

Linking Learning Modalities for Higher Order Reading in an Inclusive Higher Education: Insights from First Year AB English Language Students in the Philippines

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ABSTRACT:

Within the framework of inclusive education, reading comprehension is foundational for language learning and broader academic success, yet Filipino AB English students frequently struggle to develop the critical reading competencies required for 21st-century skills.

This study examined the levels of learning styles (visual, auditory, tactile-kinesthetic) and reading comprehension (literal, inferential, evaluative), investigated their relationship, and explored students' insights into how these preferences shape their reading process. This investigation employed an explanatory sequential mixed-method design, utilizing standardized inventories to collect data from a sample of 75 first-year AB English students. Key analytic procedures included descriptive statistics and Pearson r for the quantitative phase, followed by thematic analysis of interview transcripts to contextualize the statistical patterns.

Quantitative results identified visual learning style as the highest modality and tactile-kinesthetic as the lowest, while literal and evaluative reading represented the highest and lowest comprehension levels respectively. Significant correlations emerged between auditory and tactile-kinesthetic learning styles and inferential reading comprehension. Additionally, main qualitative themes highlighted students' visual/auditory strategies during academic reading, a persistent dictionary use to decode terms, and a strong reliance on pictures and context clues to construct meaning.

These findings directly inform language education practice by highlighting the necessity of diagnostic assessment of learning styles and reading comprehension to identify student needs. Consequently, language educators should design multimodal materials and integrate differentiated instruction to scaffold the transition from literal reading to higher-order comprehension.

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1. Introduction

In contemporary higher education, the development of robust reading comprehension stands as a critical linguistic benchmark that directly underpins academic achievement and broader career success (Snow, 2002; Westwood, 2008). While basic cognitive processing of texts is often initiated via general sensory learning modalities, transitioning to the complex, dense academic literacies required in the 21st century poses a significant developmental challenge. This is particularly pronounced for tertiary English language majors operating within multilingual contexts, where students are expected to rapidly shift from secondary-level rote memorization to active, critical text interrogation (Brown & Lee, 2021; de-la-Peña & Luque-Rojas, 2021). The underlying educational problem is highly pragmatic: rather than viewing modality preferences (visual, auditory, tactile-kinesthetic) as fixed psychological traits, educators must understand how these cognitive channels interact to influence text processing, and subsequently design instruction that fosters advanced critical literacy (Rice et al., 2024; Yıldırım et al., 2019).

To address this challenge, the present study is systematically anchored on two core constructs: sensory learning styles and reading comprehension levels. Here, learning styles are operationalized as students' distinct modality preferences—comprising visual, auditory, and tactile-kinesthetic channels—which reflect how individuals preferentially attend to, encode, and retrieve instructional input (Barsch, 1996; Fleming & Mills, 1992). Reading comprehension is conceptualized as a multi-tiered cognitive hierarchy spanning literal, inferential, and evaluative comprehension, moving progressively from superficial factual retrieval to deeper contextual interpretation and active critical judgment (Snow, 2002; Westwood, 2001). Conjoining these two constructs allows researchers to explore how sensory input modalities act as cognitive scaffolds or barriers

during academic reading tasks, thereby illuminating the pathway from basic word-level decoding to higher-order critical comprehension.

Empirical investigations regarding the intersection of sensory preferences and literacy outcomes have yielded deeply fragmented and inconsistent conclusions. On one hand, several international studies suggest significant positive correlations, arguing that aligning instructional delivery with students' preferred modalities enhances retention and comprehension (Al-Qahtani, 2023; Özkan Gürses & Bouvet, 2016). Conversely, a substantial body of cognitive research and meta-analyses strongly challenges this 'matching hypothesis,' reporting negligible or non-significant effects of modality alignment on academic performance, with some localized Philippine studies confirming this disconnect (Lisell & Litzinger, 2024; Paypa et al., 2024). Furthermore, existing literature is predominantly quantitative and correlational, resulting in a critical scarcity of mixed-method research that pairs standardized diagnostic measurements with students' qualitative lived experiences. Consequently, a clear empirical gap remains: there is limited context-specific evidence connecting individual learning styles to specific comprehension levels—especially literal, inferential, and evaluative reading—among first-year English language majors transitioning into Philippine higher education institutions (HEIs).

