeling, and metacognitive engagement to deepen understanding (Hattie & Timperley, 2017; Bransford et al., 2000). Social-Cultural Development Theory underscores the role of interaction and collaboration in learning, emphasizing the importance of guided support and social engagement in comprehension development (Vygotsky, 1978). Thorndike's Laws of Effect, Exercise, and Readiness highlight motivation, practice, and learner preparedness as essential to learning success (Thorndike, 1911; Thorndike, 1913). Sequential Learning Theory further supports structured progression of content to facilitate cumulative comprehension across subjects (Gagné, 1965; Ausubel, 2000).

1.5 Gaps in Strategy-Based Comprehension Research and Rationale for the Study

Although prior studies establish the importance of comprehension and instructional strategies, limited research has examined their relationship across English, Math, and Science within Philippine junior high school contexts at the district level. There is also a lack of empirically grounded instructional materials tailored to students' specific comprehension needs. This study addresses these gaps by investigating the relationship between teachers' strategy utilization and students' comprehension skills as a basis for developing an enhanced self-learning module.

1.6 Alignment of Comprehension-Focused Instruction with Relevant Sustainable Development Goals (SDGs)

This study supports SDG 4 – Quality Education by examining instructional strategies that improve learning effectiveness and foundational skills. By strengthening comprehension in core subjects, the study also contributes to SDG 8 – Decent Work and Economic Growth, as comprehension skills underpin employability, adaptability, and lifelong learning.

1.7 Contribution of Strategy-Based Comprehension Research to Multidisciplinary Educational Sustainability

The study contributes to educational sustainability by informing evidence-based instructional improvement and resource development. It supports socio-economic sustainability by addressing learning gaps that affect students' long-term academic and economic outcomes. Additionally, the development of an enhanced self-learning module promotes institutional sustainability by providing adaptable instructional support responsive to diverse learner needs.

2. Material and methods

2.1 Research Design

The study employed a descriptive-correlational research design to determine the relationship between the extent of teachers' utilization of instructional strategies and the level of comprehension skills of junior high school students. A self-made survey questionnaire was used to gather quantitative data from both teachers and students. Descriptive statistics were utilized to describe respondent profiles, strategy utilization, and comprehension levels, while inferential statistics were applied to examine relationships between variables. The use of a Likert scale allowed for systematic quantification of perceptions and levels of utilization, providing a structured basis for statistical interpretation and subsequent recommendations.

2.2 Locale of the Study

The study was conducted in Minglanilla District II, a geographically diverse area characterized by both urban and rural settings. The district comprises several junior high schools that vary in size, resource availability, and instructional practices. This diversity provided a meaningful context for examining how different learning environments and pedagogical approaches influence students' comprehension skills in English, Mathematics, and Science. Variations in access to facilities, instructional methodologies, and student socio-economic backgrounds presented both challenges and opportunities for analyzing comprehension outcomes within the district. The locale was therefore suitable for investigating instructional effectiveness across differing school contexts while facilitating efficient data collection. The geographic location of the research environment was visually presented in the original manuscript to situate the study contextually, reinforcing the relevance of Minglanilla District II as the setting for examining comprehension and instructional strategies.

2.3 Respondents of the Study

The respondents of the study consisted of junior high school students and teachers from selected schools within Minglanilla District II. Both groups were included to capture complementary perspectives: teachers provided data on students' comprehension skills, while students reported on the instructional strategies utilized by their teachers in English, Mathematics, and Science. This dual-respondent approach strengthened the validity of the findings by triangulating instructional practices and learning outcomes.

2.4 Sample and Sampling Procedure

The sample size was determined using Slovin's formula to ensure proportional representation of the population. Stratified random sampling was employed, with respondents drawn from each junior high school in the district based on predetermined proportions. This method ensured that both teachers and students from different schools were adequately represented. The final sample consisted predominantly of students, with teachers comprising a smaller but essential portion of the respondents. The distribution of respondents was originally presented in tabular form, indicating that students represented the majority of participants, while teachers accounted for a smaller percentage of the total sample.

