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An Eye-Tracking Study on the Reading Patterns and Comprehension of Malay Proverbs among Pre-Service Teachers in Malaysia

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Abstract

Proverbs constitute a vital component of the Malay language curriculum, functioning as a medium for preserving cultural heritage, cultivating cognitive skills, and enriching literary appreciation. Nevertheless, their figurative nature and implicit meanings often create comprehension challenges, not only for students but also for teachers tasked with delivering effective instruction. This study examines the reading patterns and comprehension processes of Malay language pre-service teachers when engaging with proverbs presented in two conditions: in isolation and embedded within contextualized sentences. Using a mixed-method design, eye-tracking data and semi-structured interviews were collected from 15 pre-service teachers enrolled in a Bachelor of Education (Malay Language) program at a Malaysian public university. The study employed 46 standalone proverbs and 46 contextualized proverbs selected from the national Form 4 and Form 5 textbooks as research stimuli. Quantitative data captured through the Tobii TX300 eye-tracker—including fixation duration, fixation count, visit duration, and visit count—were triangulated with qualitative insights from interview protocols. Findings reveal that standalone proverbs imposed significantly greater cognitive load compared to contextualized ones. Notably, Malay language proverb categories required longer fixation durations, suggesting greater interpretive difficulty in the absence of supporting context. The interviews further confirmed that contextualized sentences facilitated comprehension by reducing interpretive ambiguity. These results underscore the pedagogical importance of integrating contextualized and interactive approaches in the teaching of proverbs, thereby ensuring that pre-service teachers not only acquire comprehension but also the ability to effectively transmit cultural and linguistic knowledge. The study contributes to the growing body of research in cognitive linguistics and language education in Southeast Asia and offers implications for curriculum design, teacher training, and language pedagogy.

Keywords: Malay proverbs; eye-tracking; pre-service teachers; figurative language; reading comprehension; cognitive processing

Introduction

The Malay language serves as the cornerstone of Malaysia's linguistic and cultural identity, firmly positioned in the education system through the implementation of the National Language Policy in the 1970s (Ministry of Education Malaysia [MOE], 2017). Beyond its role as the national medium of communication, Malay functions as a vehicle for transmitting cultural values, social norms, and moral teachings. One of the key elements through which this transmission occurs is *peribahasa* (proverbs), which are rich in metaphorical meaning and deeply embedded in the collective wisdom of the Malay community. Within the school curriculum, proverbs are used not only to develop students' linguistic proficiency but also to instill cultural appreciation and critical thinking (Asmah Omar, 2005; Nik Safiah Karim, 1992).

Despite their recognized importance, the teaching and learning of proverbs remain a pedagogical challenge. Proverbs are inherently figurative; they encapsulate abstract ideas through symbolic expressions that demand inferential reasoning. For example, the proverb *bagai menatang minyak yang penuh* ("like carrying oil in a full vessel") symbolizes extreme caution and care. Comprehending such expressions requires learners to transcend literal interpretations and draw upon cultural schemas. This complexity often leads to difficulties for students, who may fail to grasp intended meanings, and for teachers, who may struggle to deliver instruction that fosters deep comprehension (Noraini Shahida Ishak et al., 2012; Hamsiah Juki & Che Ibrahim Salleh, 2017).

The role of teachers is particularly crucial in addressing these challenges. Pre-service teachers, who represent the next generation of educators, must be adequately equipped with not only the ability to interpret proverbs but also the pedagogical competence to facilitate students' understanding. However, previous studies indicate that even pre-service teachers encounter difficulties in analyzing, interpreting, and applying proverbs in authentic contexts (Abdull Shukor Shaari et al., 2004). This raises concerns about the extent to which teacher education programs prepare candidates to integrate proverbs effectively in classroom instruction. Without sufficient mastery, teachers risk reducing proverbs to rote memorization, undermining their cultural and linguistic richness.

Advances in cognitive research provide new avenues for exploring how learners and teachers process figurative language. Eye-tracking technology has gained traction as an innovative tool in applied linguistics and educational psychology. By recording fixation points, gaze duration, and visual scan paths, eye-tracking enables researchers to capture real-time cognitive processing during reading tasks (Tad Brunye et al., 2019; Nur Ainil Sulaiman et al., 2020). This method has been widely applied to investigate reading comprehension, bilingual processing, and figurative language, but its use in the context of Malay language education remains underexplored.