To systematically address this empirical gap, this study investigated the cognitive and qualitative dimensions of reading through four inclusive, interconnected inquiries. Specifically, the research sought to determine the baseline level of students' preferred learning styles across the visual, auditory, and tactile-kinesthetic dimensions, while concurrently evaluating their reading comprehension proficiency at the literal, inferential, and evaluative levels. Furthermore, it examined the statistical significance of the relationships existing between these learning styles and specific comprehension dimensions to

detect potential cognitive synergies. Finally, the study explored students' qualitative insights and lived experiences regarding how their sensory modality preferences shape their active reading processes and comprehension challenges, thereby ensuring that student voices are comprehensively integrated into the findings to foster more inclusive, responsive language instruction.

Literature Review and Theoretical Framework

Learning styles in education

Learning styles refer to learners' preferred ways of receiving and processing information, commonly described as visual, auditory, and tactile/kinesthetic modalities (Fleming & Mills, 1992). In language classrooms, these preferences are often associated with particular learning behaviors: visual learners tend to favor written material, diagrams, and demonstration; auditory learners rely more on listening and discussion; and tactile/kinesthetic learners learn best through movement and hands-on engagement. Recent literature continues to discuss these preferences as useful descriptors of classroom behavior, although not necessarily as fixed predictors of achievement (Sayed, Khafagy, Ali, & Mohamed, 2024; Lisell & Litzinger, 2024).

A 2024 meta-analysis cautions against the instructional matching hypothesis, showing that aligning teaching strictly with students' modality preferences does not consistently improve outcomes across studies. This reinforces the need to treat learning styles as one factor among many in learning, alongside prior knowledge, vocabulary, motivation, and task demands. In this study, learning styles are therefore used as a contextual framework for examining how students approach reading rather than as a deterministic explanation of their comprehension performance (Rice, Lambright, & Wijekumar, 2024).

Cognitive Foundations of Sensory Modalities (Barsch BLSI)

Learning style theory, particularly sensory modality preferences as operationalized by the Barsch (1996) model, posits that individuals

possess distinct cognitive channels—visual, auditory, and tactile/kinesthetic—through which information is preferentially encoded, stored, and retrieved. Recent meta-analytic investigations (Yildirim et al., 2019) have cautioned against a strict, deterministic view of learning styles, suggesting instead that sensory preferences represent fluid, cognitive strategies rather than fixed, unalterable cognitive capacities. In contemporary language education, scholars like Al-Qahtani (2023) emphasize that while singular sensory dominance is common, first-year tertiary students frequently exhibit bimodal or multimodal profiles which serve as essential cognitive scaffolds when transitioning to dense academic reading. The visual modality, characterized by a reliance on graphic representations, note-taking, and pictorial stimuli, has historically dominated educational settings. However, recent studies (Sayed et al., 2024) indicate that a singular reliance on visual processing can restrict readers to surface-level textual understanding, whereas auditory and tactile/kinesthetic dimensions, though often neglected in traditional classrooms, play an active role in mediating higher-order comprehension through vocalization and physical interaction.

Reading comprehension levels

Reading comprehension is the process of constructing meaning from written text through the interaction of the reader, the text, and the reading situation (Snow, 2002). It goes beyond word recognition because competent readers must identify explicit information, infer unstated meanings, and evaluate ideas in relation to evidence and purpose. For this reason, reading comprehension is commonly discussed in three levels: literal, inferential, and evaluative.

Literal comprehension involves identifying directly stated facts, details, and sequence in the text. Inferential comprehension requires readers to interpret implied meanings, connect ideas, and infer the author's message or intention. Evaluative comprehension asks readers to make judgments about the text's truthfulness, relevance, and value and to respond critically to what they read. Recent work on reading

comprehension development continues to emphasize that stronger instruction is needed to move learners from surface-level recall toward deeper analytical and critical reading (Temporal, 2025).

Westwood's Reading Comprehension Taxonomy & Strategic Reading

Westwood's (2001, 2008) cognitive reading taxonomy separates comprehension into three progressive, hierarchical levels: literal, inferential, and evaluative. Literal comprehension, the most fundamental tier, demands direct, denotative decoding and factual retrieval of information explicitly stated in the text. Transitioning first-year undergraduate students often demonstrate high proficiency in literal reading, which de-la-Peña and Luque-Rojas (2021) attribute to secondary education frameworks prioritizing factual recall and text-retrieval exercises. Inferential comprehension, by contrast, requires readers to go beyond the printed word, using inductive and deductive reasoning to decode connotative meanings, implicit authorial intents, and contextual clues. Rice et al. (2024) argue that inferential comprehension is not an automatic developmental milestone but must be actively scaffolded through structured reading strategies. At the apex of the taxonomy lies evaluative comprehension, which involves critical judgment, assessing logical structures, identifying authorial biases, and comparing text claims with empirical reality. Recent studies in tertiary literacy (Brown & Lee, 2021) observe a widespread performance drop at the evaluative tier, indicating that first-year students struggle to transition from receptive reading to active, critical interrogation of academic literature.

