

Interplay of vocabulary knowledge, instructional quality, and metacognitive awareness on learners' reading comprehension skills

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Abstract

Aim: This study examined the interplay of vocabulary knowledge, teachers' quality of reading instruction, and metacognitive awareness on the reading comprehension skills of Grade 10 students.

Methodology: A descriptive–correlational research design was employed to examine the relationships among vocabulary knowledge, instructional quality, and metacognitive awareness in relation to students' reading comprehension skills. Quantitative data were collected using surveys and reading comprehension tests and analyzed using statistical procedures.

Results: Canonical correlation analysis revealed a statistically significant multivariate relationship between vocabulary knowledge and reading comprehension skills, with a moderate canonical correlation ($R_c = 0.521$). The first canonical function was significant based on Wilks' Lambda, $\Lambda = 0.729$, $F(4,195) = 18.157$, $p < .001$, indicating that vocabulary knowledge shares substantial variance with the combined reading comprehension variables. In contrast, instructional quality demonstrated a weak but significant multivariate relationship with reading comprehension ($R_c = 0.281$, $\Lambda = 0.921$, $F(4,195) = 4.185$, $p = .003$), suggesting a modest contribution to the variance of comprehension skills. Meanwhile, metacognitive awareness did not show a statistically significant multivariate relationship with reading comprehension ($R_c = 0.203$, $\Lambda = 0.959$, $F(4,195) = 2.085$, $p = .084$), indicating minimal shared variance with the outcome variables.

Conclusion: The findings highlight the importance of strengthening vocabulary development and effective reading instruction to enhance students' comprehension skills. Educators may design instructional strategies that deepen vocabulary knowledge and support students in interpreting both traditional and digital texts, thereby improving literacy outcomes in contemporary learning environments.

Keywords: *metacognitive awareness, instructional quality, vocabulary knowledge, reading comprehension, literacy instruction*

INTRODUCTION

Vocabulary is a crucial component of language proficiency, contributing significantly to reading comprehension, writing ability, and overall academic success. According to Mathieson, Bolstad, and Sasao (2024), vocabulary comprises two dimensions: breadth, or the number of words known, and depth, reflecting how well students understand and use words across contexts. Students with a large vocabulary tend to demonstrate stronger critical thinking and better reading comprehension performance. However, vocabulary acquisition can be challenging, particularly in multilingual settings where multiple languages may interfere with learning new words.

Research has consistently shown that vocabulary knowledge predicts academic achievement across domains, as students with strong vocabularies can understand complex texts and express ideas clearly (Cervetti et al., 2023).

Addressing disparities in vocabulary knowledge, instructional quality, and metacognitive awareness is important for improving reading comprehension and promoting educational equity. Vocabulary development plays a key role in understanding texts, while effective instruction supports the development of both linguistic and cognitive skills (Zeng et al., 2025). Metacognitive awareness also helps learners monitor and regulate their reading processes,

leading to better comprehension outcomes (Vicente, 2024; Bernardo & Mante-Estacio, 2023). However, differences in instructional practices and learner backgrounds suggest that not all students benefit equally, particularly those from disadvantaged contexts. Findings from large-scale assessments such as PISA further highlight gaps in reading performance linked to socio-economic differences and strategy use. These indicate the need for targeted instructional approaches to help close achievement gaps and improve reading comprehension outcomes.

Despite growing interest in these factors, most studies examine vocabulary, instructional quality, and metacognitive awareness separately rather than as an interconnected system. In the Philippines, literacy performance remains a concern; Filipino 15-year-olds scored well below the Organization for Economic Co-operation and Development (OECD) average in Programme for International Student Assessment (PISA) 2018 and 2022 assessments (OECD, 2023; Department of Education (DepED), 2019). Locally, tools like the Revised Philippine Informal Reading Inventory (Phil IRI) reveal ongoing challenges in achieving expected reading proficiency. These findings underscore the need to examine the combined influence of vocabulary, instructional quality, and metacognitive awareness to inform instructional strategies that integrate both traditional and digital literacy practices.

Recent studies conducted in Bukidnon reveal that reading difficulties among learners remain a persistent educational concern, particularly in terms of comprehension and fluency. A study in selected districts of Bukidnon found that learners exhibited varying reading levels, including those at the frustration level, and that teaching practices significantly influenced their reading comprehension outcomes (Espinar & Narido, 2025). This indicates that a large number of students still struggle with decoding and understanding texts. Supporting this, a regional literacy report also revealed that while basic literacy is relatively high, functional literacy, which includes comprehension, remains lower, highlighting ongoing challenges in understanding written texts. These findings suggest that struggling readers remain a significant concern in the local context.

Several local Philippine studies highlight persistent reading comprehension challenges among learners. For instance, research on Grade 10 students in the Philippines found that many learners demonstrated difficulty in reading comprehension, suggesting ongoing instructional and proficiency issues within the secondary school context (Cabural & Infantado, 2023). Similarly, local school-based research found that many learners experience difficulty in interpreting texts and making meaning, emphasizing the need for improved instructional practices (Balisoro, 2025). These findings highlight that struggling readers are often characterized by weak comprehension skills and limited strategic reading abilities.

Research shows that explicit summarizing instruction significantly improves students' reading comprehension outcomes by helping them organize and distill key text ideas (Cabural & Infantado, 2023). Studies also indicate that metacognitive reading strategy use, such as previewing, paraphrasing, and problem-solving, are linked to stronger comprehension performance (Navarro, 2025; LaBad et al., 2025). Recent research in Isabela City, Basilan, Philippines, shows that Grade 10 students with higher vocabulary proficiency performed better in reading comprehension tests, particularly when exposed to school-based instruction and regular vocabulary-building activities (Misuari-Abdurasul, 2023). Additionally, empirical research in Philippine junior high schools highlights specific factors affecting learners' comprehension performance, reinforcing the need for targeted instructional interventions (Alindayu et al., 2025).

In the 21st century, rapid technological advancements have reshaped education, making digital literacy an essential skill for students. Digital literacy involves not only technical abilities but also cognitive and critical thinking skills needed to effectively navigate digital learning environments (Tinmaz et al., 2022). It has been shown to enhance academic performance by improving students' self-regulated learning and adaptability in online contexts (Chen, 2025). At the same time, vocabulary instruction remains a crucial factor in reading comprehension, particularly in secondary education. A strong vocabulary foundation enables learners to understand complex texts and engage in higher-order thinking. Studies emphasize that explicit and contextualized vocabulary instruction significantly improves comprehension (Cervetti et al., 2023; Wright et al., 2022).