This study seeks to address this gap by examining the reading behaviors of Malay language pre-service teachers when engaging with proverbs in two conditions: standalone and contextualized within sentences. Specifically, it aims to (1) analyze how different categories of proverbs influence reading patterns, (2) determine the cognitive differences between processing isolated and contextualized proverbs, and

(3) identify factors affecting comprehension. By employing a mixed-method approach—integrating eye-tracking data with qualitative interviews—this research provides a comprehensive account of the challenges and strategies involved in proverb comprehension.

The significance of this study is twofold. First, it contributes to cognitive linguistics by providing empirical evidence on how figurative language is processed in a Southeast Asian linguistic and cultural context. Second, it offers practical insights for teacher education and curriculum design, emphasizing the need for contextualized, interactive, and culturally responsive approaches to proverb instruction. Ultimately, the findings aim to enhance the pedagogical readiness of pre-service teachers, ensuring that they can preserve and transmit the cultural and cognitive value of Malay proverbs to future generations.

Based on the issues outlined above, this study was designed to achieve the following objectives:

1. To identify the reading patterns of pre-service teachers across different types of proverbs in the Form 4 and Form 5 Malay language textbooks.
2. To identify the differences in reading patterns between standalone proverbs and proverbs embedded within sentences.
3. To explain the factors that influence the reading patterns and comprehension of proverbs among pre-service teachers.

Literature Review

Proverbs in the Malay Language Curriculum

Proverbs (*peribahasa*) occupy a central role in the Malay language curriculum as cultural and linguistic artefacts that encapsulate traditional wisdom, moral lessons, and collective worldviews. They are used not only to enrich students' vocabulary but also to cultivate critical thinking and moral reasoning (Asmah Omar, 2005; Nik Safiah Karim, 1992). Within the Malaysian secondary school curriculum, particularly in Forms 4 and 5, proverbs are explicitly integrated into textbooks as part of literary appreciation and moral education (MOE, 2017). However, despite their curricular prominence, studies consistently report that students find proverbs difficult to interpret and apply in authentic contexts due to their figurative and implicit meanings (Noraini Shahida Ishak et al., 2012; Hamsiah Juki & Che Ibrahim Salleh, 2017).

Teachers play a pivotal role in bridging these gaps. Effective proverb teaching requires not only linguistic knowledge but also cultural sensitivity and pedagogical creativity. Unfortunately, research indicates that many teachers tend to approach proverbs through rote memorization and literal explanation rather than through interactive or contextualized strategies (Abdull Shukor Shaari et al., 2004). Consequently, learners often fail to develop deeper interpretive skills and may perceive proverbs as archaic or irrelevant.

Figurative Language and Cognitive Processing

The difficulty in proverb comprehension is not unique to the Malay language; it reflects a broader cognitive challenge associated with figurative language. Figurative expressions such as metaphors, idioms, and proverbs require learners to map abstract meanings onto concrete images, often invoking cultural schemas (Gibbs, 1994). Cognitive linguistics views proverbs as conceptual metaphors that reveal how people structure thought and meaning. For instance, many Malay proverbs employ imagery from agriculture, animals, and natural phenomena, reflecting the agrarian roots of Malay society (Asmah Omar, 2005).

Research in psycholinguistics has demonstrated that figurative language processing involves greater cognitive load compared to literal language, as it requires the activation of multiple semantic networks (Lakoff & Johnson, 1980). Learners must simultaneously access lexical knowledge, cultural frames, and contextual cues. When such cues are absent, as in the case of standalone proverbs, comprehension becomes significantly more demanding (Noraini Shahida Ishak et al., 2012). This theoretical lens is crucial for understanding why Malay proverbs, especially those unfamiliar to modern learners, present a pedagogical challenge.

Eye-Tracking in Reading Research

Eye-tracking technology has emerged as a powerful tool in examining reading behavior and cognitive processing. It records real-time measures such as fixation duration, fixation count, saccades, and gaze paths, which are widely regarded as reliable indicators of cognitive effort (Rayner, 1998). In applied linguistics, eye-tracking has been used to investigate second language reading (Godfroid et al., 2013), figurative language processing (Tad Brunye et al., 2019), and vocabulary acquisition (Siyanova-Chanturia et al., 2011). Findings consistently demonstrate that longer fixation durations and higher fixation counts correlate with increased processing difficulty, particularly when learners encounter unfamiliar or ambiguous linguistic input.