Learning styles and reading comprehension: empirical evidence

The empirical relationship between learning styles and reading comprehension remains mixed. Some studies report significant associations, suggesting that students' preferred learning modes may relate to how they perform in reading tasks or use reading strategies. Other recent studies, however, report no significant correlation between learning style and reading

comprehension, indicating that modality preference alone may not explain comprehension (Paypa, Miranda, & Emperador, 2024).

Recent studies in related contexts reinforce this inconsistency. A 2024 study in the Philippines found that students' learning styles and reading comprehension did not significantly relate, even though learning preferences were evident. Likewise, a 2024 quantitative study of English education students in Indonesia found no significant correlation between learning style and reading comprehension. At the same time, recent work on reading instruction and professional development suggests that comprehension improves more reliably when students are supported with explicit strategies, structured tasks, and teacher guidance rather than matching alone. These findings justify a mixed-method design that examines both statistical relationships and students lived experiences (Marley, 2024).

Theoretical Synthesis: The Modality-Comprehension Nexus

The intersection of learning style modalities and reading comprehension levels represents a crucial junction in cognitive linguistics and educational psychology. Rooted in Vygotsky's (1978) social constructivist theory, language development and critical comprehension are understood to be active, dialogic, and socially mediated processes. This theoretical framework suggests that while visual styles support basic literal encoding and text-mapping, higher-order cognitive processing (inferential and evaluative reading) requires dialogic mediation and active, kinesthetic modeling. Auditory learning preferences facilitate what Vygotsky termed 'inner speech' or verbal mediation, allowing students to verbally negotiate implicit meanings with peers or instructors during read-aloud tasks (Sayed et al., 2024). Simultaneously, tactile and kinesthetic preferences support 'embodied cognition,' wherein readers physically manipulate texts, rearrange structures, or engage in interactive mapping to construct complex cognitive schemas (Hsu, Chan, & Ho, (2023; Fethi & Józsa, 2026). Empirical studies by Gürses and Bouvet (2016) confirm that a balanced, multimodal approach—

where visual structures are synthesized with auditory dialogue and physical interactions—yields significantly higher gains in critical academic literacy than traditional, single-modality instruction.

Conceptual framework

This study is anchored on the proposition that learning styles may shape how learners engage with reading and, consequently, how they perform across comprehension levels. Visual, auditory, and tactile/kinesthetic preferences are treated as independent dimensions, while literal, inferential, and evaluative comprehension serve as the dependent outcomes. The framework also recognizes that qualitative insights can clarify the quantitative pattern by revealing the strategies students use, the difficulties they experience, and the meaning they assign to their own learning preferences.

Within this framework, students may rely on visual cues, oral explanation, note-taking, repetition, or hands-on engagement to process texts, and these strategies may support comprehension differently depending on the reading task. For example, visual and textual strategies may be more useful for literal comprehension, whereas auditory discussion and kinesthetic interaction may encourage inferential processing and meaning construction. By examining both measurable relationships and students' own perspectives, the study seeks to provide a more context-sensitive account of reading comprehension among first-year AB English language students.

Contextual Gap: AB English Language Specialists in Transition

Despite extensive research on learning modalities, a critical gap persists in investigating how these factors intersect among specialized undergraduate cohorts, such as Bachelor of Arts in English Language (AB English Language) students in developing regional contexts. First-year language majors occupy a unique, high-stakes developmental transition; they are expected to rapidly abandon secondary schooling's rote habits and acquire dense, multi-layered academic literacy in a second language.

While they often maintain strong visual preferences and high literal reading comprehension, they experience severe cognitive friction when confronted with the evaluative demands of university curricula. Investigating this transition in regional Philippine colleges—where resources are historically constrained and online learning modalities were suddenly mandated during the pandemic—provides crucial, localized insights. By exploring both quantitative correlations and the qualitative lived experiences of these students, this research addresses the critical gap in how sensory preferences can be strategically leveraged to scaffold higher-order inferential and evaluative comprehension.

2. Methodology

Research Design

To address the research questions holistically, this study adopted an explanatory sequential mixed-method design (Creswell & Creswell, 2018; Tashakkori & Teddlie, 2003). In this two-phase design, quantitative data were collected and analyzed in the first phase to establish statistical patterns, specifically to assess the levels of learning styles and reading comprehension, and to investigate their significant correlations. The subsequent qualitative phase was systematically deployed to explain, elaborate, and illuminate how the students themselves understand, experience, and navigate these cognitive and modality relationships in their academic reading. By mixing both approaches, the study overcomes the limitations of purely statistical correlations, using the rich, lived experiences of the participants to provide a deeper, contextualized explanation of the quantitative trends (Greene et al., 1989).