Moreover, technology-enhanced reading instruction provides opportunities to improve students' engagement and comprehension through digital tools and interactive platforms. Digital reading environments, when effectively used, can support better learning outcomes, particularly when instructional practices leverage digital tools to enhance reading comprehension (Salmerón et al., 2022). However, challenges such as limited digital skills and insufficient instructional integration persist (Fernández-Otaya et al., 2024). Therefore, integrating digital literacy, vocabulary instruction, and technology-enhanced reading strategies is essential to improve students' reading comprehension and meet the demands of modern education.

Existing studies have examined digital literacy, vocabulary instruction, and technology-enhanced reading instruction as separate constructs, but there is limited research that integrates these variables into a single framework. Digital literacy has been widely studied in relation to academic performance (Tinmaz et al., 2022; Chen,

2025), vocabulary instruction has been linked to reading comprehension (Cervetti et al., 2023; Wright et al., 2022), and technology-enhanced reading has been shown to improve engagement and comprehension (Salmeron et al., 2022; Liang et al., 2025). However, few studies explore how these factors collectively influence students' reading comprehension.

Moreover, there is a scarcity of studies conducted in the Philippine secondary education context examining these variables together. Most available research is based on international settings, which may not fully reflect local classroom conditions, access to technology, and learner needs. Fernández-Otoya et al. (2024) also emphasized existing gaps in the integration of digital literacy in education. Hence, there is a need for localized studies in Philippine secondary schools to better understand the combined effects of digital literacy, vocabulary instruction, and technology-enhanced reading instruction on students' reading comprehension.

The present study extends previous research by examining the combined influence of vocabulary knowledge, instructional quality, and metacognitive awareness on learners' reading comprehension, rather than studying these variables separately. While prior studies have shown that vocabulary knowledge supports comprehension (Cervetti et al., 2023; Wright et al., 2022), instructional quality improves learning outcomes (Fernández-Otoya et al., 2024), and metacognitive awareness enhances understanding and self-regulation (Tinmaz et al., 2022), limited research has explored their interplay.

Moreover, this study also addresses the gap in Philippine secondary education, where integrated investigations of these variables are scarce, thereby providing a more contextualized understanding of factors influencing students' reading comprehension.

Furthermore, Vocabulary knowledge, instructional quality, and metacognitive awareness are grounded in key principles of educational psychology, particularly schema activation, cognitive processing, and metacognition in reading. Vocabulary knowledge supports schema activation, enabling learners to connect prior knowledge with new information and construct meaning from texts (Cervetti et al., 2023). Instructional quality contributes to effective cognitive processing by providing structured guidance, scaffolding, and strategies that help students organize and interpret information, thereby improving comprehension (Fernández-Otoya et al., 2024).

Generally, Metacognitive awareness is directly linked to metacognition and self-regulated learning, as it allows learners to plan, monitor, and evaluate their understanding during reading. Students with higher metacognitive awareness are better able to regulate their cognitive processes and apply appropriate strategies when comprehension breaks down (Tinmaz et al., 2022). Together, these variables interact within the reading process: vocabulary activates prior knowledge, instructional quality supports cognitive processing, and metacognitive awareness regulates comprehension, all contributing to improved reading outcomes (Liang et al., 2023; Chen, 2025).

Additionally, this study contributes to reading comprehension research by examining the combined effects of vocabulary knowledge, instructional quality, and metacognitive awareness, rather than treating them as isolated variables. In doing so, it extends existing literature that often focuses on single-variable influences, offering an integrated perspective of cognitive and instructional factors in reading development. The study also provides evidence-based insights for literacy instruction in secondary education, helping teachers enhance classroom practices through improved vocabulary instruction, effective teaching strategies, and the promotion of metacognitive skills. Additionally, it contributes to learning sciences by illustrating how cognitive processes such as schema activation and metacognition interact with instructional quality to influence students' reading comprehension outcomes in secondary education.

Lastly, it contributes to reading comprehension research by examining the combined effects of vocabulary knowledge, instructional quality, and metacognitive awareness rather than treating them as separate variables, providing an integrated perspective of cognitive and instructional factors (Cervetti et al., 2023; Tinmaz et al., 2022). It introduces pedagogical innovation by promoting a unified approach that integrates vocabulary instruction, effective teaching practices, and metacognitive strategies. The study also has implications for teachers and schools in improving instructional practices and supporting learners' reading development, while highlighting how cognitive processes such as schema activation and metacognition interact with instructional quality to influence reading comprehension outcomes (Liang et al., 2023; Chen, 2025).

Review of Related Literature and Studies

Reading Comprehension Skills

Reading comprehension literacy requires multiple forms of knowledge to engage with texts that combine language, images, and digital formats. Making inferences enhances comprehension by helping students connect ideas, interpret implicit meanings, and manage both micro- and macro-level processes (Guerra & Kronmüller, 2024;

Daulay & Dewi, 2025). Research further indicates that interaction with digital and multimodal texts promotes strategic reading behaviors, deeper understanding, and more active engagement, leading to improved comprehension outcomes.

Identifying Main Ideas. Research on Filipino Grade 8 students shows they struggle with identifying main ideas. Villanueva (2022) found that about 56% of Grade 8 students in Metro Manila had trouble finding central themes in informational texts.

Making Inferences. Making inferences is a key reading skill that helps students connect ideas and understand hidden meanings. Recent research shows Filipino Grade 8 students struggle with comprehension skills, including those related to inference making (Basali, 2024).

Studies show significant variability in students' ability to answer inference-based questions (Nadalini et al., 2025) identified that Filipino students find causal and predictive inferences (29% accuracy) more difficult than referential inferences (62% accuracy). Department of Education data (2020) confirmed inference-making as the second-lowest performing comprehension subskill, with only 34% of Grade 8 students showing grade-level proficiency.

Distinguishing Real from Fake. Research shows Filipino Grade 8 students struggle to tell facts from opinions. Pascual (2023) found only 43% of students could correctly identify factual statements in mixed passages, with particular difficulty on statements containing technical vocabulary. Research on critical thinking highlights gaps in how thinking skills are cultivated and assessed in education (Lopez et al., 2023)

Vocabulary Knowledge

Vocabulary knowledge is a fundamental component of language proficiency and plays a crucial role in students' academic success, with both breadth and depth contributing uniquely to reading comprehension and literacy development; recent research critically examines theoretical frameworks and instructional trends in vocabulary (Zeng et al., 2025), analyzes distinct dimensions of vocabulary knowledge and their effects on school achievement (2026), and provides empirical evidence linking vocabulary proficiency with reading comprehension outcomes (Corpuz et al., 2024).