2.5 Research Instrument

Data were collected using two structured survey questionnaires developed by the researcher. One questionnaire was designed for students to assess the extent of teachers' utilization of instructional strategies in English, Mathematics, and Science, while the second questionnaire was designed for teachers to assess students' comprehension skills in the specified competencies. The construction of both instruments was guided by the research questions to ensure alignment with the study objectives. Reliability testing using Cronbach's alpha demonstrated high internal consistency for both questionnaires across all subject areas. For the student questionnaire, Cronbach's alpha values were 0.9129 for Mathematics, 0.9315 for science, and 0.9325 for English, with high lower confidence limits, indicating strong reliability. Removal of any item resulted in a decrease in alpha values, confirming the contribution of each item to internal consistency. Similarly, the teacher questionnaire showed excellent reliability, with Cronbach's alpha values of 0.9812 for Mathematics, 0.9717 for science, and 0.9677 for English. These results confirmed that the instruments were reliable and valid measures of instructional strategies and comprehension skills. The questionnaires were further examined using robust regression analysis to ensure proportionality, parallelism, and similarity in item construction across respondent groups. This process ensured that both instruments were methodologically sound and capable of capturing accurate and meaningful data.

2.6 Data Gathering Procedure

Data collection began with the issuance of a transmittal letter to formally inform respondents of the study's purpose, schedule, and procedures. Following this, the questionnaires were distributed either electronically or in printed form, depending on respondent accessibility and preference. Clear instructions and deadlines were provided to ensure consistency and timely submission. During the collection phase, respondents were given support to address any concerns or clarifications. Completed questionnaires were systematically collected, securely stored, and reviewed for completeness and accuracy. Confidentiality and anonymity were strictly maintained throughout the process, and participants were informed of the next steps upon completion of data collection.

2.7 Data Analysis Techniques

Descriptive statistics were used to analyze respondent profiles, including frequency counts and percentage distributions of demographic variables. Weighted mean was employed to determine the extent of teachers' utilization of instructional strategies and the level of students' comprehension skills in English, Mathematics, and Science. The rating scales used for both variables were structured into five levels, each corresponding to specific numerical ranges and descriptive interpretations, allowing for precise assessment of utilization and comprehension levels. Standard deviation was used to measure the variability of scores, providing insight into the consistency of strategy utilization and comprehension levels across respondents. To examine the relationship between instructional strategies and comprehension skills, robust regression analysis was employed. This method was chosen to address potential outliers and variability in educational data, ensuring more reliable and generalizable results. The regression model assessed the predictive effect of strategy utilization on comprehension skills, offering a nuanced understanding of how instructional practices influence student learning outcomes.

3. Results and Discussion

3.1 Profile of the Respondents

3.1.1 Profile of Junior High School Student Respondents in Terms of Grade Level, Age, Area of Strength, Academic Recognition, and School

A total of 364 junior high school students participated in the study, with representation across Grades 7 to 10. Grade 8 students comprised the largest proportion, while the remaining students were almost evenly distributed across the other grade levels. Most respondents were aged between 14 and 16 years, with an average age of 13.9 years and low age variability, indicating a relatively homogeneous group. In terms of area of strength or interest, the majority preferred Arts and Humanities, followed by science, while Technical and Vocational Education attracted the least interest. More than half of the students reported having no academic recognition, while the rest had attained honors at varying levels. The respondents were enrolled in seven different schools, with a substantial proportion coming from one large school within the district. The balanced distribution of students across grade levels and the narrow age range support comparability in assessing comprehension skills. The strong inclination toward Arts and Humanities may influence students' engagement in language-based activities, while the lower interest in technical fields may affect performance in applied or skill-based learning contexts. The high proportion of students without academic recognition highlights the need for instructional strategies that support learners with varying academic abilities, particularly in strengthening comprehension across core subjects.

3.1.2 Profile of Teacher Respondents in Terms of Position, Age, Educational Attainment, and Academic Recognition

The study included 39 teacher respondents, most of whom held the position of Teacher I, followed by Teacher III, with only one Master Teacher. The average age of the teachers was approximately 36 years, with most falling within the 25–44 age range. A majority of the teachers had earned master's degrees, while none reported holding doctoral qualifications. Most respondents indicated no academic recognition at the college level, although some reported receiving other forms of recognition. The predominance of teachers with graduate-level education suggests a strong academic foundation that may support the effective use of varied instructional strategies. The age distribution reflects a teaching workforce with sufficient experience to implement diverse pedagogical approaches. However, the limited presence of formal academic honors suggests that instructional effectiveness may be more closely associated with professional experience and ongoing development rather than academic distinction alone.