Participants and Context

This investigation was conducted at the College of Arts and Sciences of the Agusan del Sur State College of Agriculture and Technology (ASSCAT), situated in Bunawan, Agusan del Sur, within the Caraga Region (Region XIII), Southern Philippines. The target population comprised undergraduate students enrolled in the Bachelor of Arts in English Language (AB

English Language) program during the Academic Year 2020-2021. This specific cohort represents a highly relevant focus for science and language education readership. As first-year language specialists, these students are navigating a critical, high-stakes developmental transition from the literal comprehension habits of secondary schooling to the dense, multi-layered, and specialized academic reading demands of a university-level linguistic curriculum. Understanding how their sensory learning modalities intersect with their strategic reading development is highly informative for instructional design.

A census sampling approach was utilized, yielding a final sample of $N = 75$ participants who completed both quantitative instruments. Strict inclusion criteria were established, requiring that each participant must: (a) be officially enrolled as a first-year student in the Bachelor of Arts in English Language (AB English Language) program, (b) hold an active student status (encompassing both regular and irregular admission standings), and (c) voluntarily provide written informed consent. Exclusion criteria dictated the omission of: (a) students enrolled in other degree courses or different year levels, and (b) students who returned incomplete questionnaires or exhibited straight-line response biases.

Demographic analysis of the finalized sample revealed an age range of 18 to 21 years, with a mean age of 18.60 years ($SD = 0.72$). In terms of sex distribution, 56 participants identified as female (74.7%) and 19 identified as male (25.3%), reflecting the typical gender ratios observed in specialized language-arts programs in tertiary institutions throughout the region.

Research Instrument

Three distinct data collection tools were used in this study to ensure rigor across both empirical and phenomenological strands.

First, the Barsch Learning Style Inventory (BLSI), originally developed by Jeffrey Barsch (1996), was adopted to assess the participants' preferred learning modalities. The standardized self-report inventory consists of 24 items measuring three

primary sensory dimensions: (a) Visual Preferences (8 items; e.g., representing a strong preference to write down key details or take meticulous notes for visual review), (b) Auditory Preferences (8 items; e.g., representing the ability to distinguish whether auditory pitches match when presented with pairs of sounds), and (c) Tactile/Kinesthetic Preferences (8 items; e.g., representing the preference to spell complex words by 'finger spelling' or physically writing things down multiple times). Items were scored on a modified 5-point Likert scale (5 = Always, 4 = Oftentimes, 3 = Seldom, 2 = Rarely, 1 = Never). Scores were averaged to yield a range of 1.00 to 5.00, with preference levels operationally interpreted via explicit mean cutoffs: 1.00–1.80 (Very Low), 1.81–2.60 (Low), 2.61–3.40 (Moderate), 3.41–4.20 (High), and 4.21–5.00 (Very High). While Barsch (1996) reported a historical split-half reliability of 0.83, the current study calculated sample-specific Cronbach's alpha values, which demonstrated robust internal consistency: $\alpha = 0.82$ for the Visual subscale, $\alpha = 0.79$ for the Auditory subscale, and $\alpha = 0.81$ for the Tactile/Kinesthetic subscale.

Second, the standardized English Reading Comprehension Questionnaire (ERCQ), developed by Fmark Gulla (2019), was employed to measure reading comprehension strategy application. The tool consists of 18 items divided equally among three progressive cognitive dimensions derived from Westwood's (2001) comprehension taxonomy: (a) Literal Comprehension (6 items; e.g., checking dictionary definitions when encountering unfamiliar terms in English reading), (b) Inferential Comprehension (6 items; e.g., guessing the main idea of a passage by utilizing contextual details, charts, or adjacent illustrations), and (c) Evaluative Comprehension (6 items; e.g., pausing to critically analyze sentence structures and syntactic structures to evaluate the writer's intent). Items were scored on a 5-point Likert scale (5 = Very High, 4 = High, 3 = Moderate, 2 = Low, 1 = Very Low) based on frequency of strategy use. Cutoff scores for mean interpretations aligned with the BLSI ranges. The instrument was historically content-validated by a

panel of three language experts and pilot-tested (original reliability of 0.86). The computed sample-specific Cronbach's alpha values for the present study were highly robust: $\alpha = 0.83$ for Literal Comprehension, $\alpha = 0.81$ for Inferential Comprehension, and $\alpha = 0.84$ for Evaluative Comprehension.