Yilmaz and Kavanoz (2025) found that learners' receptive vocabulary knowledge (recognizing words) tended to be significantly stronger than their productive vocabulary knowledge (using words accurately in speaking and writing), highlighting persistent gaps in vocabulary development. These results underscore the importance of instruction that addresses both recognition and productive use of vocabulary, including word associations and grammatical structures, to support learners' overall language proficiency.

Vocabulary knowledge is a key factor in reading comprehension, as both vocabulary breadth and depth enable learners to understand and interpret texts more effectively. Recent systematic reviews indicate that students with stronger vocabulary tend to perform better in comprehension tasks because they can recognize word meanings and establish connections within texts (Zeng et al., 2025). Studies also show that explicit vocabulary instruction can improve comprehension, although its effectiveness depends on how it is implemented in classroom settings.

Teachers Quality of Reading Instruction

The way teachers teach reading significantly affects students' comprehension and academic performance, with high-quality instructional practices linked to better digital reading outcomes and engagement (multilevel analysis across OECD countries; 2022) and reflective, strategic teaching approaches shown to correlate with stronger reading comprehension outcomes in recent Philippine research (2025). Additionally, analytical reviews of reading approaches reveal that the choice and integration of instructional methods influence comprehension development beyond descriptive technique lists.

Good reading instruction uses proven methods, organized classroom activities, and teaching styles that match students' different abilities. Teachers' knowledge about how students learn to read plays a crucial role in shaping effective instruction. When teachers possess strong understanding of reading processes, they are better able to select and apply appropriate instructional strategies that address students' needs and improve learning outcomes. Research also indicates that teachers' familiarity with the science of reading supports more effective instructional decisions and contributes to improved student reading performance (Flanagan et al., 2025). In addition, the extent to which teachers implement structured reading programs with fidelity further influences how much students learn, as consistent and evidence-based instruction enhances comprehension development.

Instructional quality also plays a significant role in reading comprehension, as effective teaching practices such as explicit instruction, scaffolding, feedback, and strategy integration support students' learning. High-quality instruction helps develop both vocabulary knowledge and metacognitive skills, which contribute to improved

comprehension. However, existing studies often examine instructional quality separately from learner variables, leaving a gap in understanding how it interacts with vocabulary knowledge and metacognitive awareness.

Metacognitive Awareness

Metacognitive awareness refers to learners' ability to reflect on, monitor, and regulate their thinking and learning, which is essential for comprehension and academic performance; recent studies show that higher metacognitive awareness is associated with improved reading comprehension outcomes among secondary students (Vicente & Baldera, 2024), enhances EFL learners' comprehension through strategy use (2025), and supports engagement and monitoring in digital reading environments (Liang & Zhang, 2025). Studies show that students with higher metacognitive awareness can adjust reading strategies, sustain engagement, and regulate learning in digital and online environments, leading to improved comprehension (Anggia & Habók, 2024). Metacognition functions as both an internal regulatory process and a critical skill for navigating technology-enhanced learning, where learners must manage information, tasks, and digital resources independently.

Metacognitive awareness is likewise important in reading comprehension, as it allows learners to plan, monitor, and evaluate their understanding while reading. Research has shown that students with higher metacognitive awareness and strategy use generally achieve better comprehension outcomes (Bernardo & Mante-Estacio, 2023). However, findings suggest that the strength of this relationship may vary depending on learners' context and the quality of instruction, indicating the need for consistent and well-implemented metacognitive strategy teaching.

Students exhibit metacognitive awareness in diverse ways depending on context, involving planning, monitoring, and evaluating learning across environments, including digital settings; recent research shows that metacognitive awareness supports reading comprehension in secondary learners (Vicente & Baldera, 2024), reflects key planning–monitoring–evaluation processes (Zsigmond et al., 2025), enhances learning outcomes through strategic regulation (Da et al., 2024; Alolaywi, 2025), and contributes to engagement in digital reading tasks (Zhu et al., 2024).

In reading, digital tools like online platforms and interactive multimedia help learners monitor and adjust understanding, fostering deeper interpretation and engagement. These findings highlight the need to integrate metacognitive strategy instruction with digital literacy to enhance self-regulated reading and overall comprehension outcomes.

Recent empirical studies consistently highlight the importance of vocabulary knowledge and metacognitive awareness as significant contributors to reading comprehension, while also pointing to gaps in instructional quality research. For example, Correlational research has shown that stronger vocabulary skills are positively associated with better reading comprehension performance, suggesting that learners with broader lexical knowledge can understand and interpret texts more effectively (Corpuz et al., 2024; Anji et al., 2025). Systematic reviews of vocabulary instruction further affirm that deliberate and structured vocabulary teaching especially for English learners supports comprehension outcomes, though the optimal instructional approaches across diverse contexts remain underexplored (Zeng et al., 2025).

Parallel research on metacognitive awareness indicates that students who are more aware of and able to regulate their reading strategies tend to achieve higher comprehension scores, with studies advocating for the integration of metacognitive strategies into curricula to strengthen learners' planning, monitoring, and evaluating during reading (Ozturk & Aydin, 2022; Vicente et al., 2024). Despite these findings, there is still limited research on how instructional quality—particularly teachers' implementation of metacognitive and vocabulary strategies—moderates these relationships in classroom settings, and how these effects vary by age, language proficiency, or educational system. Future research should therefore investigate not only the direct effects of instructional quality on reading comprehension but also how it interacts with vocabulary knowledge and metacognitive awareness to produce sustained literacy gains.

The present study addresses the gap in existing research by examining vocabulary knowledge, instructional quality, and metacognitive awareness simultaneously in relation to reading comprehension. While previous studies have generally explored these variables separately, limited research has analyzed their combined influence within a single framework. By using a descriptive correlational design among Grade 10 students, this study provides integrated evidence on how these factors collectively relate to reading comprehension and offers insights that may help improve instructional practices in classroom settings.

Overall, previous studies show that vocabulary knowledge, metacognitive awareness, and instructional quality each contribute to reading comprehension. However, there is limited research examining these variables together within a single framework, particularly at the secondary level. This gap highlights the need for studies that explore their combined influence on students' reading comprehension skills.