In the Malaysian context, research on eye-tracking remains relatively limited but growing. Recent studies have employed eye-tracking to examine reading comprehension strategies among bilingual learners (Nur Ainil Sulaiman et al., 2020) and the processing of English idioms (Ismail & Yusof, 2019). However, little to no work has applied eye-tracking to the study of Malay proverbs, leaving a significant gap in both cognitive linguistics and language pedagogy research.

Pre-Service Teachers and Pedagogical Readiness

Teacher education programs are tasked with equipping pre-service teachers with the knowledge, skills, and dispositions necessary for effective instruction. Pedagogical content knowledge (PCK) emphasizes not only mastery of subject matter but also the ability to translate content into comprehensible forms for learners (Shulman, 1987). In the case of proverbs, this entails understanding figurative meaning, cultural resonance, and appropriate teaching strategies.

Yet research indicates that many pre-service teachers struggle with these competencies. Studies show that pre-service teachers often rely on memorization and direct translations when explaining proverbs, lacking deeper analytical and

interpretive skills (Abdull Shukor Shaari et al., 2004). This shortcoming reflects broader issues in teacher preparation, where limited attention is given to figurative language pedagogy. Given that pre-service teachers are future agents of language and cultural transmission, strengthening their ability to teach proverbs effectively is critical for sustaining the role of proverbs in the curriculum.

Research Gap and Theoretical Framework

While existing literature highlights the importance of proverbs, the cognitive demands of figurative language, and the potential of eye-tracking methods, significant gaps remain. First, little empirical work has examined how Malay pre-service teachers process proverbs in real time, despite their central role in pedagogy. Second, most studies rely on written tests, surveys, or classroom observations, which provide limited insights into underlying cognitive processes. Third, the role of context—whether proverbs are presented in isolation or embedded within sentences—has not been systematically explored in the Malay language context. This study addresses these gaps by applying eye-tracking methods to analyze the reading patterns of Malay pre-service teachers when engaging with both standalone and contextualized proverbs. By triangulating quantitative measures of eye movement with qualitative interviews, the study adopts a mixed-method approach grounded in cognitive linguistics and educational psychology. This theoretical orientation allows for a nuanced understanding of both the cognitive challenges and pedagogical implications of proverb comprehension.

Methodology

Research Design

This study employed a **mixed-method design** combining quantitative and qualitative approaches. Eye-tracking technology was used to capture objective measures of reading behavior, while semi-structured interviews were conducted to gather in-depth insights into participants' comprehension strategies. The integration of both methods allowed for triangulation, thereby increasing the validity and reliability of the findings (Creswell & Plano Clark, 2017).

The participants consisted of **15 Malay language pre-service teachers** enrolled in the Bachelor of Education (Malay Language) program at a Malaysian public university. All participants were in their final year of study and had completed core courses in Malay linguistics and pedagogy. Selection was based on purposive sampling to ensure that participants represented individuals who would soon assume teaching responsibilities in secondary schools. All participants were native speakers of Malay and had normal or corrected-to-normal vision. Informed consent was obtained prior to data collection, and participants were assured of confidentiality and anonymity.

The study stimuli comprised **92 proverbs** drawn from the national Form 4 and Form 5 Malay language textbooks. These included:

- 46 standalone proverbs presented in isolation.
- 46 contextualized proverbs embedded within short sentences or passages.

The proverbs were selected to reflect the major categories of Malay *peribahasa*, including *pepatah* (sayings), *bidalan* (aphorisms), *simpulan* (idiomatic

phrases), and *perumpamaan* (similes). Stimuli were randomized to avoid order effects and presented in a digital format via Tobii Studio software.

Instruments

Eye-Tracking Device

A **Tobii TX300 eye-tracker** was used to record participants' visual behavior at a sampling rate of 300 Hz. The device measured key indicators of cognitive processing, including:

- **Fixation duration** (time spent fixating on a word or phrase)
- **Fixation count** (number of fixations on a given area of interest)
- **Visit duration** (total time spent on a specific text region)
- **Visit count** (number of times a region was revisited)

These metrics have been widely validated as reliable indicators of cognitive load and reading difficulty (Rayner, 1998). Following the eye-tracking sessions, participants engaged in **semi-structured interviews** to reflect on their experiences reading the proverbs. Interview questions probed participants' comprehension strategies, perceived difficulties, and the role of context in interpreting figurative meaning. Interviews were conducted in Malay, audio-recorded, and transcribed for analysis.