3.2 Extent of Utilization of Teachers' Instructional Strategies in Teaching Core Subjects

3.2.1 Extent of Utilization of Instructional Strategies in Teaching English

The extent of teachers' utilization of instructional strategies in English was rated at a high level. Among the strategies assessed, cooperative learning obtained the highest mean rating, indicating frequent use of collaborative activities to facilitate learning. Macro-communication skills and literary workshops received comparatively lower mean scores, although both remained within the high utilization category. The strong emphasis on cooperative learning suggests that English teachers prioritize student interaction, peer engagement, and collaborative meaning-making as central components

of instruction. These practices likely support active participation and shared understanding. However, the comparatively lower utilization of macro-communication skills and literary workshops implies that opportunities for developing advanced communication abilities, public speaking, and deeper literary analysis may be limited. Strengthening these strategies may enhance students' higher-order language skills and support more comprehensive English comprehension.

3.2.2 Extent of Utilization of Instructional Strategies in Teaching Mathematics

Teachers' utilization of instructional strategies in Mathematics was also rated at a high extent. Seatwork, homework, and group activities received the highest ratings, reflecting frequent use of structured and practice-oriented tasks. Discussion of complex mathematical concepts obtained the lowest mean rating, though it still fell within the high utilization range. The predominance of structured tasks indicates that mathematics instruction heavily emphasizes procedural practice and reinforcement of learned skills. While this approach supports mastery of routine computations, the lower emphasis on discussing complex concepts suggests potential gaps in conceptual explanation and reasoning. Enhancing instructional approaches that encourage conceptual discussions, visualization, and guided problem exploration may help students develop deeper mathematical understanding beyond procedural proficiency.

3.2.3 Extent of Utilization of Instructional Strategies in Teaching Science

Instructional strategies in science were utilized to a high extent, with practice exercise sessions receiving the highest rating. Problem-based learning obtained the lowest mean score among the strategies, although it remained within the high utilization category. The strong use of practice exercises reflects an instructional focus on reinforcing scientific concepts through repeated application. While this supports content retention, the comparatively lower utilization of problem-based learning suggests fewer opportunities for students to engage in inquiry-driven problem solving. Expanding the use of problem-based approaches may enhance students' critical thinking skills and their ability to apply scientific knowledge to real-world situations.

3.3 Level of Students' Comprehension Skills in Learning Specified Competencies

3.3.1 Level of Comprehension Skills of Students in English

Students' overall comprehension skills in English were rated at a low level. The lowest-rated areas included macro-communication skills, participation in debates and presentations, and engagement in literary workshops. Relatively higher performance was observed in vocabulary enhancement and participation in classroom discussions. These results indicate that while students possess foundational language skills, they experience difficulty with higher-order communication tasks that require synthesis, articulation, and critical interpretation. The disparity between basic and advanced skills suggests that current instructional practices may not sufficiently support the development of complex language competencies. Focused interventions targeting macro-communication and literary engagement are necessary to strengthen overall English comprehension.

3.3.2 Level of Comprehension Skills of Students in Mathematics

Students' comprehension skills in Mathematics were generally at a moderate level. Completing assignments was the strongest area, while understanding complex concepts received the lowest mean rating. The strong performance in completing assignments reflects students' ability to follow procedures and apply learned methods in routine tasks. However, difficulties in understanding complex concepts indicate challenges in conceptual reasoning and abstraction. These findings suggest the need for instructional strategies that emphasize conceptual clarity, reasoning processes, and the connections between mathematical ideas.

3.3.3 Level of Comprehension Skills of Students in Science

Overall comprehension skills in science were rated at a moderate level. Students performed better in participating in learning activities and group collaboration, while applying project-based and problem-based learning skills received the lowest ratings. The results suggest that students are engaged in structured classroom activities but face challenges when required to independently apply scientific concepts through inquiry-based tasks. Limited proficiency in project-based and problem-based learning may hinder students' ability to analyze problems and construct solutions. Strengthening these approaches may improve scientific reasoning and applied understanding.