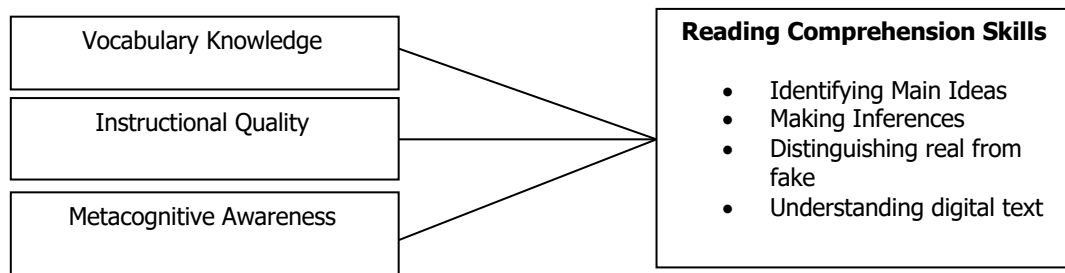
Theoretical Framework

This study posits that students' vocabulary, metacognitive awareness, and perceptions of reading instruction are key factors in reading comprehension, supported by Schema Theory (Anderson & Pearson, 1984), Cognitive Load Theory (Sweller, 1988), and Vygotsky's Sociocultural Theory (1978). Schema Theory suggests that comprehension improves when new information is connected to existing knowledge organized in mental frameworks. In this study, it explains how vocabulary, instructional quality, and metacognitive awareness interact: vocabulary links new concepts to prior knowledge, high-quality instruction facilitates integration, and metacognitive awareness allows learners to monitor and adjust understanding.

Cognitive Load Theory emphasizes the limitations of working memory during learning (Sweller, 1988). Recent research on reading and vocabulary acquisition, such as Jiang and Kalyuga (2020), highlights the complexities of processing information and supports a two-factor model of cognitive load, underscoring the need for instructional approaches that manage mental demands effectively.

Conceptual Framework

The conceptual framework of this study highlights how Vocabulary Knowledge, Instructional Quality, and Metacognitive Awareness interact to influence Reading Comprehension. Vocabulary knowledge helps students connect prior knowledge to new information, high-quality instruction facilitates concept integration through guidance and scaffolding, and metacognitive awareness enables learners to regulate their cognitive processes. Grounded in schema activation, cognitive processing efficiency, and social mediation of learning, the framework suggests that these factors collectively enhance Grade 10 students' reading comprehension skills.



Statement of the Problem

Reading comprehension is a fundamental literacy skill that enables learners to construct meaning from texts and achieve academic success across subject areas. However, many secondary school learners continue to experience difficulties in understanding increasingly complex and multimodal texts. These challenges have become more evident in contemporary learning environments where students are required to interpret printed, visual, and digital materials.

Several factors may influence students' reading comprehension performance, including vocabulary knowledge, the quality of reading instruction provided by teachers, and learners' metacognitive awareness during reading tasks. Limited vocabulary may hinder students' ability to interpret textual meanings, while variations in instructional quality may affect how reading strategies are developed in the classroom. Likewise, insufficient metacognitive awareness may prevent learners from effectively monitoring and regulating their comprehension processes.

Although previous studies have examined vocabulary knowledge, instructional quality, and metacognitive awareness independently, limited research has explored how these variables interact to influence reading comprehension skills among secondary school learners. In the context of public secondary schools in Bukidnon, understanding the combined influence of these factors is essential for improving literacy instruction and strengthening students' comprehension skills.

Therefore, this study investigates the interplay of vocabulary knowledge, instructional quality, and metacognitive awareness in relation to the reading comprehension skills of Grade 10 students in selected public schools in Bukidnon.

Research Objectives

General Objective

To determine the relationship between vocabulary knowledge, teachers' quality of reading instruction, and metacognitive awareness and the reading comprehension skills of Grade 10 students in selected public schools in Bukidnon.

Specific Objectives

1. To assess the participants' level of vocabulary knowledge.
2. To evaluate the participants' assessment of their teachers' quality of reading instruction.
3. To determine the participants' level of metacognitive awareness during the reading process.
4. To assess the participants' level of reading comprehension skills in terms of:
 - 4.1 identifying main ideas
 - 4.2 making inferences
 - 4.3 distinguishing real from fake information
 - 4.4 understanding digital texts
5. To examine the relationship between vocabulary knowledge, teachers' instructional quality, metacognitive awareness, and students' reading comprehension skills.

Research Questions

This study sought to answer the following questions:

1. What is the participants' level of vocabulary knowledge?
2. What is the participants' assessment of their teachers' quality of reading instruction?
3. What is the participants' level of metacognitive awareness during the reading process?
4. What is the participants' level of reading comprehension skills in terms of:
 - 4.1 identifying main ideas
 - 4.2 making inferences
 - 4.3 distinguishing real from fake information
 - 4.4 understanding digital texts
5. Is there a significant relationship between vocabulary knowledge, teachers' instructional quality, metacognitive awareness, and students' reading comprehension skills?

Hypothesis

There is no significant relationship between vocabulary knowledge, teachers' instructional quality, metacognitive awareness, and students' reading comprehension skills.

METHODS

Research Design

The study utilized a descriptive-correlational research design to examine the relationships among vocabulary knowledge, teachers' quality of instruction, metacognitive awareness, and Grade 10 students' reading comprehension skills. This design describes existing conditions and determines the strength and direction of relationships among variables without manipulation (Creswell & Creswell, 2022). Quantitative methods such as surveys and standardized reading tests were used to collect data (Johnson & Christensen, 2023). To analyze the data, canonical correlation analysis (CCA) was employed to examine the relationships between two sets of variables simultaneously. CCA identifies linear combinations of variables that maximize the correlation between predictor variables such as vocabulary knowledge, instructional quality, and metacognitive awareness and the outcome variable set on reading comprehension (Tabachnick & Fidell, 2019). This approach is appropriate for assessing multivariate relationships in a non-experimental setting.

Population and Sampling

This study focused on Grade 10 students from two public high schools in Bukidnon, Philippines, during the 2025–2026 school year. There were 329 Grade 10 students in total—289 from a school in District 1 and 40 from a

school in District 2. These schools belong to the Division of Bukidnon, Philippines and serve students with different backgrounds, making them a good choice for this research. To select the participants, the researcher used systematic random sampling. Using the Taro Yamane formula, 200 Grade 10 students were selected—168 from District 1 and 32 from District 2. This sampling method gives every student an equal and fair chance to be chosen. It also avoids favoritism and helps make the results more accurate and trustworthy.

Furthermore, to select the participants, the students must be currently enrolled in the two Districts of Bukidnon. All students enrolled were eligible regardless of gender, socioeconomic status, or academic standing. Student must have parental consent/assent to participate in the study.