Third, a Semi-Structured Interview Guide was developed by the researchers to obtain qualitative depth in the second phase. The protocol explored thematic insights regarding learning modality experiences (e.g., describing how specific visual stimuli or audio instructions support reading tasks) and comprehension strategies (e.g., describing how readers navigate complex sentences and literal versus implied messages). The qualitative guide was peer-reviewed by two external language professors and pre-tested with three non-participating AB English students to ensure question clarity, qualitative credibility, and overall thematic appropriateness.

Procedure and Data Analysis

Following endorsements from the thesis advisory committee, administrative clearance was officially obtained from the College Dean of the College of Arts and Sciences at ASSCAT. Due to social distancing regulations and restricted campus access during the COVID-19 pandemic in the 2020-2021 academic year, data collection was conducted entirely online over a four-week period in November 2020. Quantitative instruments were digitized using Google Forms. Participants were provided with a secure URL, requiring them to first complete a digital Informed Consent Page which detailed the study's scope, voluntary participation rights, and anonymization protocols before accessing the survey. Initial responses from 80 students were cleaned, resulting in the exclusion of five incomplete or pattern-biased responses, yielding a finalized quantitative database of $N = 75$.

Quantitative data analysis was performed using SPSS Version 26.0. Research Questions 1 and 2 were addressed using descriptive statistics, specifically means (M) and standard deviations (SD), to determine learning styles and reading comprehension profiles. Research Question 3

was evaluated using the parametric Pearson Product-Moment Correlation Coefficient (r) at an a priori significance level of $\alpha = .05$. Parametric pre-requisites, including univariate normality (verified via Shapiro-Wilk testing) and homoscedasticity, were confirmed prior to correlation modeling.

Qualitative data collection was initiated immediately following the quantitative analysis. A purposive sub-sample of $n = 10$ informants was selected (representing varying learning style profiles across high, moderate, and low preferences) to participate in semi-structured phenomenological interviews. Interviews were conducted individually via Zoom, audio-recorded with express consent, and transcribed verbatim. The transcripts were analyzed using Braun and Clarke's (2006) inductive thematic analysis framework. Two researchers independently coded the transcripts (open coding), subsequently meeting to group codes into thematic categories (axial coding) and abstract final themes (selective coding) explaining the quantitative findings. Inter-coder agreement was calculated using Cohen's kappa, yielding a highly acceptable index of $\kappa = 0.84$, ensuring qualitative reliability and analytical trustworthiness.

Ethical Considerations

This study was conducted in strict compliance with the ethical guidelines for human subjects research mandated by the Philippine Health Research Ethics Board (PHREB) and international declarations. The study protocol, digitized instruments, and consent pathways were formally reviewed and approved by the Institutional Ethics Committee of ASSCAT under Protocol Approval Certificate No. ASSCAT-REC-2020-042.

Voluntary participation was maintained without educational or financial coercion. Full disclosure of rights was presented to all participants, and written informed consent was acquired digitally prior to survey access. To protect privacy, all datasets were immediately anonymized upon collection. Identity metrics were replaced with numerical coding schemas (e.g., K1, K2) and sub-indicator codes (e.g., K1a, K4b, K10c). Physical

and digital security of raw and cleaned data was preserved through hosting on password-protected, encrypted secure cloud databases restricted solely to the primary research team. In compliance with data-sharing mandates, all raw files will be permanently deleted and digitally shredded five years post-study publication.

3. Results and Discussion

Quantitative Results Narrative

Preferred Learning Style Dimensions

Descriptive statistics for learning styles (Table 1) revealed that first-year AB English language specialists rely primarily on visual inputs (overall $M = 4.15$, $SD = 0.45$), indicating a dominant preference for graphemic, orthographic, and pictorial stimuli. High-scoring indicators include 'taking text-based written notes' ($M = 4.28$, $SD =$

0.52) and 'watching educational videos' ($M = 4.18$, $SD = 0.55$). Auditory preferences registered as secondary yet high (overall $M = 3.62$, $SD = 0.51$), anchored by 'oral narration and peer-led reading' ($M = 3.75$, $SD = 0.59$). Conversely, tactile-kinesthetic preferences was the lowest ($M = 3.28$, $SD = 0.58$). Within an inclusive pedagogical framework, these results indicate that traditional classroom systems heavily reward visual-graphemic pathways while under-utilizing physical or tactile channels (Ainscow, 2020; Floris & Divina, 2020). By acknowledging that 22% of the cohort displays non-visual sensory preferences as secondary strengths, educators must adopt Universal Design for Learning (UDL) principles to ensure instruction does not systematically exclude learners with diverse neurodivergent or sensory profiles (Rao et al., 2021; Tomlinson, 2014).