3.4 Relationship Between the Extent of Teachers' Instructional Strategies and Students' Comprehension Skills

3.4.1 Relationship Between Instructional Strategies and Comprehension Skills in English

Robust regression analysis revealed positive relationships between instructional strategies and students' comprehension skills in English. Cooperative learning demonstrated the strongest predictive effect, while macro-communication strategies showed the weakest, though still positive, influence. The strong predictive effect of cooperative learning highlights the effectiveness of collaborative instructional environments in supporting English comprehension. The weaker influence of macro-communication strategies suggests that these approaches may require more structured implementation or reinforcement through complementary strategies to fully support comprehension development.

3.4.2 Relationship Between Instructional Strategies and Comprehension Skills in Mathematics

All instructional strategies in Mathematics exhibited significant positive relationships with students' comprehension skills. Cooperative learning emerged as the most influential predictor, while discussion of complex concepts demonstrated the weakest predictive relationship. These findings reinforce the value of collaborative learning in enhancing mathematical comprehension. The weaker predictive strength of discussions of complex concepts suggests that conceptual explanations alone may be insufficient without supportive instructional scaffolding. Combining collaborative learning with targeted conceptual instruction may better support students' mathematical understanding.

3.4.3 Relationship Between Instructional Strategies and Comprehension Skills in Science

The relationship between instructional strategies and comprehension skills in Science showed mixed results, with several strategies exhibiting negative or non-significant relationships. The mixed findings indicate that increased use of instructional strategies does not automatically result in improved comprehension in Science. Effectiveness appears to depend on how strategies are implemented and aligned with learners' needs and contexts. These results emphasize the importance of instructional quality, appropriate strategy selection, and continuous evaluation to ensure that teaching practices meaningfully support scientific comprehension.

4. Conclusion & Recommendations

The study examined the relationship between teachers' utilization of instructional strategies and junior high school students' comprehension skills in English, Mathematics, and Science. The findings revealed that instructional strategies demonstrate varying relationships with comprehension skills, indicating that increased use of certain strategies does not necessarily result in improved comprehension outcomes. Some commonly used strategies showed negative or non-significant relationships with specific comprehension skills, emphasizing that effectiveness depends on proper implementation, contextual relevance, and alignment with learner needs. Overall, the results highlight that instructional quality, strategic integration, and adaptability are critical factors in enhancing students' comprehension skills across core subject areas.

Based on the findings, teachers are encouraged to reassess and refine their instructional strategies to ensure they are interactive, student-centered, and responsive to learners' comprehension needs. Instructional methods should be strategically blended rather than applied in isolation, with emphasis placed on quality, relevance, and appropriate structuring of learning activities. School administrators and instructional leaders may support this effort by providing professional development opportunities that enhance teachers' capacity to implement strategies effectively. The development and utilization of an enhanced self-learning module is also recommended to support both teachers and students in improving comprehension skills in English, Mathematics, and Science.

The study was limited to selected junior high school teachers and students within a specific district, which may restrict the generalizability of the findings to other educational contexts. The data relied on self-reported questionnaires, which may be influenced by respondents' perceptions and interpretations. Additionally, the study focused on the extent of strategy utilization and its relationship to comprehension skills without examining other possible contributing factors such as classroom environment, student motivation, or external learning support, which may also affect comprehension outcomes.

Compliance with ethical standards

This study adhered to accepted institutional and academic ethical standards for research involving human participants. No experimental procedures were conducted, and participation was voluntary. Confidentiality, anonymity, and responsible handling of all data were strictly observed throughout the research process.

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Conflict of interest statement

The researcher declares no financial, personal, or professional conflicts of interest related to the conduct, analysis, or reporting of this study. No external entity influenced the research process or outcomes.

Statement of ethical approval

The study involved non-invasive, survey-based data collection. As it posed no physical, psychological, or legal risk to participants, formal ethics committee approval was not sought. All procedures were conducted in accordance with standard ethical guidelines for educational research.

Statement of informed consent

Informed consent was obtained from all participants prior to data collection. Respondents were informed of the study's purpose, voluntary nature, and confidentiality measures, and no personal identifiers were included in the final dataset or report.

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