Instruments

The study used researcher-made questionnaires and tests to measure the main variables: vocabulary knowledge, teachers' quality of instruction, metacognitive awareness, and reading comprehension skills among Grade 10 students. Items were adapted and developed based on established guidelines in vocabulary assessment literature, which emphasize understanding word meaning through context, idiomatic expressions, and semantic relationships (Beck et al., 2013). Recent studies also support the use of structured instruments and validated questionnaires in assessing vocabulary and metacognitive processes, highlighting their strong relationship with reading comprehension outcomes (Anggia & Habók, 2024; Teng, 2022; Villanueva, 2022).

These tools were made based on previous studies and related literature. To check if the items were appropriate for the study and fit Grade 10 students, the tools were reviewed by a group of experts. This expert validation helped ensure that the questions were clear, important, and connected to the study's goals. Any advice or corrections from the experts will be carefully considered and applied before the pilot testing.

After the validation, the tools were tested through a pilot study with 30 Grade 10 students who would not be part of the actual survey. This trial run helped the researcher found out if there were any confusing or unclear questions. The reliability of each instrument was assessed using Cronbach's alpha, a measure of internal consistency used to evaluate the extent to which items within a scale are correlated. A threshold of 0.70 or higher was considered acceptable, indicating satisfactory reliability (Taber, 2018). These steps helped the researcher make sure that the instruments were ready for the main data collection and that the information gathered was accurate and dependable.

Data Collection

Before starting the study, the researcher obtained approval from the LC Research Ethics Committee, which reviewed the research plan, survey tools, consent and assent forms, and other documents to ensure ethical standards, especially for minors, were met. Afterward, permission was sought from the Authorized Personnel from the Department of Education, School Principals, and Grade 10 Class Advisers of the selected schools, informing them of the study's purpose, data collection procedures, and student involvement to ensure smooth and proper conduct within the school setting. Data collection was conducted from October to November 2025.

The researcher personally administered the instruments during regular class hours, which included a vocabulary test, reading comprehension test, and a questionnaire on teachers' quality of instruction and students' metacognitive awareness. Clear instructions were given, and a conducive classroom environment was maintained to ensure reliable responses.

The data collection was conducted from October to November 2025, with each session lasting approximately 45 minutes to one hour. Students were instructed to work independently, while the researcher monitored the process and addressed clarifications when necessary. After completion, all responses were collected, checked, and organized for analysis, ensuring confidentiality and anonymity throughout the study.

Treatment of Data

This study utilized both descriptive and multivariate inferential statistics. Descriptive measures such as frequency, percentage, mean, and standard deviation were used to describe the levels of vocabulary knowledge, teachers' quality of instruction, metacognitive awareness, and reading comprehension skills of Grade 10 students, including their subskills.

For inferential analysis, Canonical Correlation Analysis (CCA) was employed to examine the relationship between two sets of variables: (1) predictor variables such as vocabulary knowledge, teachers' quality of instruction, and metacognitive awareness; and (2) criterion variables namely reading comprehension skills and their subskills. CCA enabled the determination of the strength and shared variance between these variable sets.

Prior to analysis, assumptions such as linearity, multicollinearity, and homoscedasticity were assessed. Normality tests using Kolmogorov–Smirnov and Shapiro–Wilk indicated non-normal distribution ($p < .05$); however, CCA is robust to moderate violations of normality with adequate sample size (Hair et al., 2019; Sherry & Henson, 2005).

The significance of the canonical functions was evaluated using Wilks' Lambda (Λ). Only significant canonical variates were interpreted, with structure coefficients and redundancy indices examined to determine variable contributions and practical significance.

Ethical Considerations

The researchers adhered to key ethical principles to ensure the protection of all individuals and institutions involved in the study. After securing the necessary permissions, informed consent forms were distributed to parents or legal guardians, explaining the study's purpose, procedures, confidentiality, and voluntary nature of participation. In addition to parental consent, students provided their assent before participating in the study.

The researchers observed the Belmont Report principles—Respect for Persons, Beneficence, and Justice—throughout the study. Respect for Persons was ensured by informing students and their parents about the study and obtaining voluntary consent, with the option to withdraw at any time. Beneficence was upheld by minimizing risks and ensuring that the benefits of participation outweighed any discomfort, while Justice was maintained by giving all participants equal opportunity to participate regardless of background and ensuring fairness and confidentiality (U.S. National Commission, 1979).

During data collection, all student information was kept confidential. No names were indicated on the instruments; instead, codes were used to identify participants. All data were securely stored, with digital files protected by passwords and printed materials kept in a locked cabinet. After the study, the data were used solely for research purposes, properly disposed of after a set period, and reported without identifying any participants, ensuring ethical and responsible conduct of the study.

RESULTS and DISCUSSION

Participants Level of Vocabulary Skills

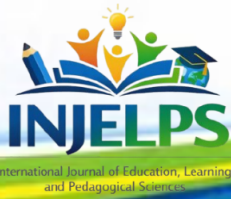
The distribution of scores shows that 38.50% of the participants fall under the *Very Good* level and 19.00% fall under the *Average* level.

Table 1 - *Frequency Distribution, Mean, and Standard Deviation of Participants' Vocabulary Skills*

Score Range	Interpretation	Frequency	Percentage
12.01 – 15.00	Very Good	77	38.50
10.01 – 12.00	Average	38	19.00
7.01 – 10.00	Moderate	55	27.50
4.01 – 7.00	Fair	24	12.00
0.00 – 4.00	Needs Improvement	6	3.00
Total		200	100
Mean		10.87	
Interpretation		Average	
SD		3.17	

Meanwhile, 27.50% scored Moderate, 12.00% Fair, and 3.00% Needs Improvement. This distribution indicates that most students can handle vocabulary tasks effectively, although a small group still requires additional support. Recent research shows that vocabulary develops at varying rates among learners, which contributes to differences in reading performance and comprehension outcomes (Corpuz et al., 2024; Royeras & Sumayo, 2024; Zeng et al., 2025).

The Very Good category emerged as the highest indicator, suggesting that many students have a solid mastery of vocabulary that enables them to understand texts confidently, recognize word meanings, and connect ideas efficiently. This finding aligns with Kormos & Indrarathne (2025), who emphasized that strong vocabulary knowledge enhances reading speed and overall comprehension performance. Although only 3.00% fall under Needs Improvement, this group highlights the need for continuous vocabulary development to ensure that all learners can fully engage with academic texts and improve reading outcomes.



The participants' assessment of their teachers' quality of instruction in reading

Table 2 shows that participants rated instructional quality in reading with an overall mean of 4.21 (Good) and a low standard deviation of 0.46, indicating consistent positive perceptions of their teachers' practices. Effective instruction—characterized by clear explanations, varied strategies, and consistent support—helps students better understand texts and enhances reading development (McMaster et al., 2023). This highlights the classroom's key role in providing meaningful support and opportunities for improving reading skills.