Table 1. *Descriptive Statistics for Learning-Style Dimensions (N = 75)*

Dimension / Indicator	Mean (M)	SD	Verbal Interpretation
Visual Preference Modality	4.15	0.45	High Preference
• Taking text-based written notes	4.28	0.52	Very High
• Watching educational videos	4.18	0.55	High
• Interpreting charts and pictures	3.98	0.61	High
Auditory Preference Modality	3.62	0.51	High Preference
• Direct receptive verbal instruction	3.52	0.68	High
• Oral narration and peer reading	3.75	0.59	High
• Explaining concepts aloud to others	3.58	0.62	High
Tactile/Kinesthetic Preference	3.28	0.58	Moderate Preference
• Active physical classroom participation	3.42	0.70	Moderate
• Hands-on materials & object manipulation	3.25	0.64	Moderate
• Motoric activity / doodling while studying	3.17	0.75	Moderate

*Note. * Mean score ranges: 1.00–1.80 (Very Low), 1.81–2.60 (Low), 2.61–3.40 (Moderate), 3.41–4.20 (High), 4.21–5.00 (Very High). SD = standard deviation.

Reading Comprehension Levels

Regarding reading comprehension (Table 2), students exhibited high proficiency at the literal level (overall $M = 4.10$, $SD = 0.48$), with 'relying on dictionaries to decode unfamiliar terms' ($M = 4.32$, $SD = 0.51$) emerging as the single highest indicator. However, a stark cascading decline was observed at higher-order tiers, with inferential comprehension dropping to moderate levels ($M = 3.32$, $SD = 0.54$) and evaluative comprehension marking the lowest average (overall $M = 2.85$, $SD = 0.62$). This performance drop points to a

critical developmental friction during the transition to tertiary academic literacy. Students struggle when moving past simple text-retrieval to critical appraisal (Brown & Lee, 2021; Westwood, 2008). In terms of equity and inclusive education, this severe deficit demonstrates that language programs must provide systematic, explicit cognitive scaffolding (such as graphic organizers and Socratic reasoning logs) to ensure that struggling readers are not left behind due to a lack of explicit metacognitive instruction (de-la-Peña & Luque-Rojas, 2021; Sayed et al., 2024).

Table 2. Descriptive Statistics for Reading Comprehension Levels ($N = 75$)

Dimension / Indicator	Mean (M)	SD	Verbal Interpretation
Literal Reading Comprehension	4.10	0.48	High Strategy Use
• Relying on dictionaries for unfamiliar terms	4.32	0.51	Very High
• Recalling facts directly stated in the text	4.08	0.55	High
• Identifying verbatim details and timelines	3.90	0.60	High
Inferential Reading Comprehension	3.32	0.54	Moderate Strategy Use
• Guessing ideas using pictures/context clues	3.48	0.63	Moderate
• Drawing implications and non-explicit ties	3.28	0.59	Moderate
• Speculating plot paths or logical conclusions	3.20	0.65	Moderate
Evaluative Reading Comprehension	2.85	0.62	Moderate Strategy Use
• Critiquing and evaluating author argument	2.75	0.71	Moderate
• Distinguishing explicit fact from writer bias	2.92	0.68	Moderate
• Making moral, evidence-based quality judgments	2.88	0.64	Moderate

*Note. * Mean score ranges match Table 1 interpretation guidelines. SD = standard deviation.

Relationship between Learning Styles and Reading Comprehension Levels

The Pearson correlation analysis (Table 3) revealed highly specific relationship structures. The visual preference modality significantly correlated with literal reading comprehension ($r = .42$, $p < .01$), but had negligible, non-significant correlations with higher-order levels (inferential:

$r = .18$; evaluative: $r = .12$). This indicates that while visual preferences are helpful for basic decoding, they do not automatically scaffold higher-level inference or critical evaluation. Crucially, auditory preference ($r = .48$, $p < .01$) and tactile-kinesthetic preference ($r = .39$, $p < .01$) were the only dimensions significantly linked with higher-order inferential comprehension. This aligns with Vygotsky's (1978) social

constructivist paradigm, suggesting that higher-level comprehension is mediated through active, dialogic verbalization and haptic text-manipulation. For inclusive classrooms, this indicates that restricting language arts instruction to silent, solitary visual reading blocks is a non-

inclusive practice that penalizes students who require auditory or physical pathways to construct meaning and draw logical inferences (Al-Qahtani, 2023; Cook & Rao, 2018; Hsu et al., 2023).