Table 2 - Frequency Distribution and Descriptive Statistics of Instructional Quality

Score Range	Description	Interpretation	Frequency	Percentage
4.51 – 5.00	Strongly agree	Very Good	48	24.00
3.51 - 4.50	Agree	Average	133	66.50
2.51 - 3.50	Neutral	Moderate	18	9.00
1.51 - 2.50	Disagree	Fair	1	0.50
1.00 - 1.50	Strongly Disagree	Needs Improvement	0	0.00
Total			200	100
Mean			4.21	
Interpretation			Average	
SD			0.46	

Statement	Mean	Description	SD
1. My teacher clearly explains new reading lessons. (Shapaka, 2024)	4.25	Agree	0.88
2. My teacher uses different strategies to help me understand texts. (Martin, 2025)	4.25	Agree	0.69
3. My teacher encourages me to ask questions about the reading. (Virtanen et al., 2019)	4.18	Agree	0.80
4. My teacher helps me connect reading lessons to real life. (Ocampo, 2018)	4.23	Agree	0.73
5. My teacher gives helpful feedback on my reading tasks. (McMaster et al., 2023)	4.12	Agree	0.95
6. My teacher uses examples to make reading easier to understand. (Moats, 2020)	4.34	Agree	0.78
7. My teacher adjusts lessons to fit the class's reading level. (Ocampo, 2018)	4.01	Agree	0.97
8. My teacher motivates me to improve my reading skills. (Shapaka, 2024)	4.38	Agree	0.73
9. My teacher uses both printed and digital texts in class. (Swanson et al., 2022)	4.13	Agree	0.89
10. I feel supported by my teacher when reading is difficult. (Virtanen et al., 2019)	4.19	Agree	0.87
Overall	4.21	Agree	0.46

The results show that 24.00% as Very Good, totaling 90.50%. Only 9.00% rated it Moderate and 0.50% Fair, with none selecting Needs Improvement. This indicates that most students perceive their teachers' reading instruction as effective, consistent, and supportive. Practices such as varied strategies, real-life connections, and constructive feedback contribute to a positive learning environment. Research supports that clear and supportive instruction enhances students' confidence and reading comprehension (Vaughn et al., 2024).

The highest-rated indicator, "My teacher motivates me to improve my reading skills" (M = 4.38), shows that students feel encouraged and engaged, which is essential for reading development. Motivation increases participation and performance in reading tasks (McBreen & Savage, 2021). Meanwhile, the lowest indicator, "My teacher adjusts lessons to fit the class's reading level" (M = 4.01), though still rated Agree, suggests room for improvement in

differentiated instruction. Overall, the findings reflect generally strong instructional quality, with opportunities to further strengthen lesson adjustments to support diverse reading levels.

Participants' level of metacognitive awareness of ones reading process

Table 3 shows the frequency counts and descriptive statistics of the participants' metacognitive awareness in reading. The mean score of 3.80, interpreted as Good, indicates that students generally understand and manage their reading processes well. The standard deviation of 0.47 shows that the answers are close to each other, meaning that most students share similar levels of metacognitive awareness. This level of awareness is important because being conscious of their thinking helps readers plan, monitor, and evaluate their understanding. Studies on reading explain that good metacognitive habits help learners handle difficult texts more effectively and build stronger comprehension skills (Bouknify, 2023).

Table 3 -*Frequency Distribution and Descriptive Statistics of Metacognitive Awareness*

Score Range	Description	Interpretation	Frequency	Percentage
4.51 – 5.00	Always	Very Good	14	7.00
3.51 - 4.50	Often	Average	118	59.00
2.51 - 3.50	Sometimes	Moderate	68	34.00
1.51 - 2.50	Rarely	Fair	0	0.00
1.00 - 1.50	Never	Needs Improvement	0	0.00
Total			200	100
Mean			3.80	
Interpretation			Average	
SD			0.47	

Statement	Mean	Description	SD
A. Before Reading			
1 I have a purpose in mind when I read.	4.01	Often	0.88
2 I think about what I know to help me understand what I read.	4.05	Often	0.76
3 I preview the text before reading it.	3.76	Often	0.98
4 I decide what to read closely and what to ignore.	3.33	Sometimes	1.06
5 I use context clues to help me better understand what I'm reading.	3.87	Often	1.05
B. During Reading			
6 I adjust my reading speed based on what I'm reading.	4.14	Often	0.98
7 I re-read when the text becomes difficult.	4.02	Often	1.13
8 I stop and think about what I'm reading.	3.84	Often	0.96
9 I try to picture or visualize information in my mind.	3.98	Often	1.01
10 When text becomes difficult, I read aloud to help me understand.	3.80	Often	1.14
C. After Reading			
11 I take notes while reading to help me understand.	3.68	Often	1.21
12 I highlight or underline important parts of the text.	3.81	Often	1.05
13 I use reference materials (e.g., dictionaries, glossaries) when needed.	3.41	Sometimes	1.01
14 I paraphrase or restate ideas in my own words.	3.57	Often	1.00
15 I summarize what I've read to check my understanding.	3.71	Often	1.08
Overall	3.80	Often	0.47

The results show that 66.00% of participants demonstrate strong metacognitive habits, with 59.00% at the Average level and 7.00% at Very Good, while 34.00% are Moderate, indicating inconsistent strategy use. In the Before Reading stage, activating prior knowledge scored highest (M = 4.05), while selective reading was less consistent (M = 3.33) (Brod, 2021). During Reading, adjusting reading speed was common (M = 4.14), but reading aloud when texts were difficult was less frequent (M = 3.80) align with the studies that during reading, adjusting

reading speed was common, but reading aloud when texts were difficult was less frequent, aligning with research showing that readers modulate speed for comprehension and that format/layout influences reading processes (Kaakinen & Hyönä, 2025; Day et al., 2024).

After Reading, highlighting key ideas ($M = 3.81$) was widely used, whereas reference tools were applied less consistently ($M = 3.41$) (Ponce et al., 2022). Overall, students show good metacognitive awareness, especially in activating knowledge, pacing, and marking texts, though selective reading, reading aloud, and use of references need improvement, supporting findings that effective readers combine multiple strategies to enhance comprehension (Peng et al., 2024).

Participants' level of reading comprehension skills in terms of: identifying main ideas; making inferences; distinguishing real from fake; and understanding digital texts

Table 4 shows the frequency counts, mean, and standard deviation of the participants' multimodal reading comprehension skills in identifying main ideas. The mean score of 3.43, which is interpreted as Moderate, shows that students have an average ability to find the main idea when reading varied texts like pictures with captions, infographics, charts, videos, and other materials that mix visuals and written information. The standard deviation of 1.57 is quite high, which means the students' scores are very widely spread.

Table 4- *Frequency Distribution, Mean, and Standard Deviation of Participants' Reading Comprehension Skill in Terms of Identifying Main Ideas*

Score Range	Interpretation	Frequency	Percentage
4.51 – 5.00	Very Good	69	34.50
3.51 - 4.50	Average	45	22.50
2.51 - 3.50	Moderate	31	15.50
1.51 - 2.50	Fair	25	12.50
1.00 - 1.50	Needs Improvement	30	15.00
Total		200	100
Mean		3.43	
Interpretation		Moderate	
SD		1.57	

Overall, the findings show that while many students have good skills in identifying main ideas in different texts, a noticeable number still need help in developing this skill. The wide range of scores and the high variability show that students do not have the same level of readiness when dealing with reading comprehension materials. As classrooms continue to use digital content, pictures, and videos, it becomes more important to help students learn how to read and understand these kinds of texts. Strengthening their reading skills can help them better understand lessons across different subjects and platforms.

Table 5 shows the frequency counts, mean, and standard deviation of the participants' reading comprehension skills in terms of making inferences. The mean score of 3.41, which is interpreted as Moderate, shows that students have an average ability to make logical guesses or conclusions based on the combined information from visuals and written text. The standard deviation of 1.37 is high, meaning that the students' scores are widely spread out. This wide range happens because making inferences in different texts requires the reader to connect visual clues, text details, layout, symbols, and context all at once, making it more demanding than regular reading.

Table 5 - *Frequency Distribution, Mean, and Standard Deviation of Participants' Reading Comprehension Skill in Terms of Making Inferences*

Score Range	Interpretation	Frequency	Percentage
4.51 – 5.00	Very Good	46	23.00
3.51 - 4.50	Average	69	34.50
2.51 - 3.50	Moderate	34	17.00
1.51 - 2.50	Fair	32	16.00
1.00 - 1.50	Needs Improvement	19	9.50
Total		200	100
Mean		3.41	
Interpretation		Moderate	

SD

1.37

The results show varied performance in making inferences, with 34.5% of students at Average and 23% at Very Good, while 17% are Moderate, 16% Fair, and 9.5% Needs Improvement. This indicates that while some learners interpret implied ideas effectively, many still struggle, highlighting the need for strategies that develop the ability to use context clues, interpret visuals, and uncover implicit messages.

In distinguishing real from fake images, the mean score of 3.44 (Moderate) and high SD of 1.56 reflect inconsistent performance. Although 37% reached Very Good and 19% Average, others remain developing this skill: 13.5% Moderate, 16% Fair, and 14.5% Needs Improvement. The variability shows gaps in visual evaluation, as verifying images is increasingly complex due to deepfakes and AI-generated content, and limited media literacy can cause students to miss signs of manipulation (Alter & Oppenheimer, 2024; Lu et al., 2024). These findings underscore the need to strengthen media literacy and critical evaluation skills.

Table 6 - Frequency Distribution, Mean, and Standard Deviation of Participants' Reading Comprehension Skill in Terms of Distinguishing Real from Fake

Score Range	Interpretation	Frequency	Percentage
4.51 – 5.00	Very Good	74	37.00
3.51 - 4.50	Average	38	19.00
2.51 - 3.50	Moderate	27	13.50
1.51 - 2.50	Fair	32	16.00
1.00 - 1.50	Needs Improvement	29	14.50
Total		200	100
Mean		3.44	
Interpretation		Moderate	
SD		1.56	

The findings indicate that many students struggle to distinguish real from fake digital content; those who succeed tend to recognize inconsistencies such as unusual lighting or mismatched details, reflecting analytical skills, while others rely on first impressions, increasing susceptibility to misinformation (Sharma et al., 2023)

The moderate mean and wide score spread highlight the need for greater focus on media literacy in the classroom. Similarly, interpreting digital texts and images shows average but inconsistent performance ($M = 3.44$, $SD = 1.54$), as students vary in handling multimodal elements such as layouts, icons, and colors. This aligns with research emphasizing that digital reading demands skills such as screen navigation, evaluation, and visual interpretation of multimodal elements (Coiro, 2021; Farrar et al., 2024).

Table 7- Frequency Distribution, Mean, and Standard Deviation of Participants' Reading Comprehension Skill in Terms of Understanding Digital Text

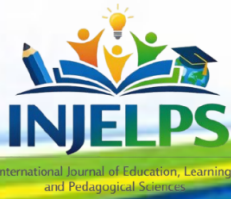
Score Range	Interpretation	Frequency	Percentage
4.51 – 5.00	Very Good	65	32.50
3.51 - 4.50	Average	54	27.00
2.51 - 3.50	Moderate	26	13.00
1.51 - 2.50	Fair	22	11.00
1.00 - 1.50	Needs Improvement	33	16.50
Total		200	100
Mean		3.44	
Interpretation		Moderate	
SD		1.54	

The distribution shows a mix of strong and weak performance among the participants. A large number of students, or 32.50%, fall under the *Very Good* level, meaning they can easily understand digital texts and images and recognize how visuals and written information connect. Another 27.00% are in the *Average* level, showing that they generally understand digital materials but may still face some difficulty with more complex layouts or images. On the other hand, several students need more support: 13.00% fall under *Moderate*, 11.00% under *Fair*, and 16.50% under *Needs Improvement*.

This pattern shows that while many learners can read digital texts well, a significant group still struggles.

Table 8 - Mean, Standard Deviation and Interpretation of Participants' Reading Comprehension Skill

208



Sub- Variable	Mean	Standard Deviation	Interpretation
Identifying Main Ideas	3.43	1.57	Moderate
Making Inferences	3.41	1.37	Moderate
Distinguishing Real from Fake Images	3.44	1.56	Moderate
Understanding Digital Text	3.44	1.54	Moderate

In summary, the findings show that while many students demonstrate strong skills in understanding digital texts, a noticeable number still need support in developing this skill. The wide range of scores and the moderate mean highlight the importance of helping students build digital literacy skills, especially because modern classrooms rely heavily on digital platforms and multimedia materials. Improving students' ability to read and understand digital content can help them perform better not only in school but also in everyday digital communication, where multimodal texts are becoming more common.