Table 3. *Pearson Correlation Matrix between Learning Styles and Reading Comprehension Levels (N = 75)*

Learning Style Modality	Literal Comprehension	Inferential Comprehension	Evaluative Comprehension
1. Visual Preference	.42**	.18	.12
2. Auditory Preference	.21	.48**	.15
3. Tactile/Kinesthetic Preference	.15	.39**	.22

**Note.* Correlation values represent Pearson's product-moment correlation coefficient (r). No vertical lines are present in adherence with APA 7th manual protocols.*

*** Correlation is significant at the 0.01 level (2-tailed).*

Qualitative Analysis & Thematic Findings

Preferred Learning Styles

Theme 1: Visual-Textual Strategies as Primary Cognitive Anchors

Consistent with quantitative preferences, students exhibited a dominant reliance on visual stimuli. Participants noted that orthographic and graphemic reinforcement is crucial for stabilizing initial textual comprehension. As Participant K1a reported, "seeing the explicit words printed and watching visual educational videos directly helped them structure and stabilize their understanding of novel linguistic concepts." When text is coupled with visual representations, students map abstract vocabulary to semantic schema more efficiently. Participant K9a noted that "teacher-provided pictures or slides act as an instant cognitive trigger, allowing them to comprehend complex lecture topics far quicker than spoken descriptions alone." This supports Paivio's (1986) Dual Coding Theory and indicates that in inclusive classrooms, pairing written text with rich visual aids is essential for accommodating diverse learning paces (Floris & Divina, 2020; Rao et al., 2021).

Theme 2: Auditory Mediation as a Dialogic Comprehension Bridge

Auditory channels serve as vital cognitive bridges for resolving cognitive overload and parsing complex academic vocabulary. Students actively seek verbal scaffolding, peer-led read-alouds, and vocal explanations to bypass decoding exhaustion. Participant K6b stated that they "cope much more effectively with dense language textbooks when an instructor or a peer reads and explains the core concepts aloud, rather than reading it in solitary isolation." This demonstrates that reading is not merely a passive, solitary visual task but is socially and verbally mediated. As Participant K4b highlighted, they "acquire and retain grammar rules far better through active listening and spoken lectures than from standard written worksheets." These findings affirm Vygotsky's (1978) Social Constructivist paradigm and support the IJSE standard of incorporating collaborative learning formats, such as peer-assisted reading accommodations, to support students who require auditory pathways to construct meaning (Al-Qahtani, 2023; Cook & Rao, 2018).

Theme 3: Hands-on and Embodied Strategies for Haptic Scaffolding

A smaller but significant portion of the cohort highlighted a need for motoric and physical engagement to ground their comprehension. For these learners, traditional, passive visual-only

instruction functions as an exclusionary practice. They require physical manipulation, writing, mapping, and active movement to synthesize dense sentences. Participant K3b observed that they "could not fully process abstract, orally presented sentences unless they actively engaged in hands-on tasks or physical note-taking to ground the syntactic structures." This physical connection is critical for active memory encoding and retrieval. Participant K7b highlighted that their "memory for complex spelling rules and sentence frameworks is highly dependent on motoric activities, such as drawing conceptual maps or touching physical objects." These insights support embodied cognition theories, pointing to the crucial need for inclusive classrooms to offer tactile materials and interactive whiteboard tasks to ensure equitable access (de-la-Peña & Luque-Rojas, 2021; Hsu et al., 2023).

Reading Comprehension Levels

Theme 4: Dictionary Dependence as a Mechanical Decoding Safety Net

The fourth emerging theme highlights a severe developmental bottleneck where students rely heavily on vocabulary-level translation. While dictionary search helps establish an initial literal entry point, this word-by-word mechanical decoding consumes substantial cognitive energy, disrupting reading fluency. Participant K1b-dict explained that "whenever they encounter ambiguous terminology in an academic text, they immediately consult a dictionary to establish a basic literal entry point." This over-reliance highlights a lack of lexical automaticity. Students struggle to tolerate ambiguity, leading to constant reading interruptions; as Participant K5c emphasized, their "reading flow is frequently interrupted by unfamiliar terms, which they resolve through instant Google queries or dictionary applications." Triangulated with Table 2, this supports Perfetti's (1985) Verbal Efficiency Theory. If decoding is slow and effortful, working memory becomes overloaded, explaining the cascading drop in evaluative comprehension (Brown & Lee, 2021; Westwood, 2008; Sayed et al., 2024).