Participants' vocabulary, assessment of their teachers' instructional quality, and metacognitive awareness of one's reading process significantly associated with their reading comprehension skills

Table 9 - Canonical Correlation Analysis Between Vocabulary and Reading Comprehension Skills

Variable	Cross loading	R	R ²	F(4, 195)	p
Vocabulary	0.52				
Reading Comprehension Skills					
Main Idea	0.49	0.521	0.271	18.157*	<.001
Making Inferences	0.44				
Distinguish Real from Fake	0.48				
Digital Texts	0.41				

Table 9 shows that vocabulary has a statistically significant relationship with reading comprehension, $F(4,195) = 18.157$, $p < .001$, rejecting the null hypothesis. The moderate positive correlation ($r = 0.521$) and R^2 of 0.271 indicate that vocabulary accounts for 27.1% of the differences in students' reading skills. This suggests that stronger vocabulary enhances comprehension across text, images, layouts, and visual cues, giving students greater confidence and accuracy in understanding meaning. Research confirms that vocabulary knowledge is a strong predictor of reading comprehension in both print and digital formats (Diprossimo et al., 2023).

The cross-loadings indicate that vocabulary is strongly linked to reading comprehension, with main idea (0.49), distinguishing real from fake (0.48), making inferences (0.44), and understanding digital texts (0.41). This shows that strong vocabulary supports word recognition, interpretation of visuals, understanding implied meanings, and digital content analysis, and that digital reading environments and technologies can facilitate vocabulary growth and comprehension (Zhu et al., 2024; Liu et al., 2024)

Canonical correlation analysis shows a significant but weak relationship between instructional quality and reading comprehension, $F(4,195) = 4.185$, $p = 0.003$, $r = 0.281$, $R^2 = 0.079$, meaning teaching explains only 7.9% of comprehension variation. Effective instruction—through clear explanations, feedback, and visual supports—affects performance, but other factors, including vocabulary and multimodal strategies, play a larger role (Chew & Cerbin, 2021).

Table 10 - Canonical Correlation Analysis Between Instructional Quality and Reading Comprehension Skills

Variable	Cross loading	R	R ²	F(4, 195)	p
Instructional Quality	0.28				
Reading Comprehension Skills					
Main Idea	0.22	0.281	0.079	4.185*	0.003
Making Inferences	0.18				
Distinguish Real from Fake	0.27				
Digital Texts	0.16				

*Significant at 0.05 two-tailed alpha level.

The cross-loadings show that instructional quality has a modest impact on specific reading comprehension skills. Distinguishing real from fake information has the highest loading (0.27), followed by identifying the main idea (0.22), making inferences (0.18), and understanding digital texts (0.16). This suggests that good instruction —

through examples, higher-order questioning, and guided visual analysis — can improve students' ability to evaluate visuals and texts, even if the effect is small (Farrar et al., 2024; Nikleva & Rodríguez-Muñoz, 2022). Overall, instructional quality contributes meaningfully but limitedly, with other factors such as vocabulary, prior knowledge, and digital literacy playing larger roles.

Canonical correlation analysis between metacognitive awareness and reading comprehension revealed no significant relationship, $F(4,195) = 2.085$, $p = 0.084$. The weak correlation ($r = 0.203$) and low explained variance ($R^2 = 0.041$) indicate that metacognitive awareness minimally affects comprehension. Cross-loadings show the highest connection to distinguishing real from fake (0.20), followed by understanding digital texts (0.14), and main idea and inferences (0.13). This aligns with research suggesting that metacognitive strategies are more effective in traditional text-focused reading contexts, and that additional skills are needed to navigate multimodal or visual-heavy materials (Manalu & Wirza, 2021)

Table 11 - Canonical Correlation Analysis Between Metacognitive Awareness and Reading Comprehension Skills

Variable	Cross loading	R	R ²	F(4, 195)	p
Metacognitive Awareness	0.20				
Comprehension Skills					
Main Idea	0.13	0.203	0.041	2.085	0.084
Making Inferences	0.13				
Distinguish Real from Fake	0.20				
Digital Texts	0.14				

*Significant at 0.05 two-tailed alpha level.

The findings suggest that metacognitive awareness alone is insufficient to improve reading comprehension, especially with texts containing images, graphics, or digital layouts. While students may manage their thinking in traditional reading, visual literacy skills—such as interpreting symbols, layouts, and visual patterns—are essential for understanding multimodal content, and these are not fully addressed by conventional metacognitive strategies (Jeong & Gweon, 2021). Thus, metacognitive awareness shows only a minimal connection to comprehension, highlighting the need for targeted instruction in visual and digital literacy. Teaching these skills separately ensures learners can effectively read, analyze, and evaluate information in today's highly visual and digital environment.

Conclusions

The study revealed that vocabulary knowledge plays a significant role in students' reading comprehension, demonstrating a moderate positive relationship with comprehension skills across various text formats. Instructional quality also contributes to reading development, although its influence is relatively modest compared with vocabulary knowledge. In contrast, metacognitive awareness showed no statistically significant relationship with reading comprehension, suggesting that metacognitive strategies alone may not be sufficient to support comprehension of multimodal and visually complex texts.

These findings highlight the importance of strengthening vocabulary development and providing effective instructional support in reading classrooms. Teachers play a crucial role in facilitating comprehension by employing varied instructional strategies, guiding students in interpreting both traditional and digital texts, and encouraging critical engagement with multimodal information.

The study contributes to educational research by providing empirical evidence on how cognitive and instructional factors interact in shaping reading comprehension among secondary school learners. The findings may inform teaching practices, curriculum planning, and literacy programs aimed at improving students' ability to interpret increasingly complex texts in contemporary learning environments.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

Teachers may strengthen vocabulary development by integrating explicit vocabulary instruction, contextual word analysis, and regular reading activities that encourage students to engage with diverse texts. Teachers may also model strategic reading practices that help students identify main ideas, make inferences, and evaluate visual and digital information.

School administrators may support literacy development by providing professional development programs focused on effective reading instruction, differentiated teaching strategies, and digital literacy integration. Schools may also enhance access to varied reading resources, including print and digital materials, to support students' comprehension development.

Curriculum developers may incorporate multimodal literacy and media evaluation skills into reading curricula to address the growing importance of interpreting digital and visual texts in modern learning environments.

Teacher education institutions may strengthen pre-service and in-service training programs by emphasizing instructional strategies for vocabulary development, metacognitive strategy instruction, and multimodal reading comprehension.

Future researchers may explore additional variables such as media literacy, digital exposure, and critical thinking skills that may influence reading comprehension. Further studies may also examine classroom-based interventions designed to enhance vocabulary development and multimodal reading skills among secondary school learners.

Students may improve their reading comprehension by actively practicing vocabulary development, applying metacognitive strategies during reading, and developing critical awareness when interpreting digital and visual information.

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