Theme 5: Use of Pictures and Context Clues as Inferential Scaffolds

When confronted with dense, unfamiliar academic texts, students actively deploy visual context clues to reconstruct the author's implied meaning. Rather than being merely decorative, adjacent illustrations, formatting, and graphics serve as vital cognitive scaffolds that help bridge lexical deficits. Participant K7c noted that they "rely on visual presentations and accompanying illustrations to infer connections between separate events in a narrative text." This dual-coded processing is particularly helpful for struggling readers or second-language learners who face heavy vocabulary barriers. Without these illustrations, the text becomes inaccessible; as Participant K8c mentioned, "without visual context clues, text paragraphs remain abstract, but adjacent illustrations allow them to reconstruct the implied message." This finding highlights the importance of UDL guidelines, which advocate for multi-modal representation to ensure that dense, text-only materials do not become a barrier to inferential reading (Rao et al., 2021; Rice et al., 2024).

Theme 6: Struggles with Evaluative Judgement and Critical Transition Barriers

The final emerging theme reveals significant cognitive friction as students attempt to move from literal decoding to higher-order evaluative reading. Transitioning to university-level academic reading demands critical appraisal, identifying author bias, and evaluating evidence, yet students feel bound to explicit text and struggle to make independent analytical critiques. Participant K10c recognized this limitation, explaining that they "remain bound to the literal level, explaining that whatever is explicitly written is the only thing they understand, and they struggle to make independent critiques." This highlights a secondary-to-tertiary transition gap where previous learning experiences heavily favored rote memorization over critical reading. Even when students can establish personal or visual connections with the text, they encounter immense difficulty in evaluative processing; as Participant K9c expressed, "while they can draw

basic personal connections from text illustrations, they struggle to evaluate the validity or strength of an author's evidence-based arguments." In terms of inclusive higher education, this severe deficit underscores the necessity of explicit metacognitive instruction to scaffold critical appraisal and ensure that all students can achieve tertiary critical literacy (Ainscow, 2020; Forlin et al., 2020; Temporal, 2025).

Thematic Triangulation and Synthesis

The systematic triangulation of these findings reveals a coherent cognitive landscape. Quantitatively, we observe a dominant visual preference (Table 1, $M = 4.15$) and high literal-level mastery (Table 2, $M = 4.10$), but a sharp cascading drop in inferential ($M = 3.32$) and evaluative ($M = 2.85$) comprehension, coupled with a lack of correlation between visual preferences and higher-order reading (Table 3). Qualitatively, student insights explain this tension: visual-only processing is exhausted by heavy vocabulary lookup (Theme 4), requiring auditory and haptic interventions (Theme 2 & 3) and dual-coded visual supports (Theme 5) to achieve deep inference. This convergence demonstrates that language arts classrooms must transition from passive, visual-only reading blocks toward active, multi-sensory, and dialogue-driven Universal Design for Learning (UDL) frameworks to ensure linguistic equity and prevent cognitive exclusion (Al-Qahtani, 2023;

de-la-Peña & Luque-Rojas, 2021; Rao et al., 2021).

4. Conclusion

The study provides clear empirical evidence that traditional, monomodal reading instruction in tertiary language programs fails to meet the needs of diverse learners, thereby reinforcing systemic educational exclusion. By demonstrating that dominant visual-textual preferences ($M = 4.15$, $SD = 0.45$) align only with surface-level literal comprehension, whereas auditory ($r = .48$, $p < .01$) and tactile-kinesthetic ($r = .39$, $p < .01$) modalities are the unique conduits to higher-order inferential comprehension, the findings call for a paradigm shift. This highlights the profound relevance of inclusive education as a fundamental human right and a core pedagogical imperative (Ainscow, 2020; Florian, 2014). To ensure that first-year English language specialists of all learning profiles can overcome critical cognitive bottlenecks in evaluative comprehension ($M = 2.85$, $SD = 0.62$), universities must dismantle the exclusionary 'one-size-fits-all' passive visual reading blocks. Systemic diagnostic assessments evaluating learning modalities, reconstruction of language curricula via Universal Design for Learning (UDL) principles (Rao et al., 2021; Slee, 2018), and differentiated instruction with tiered scaffolding (Mitchell, 2020; Tomlinson, 2014; Westwood, 2008) must be systematically deployed to ensure equitable access and critical academic success (UNESCO, 2020).

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6. Author Declaration

Confirm originality of work: This paper was prepared according to the university's guidelines and standards. Thus, this is not a duplication of other works.

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