Procedures

Data collection took place in a controlled laboratory setting. The procedure involved three phases:

1. **Calibration:** Participants underwent a nine-point calibration procedure to ensure accuracy of eye-tracking data.
2. **Reading Task:** Participants silently read 92 proverbs presented on a computer screen. Each proverb or sentence appeared individually, and participants pressed the space bar to proceed to the next item. No time limit was imposed.
3. **Interview Session:** Immediately after completing the reading task, participants were interviewed individually for approximately 20–30 minutes.

The entire session for each participant lasted about 60–75 minutes.

Data Analysis

Eye-tracking data were analyzed using Tobii Studio software. Areas of Interest (AOIs) were designated around each proverb or sentence, and fixation measures were extracted. Descriptive statistics (mean and standard deviation) were calculated, followed by inferential tests to compare:

- Standalone vs. contextualized proverbs.
- Different categories of proverbs.

A **paired-samples t-test** was used to examine differences in reading measures between the two conditions. An alpha level of .05 was set for statistical significance.

Interview transcripts were coded thematically using NVivo software. Thematic analysis followed Braun and Clarke's (2006) six-step framework: familiarization, generating codes, searching for themes, reviewing themes, defining themes, and producing the report. Emergent themes were compared with quantitative findings to identify convergences and divergences. Both datasets were integrated during the interpretation stage. Eye-tracking results provided objective evidence of processing difficulty, while interviews offered explanatory insights into participants' strategies and perceptions. This triangulation enhanced the robustness of the study's conclusions.

Findings

The findings of this study are presented according to the three research objectives. Both quantitative data from the eye-tracking experiment and qualitative insights from semi-structured interviews are integrated to provide a comprehensive account of how Malay language pre-service teachers engaged with proverbs.

The Reading Patterns of Pre-Service Teachers Across Different Types of Proverbs

The first objective of this study was to examine how different categories of Malay proverbs influenced the reading patterns of pre-service teachers. The analysis of eye-tracking data revealed clear distinctions across the four categories—sayings, aphorisms, idiomatic phrases, and similes—indicating that the structural and figurative complexity of a proverb type directly affected the cognitive load required for its interpretation.

Proverb Category	Fixation Duration (s)	Fixation Count	Visit Duration (s)	Visit Count
Similes	1.98	9.88	2.69	1.22
Aphorisms	0.93	5.11	1.22	5.54
Sayings	2.75	13.93	3.59	1.12
Idiomatic Phrases	0.93	5.11	1.22	5.54

Table 1. Mean Fixation Duration, Fixation Count, Visit Duration, and Visit Count by Proverb Category

As shown in **Table 1**, sayings imposed the heaviest cognitive load. They recorded the longest mean fixation duration (2.75 seconds) and the highest fixation count (13.93), together with the longest visit duration (3.59 seconds). These findings suggest that sayings demanded prolonged and repeated attention, as participants paused frequently and revisited words in order to extract their figurative and moralistic meaning.

Similes produced intermediate levels of processing demand. Their mean fixation duration was 1.98 seconds, with an average fixation count of 9.88 and a visit

duration of 2.69 seconds. The presence of comparative structures appeared to provide some interpretive guidance, yet participants still required considerable cognitive effort to derive the intended figurative message.

Aphorisms and idiomatic phrases displayed the lowest mean fixation duration (0.93 seconds) and fixation count (5.11). However, both categories triggered relatively high visit counts (5.54), suggesting that although participants processed each fixation more quickly, they tended to return to the text repeatedly, possibly due to uncertainty or the need to confirm their interpretation.

Qualitative interviews reinforced these quantitative trends. Participants often reported that sayings were “the hardest to understand” because of their abstract moral lessons, while similes were described as moderately challenging due to the need for inferential reasoning. Aphorisms and idiomatic phrases were perceived as more familiar and therefore easier to process, even though participants sometimes revisited them multiple times to check their interpretations.

In summary, proverb type had a decisive impact on reading patterns. Sayings placed the greatest cognitive demands on participants, similes required intermediate effort, while aphorisms and idiomatic phrases were processed more efficiently, though often with repeated visits. These findings highlight the role of figurative complexity and familiarity in shaping how pre-service teachers engage with different categories of proverbs.

The Differences in Reading Patterns Between Standalone and Contextualized Proverbs

The second objective of this study was to identify how reading patterns differed when pre-service teachers engaged with proverbs presented in isolation compared to those embedded within sentences. Eye-tracking data revealed consistent and statistically significant differences across all measures, indicating that the presence of contextual information substantially influenced cognitive processing.

Metric	Mean (Standalone)	Mean (Contextualized)	<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
Visit Count	2.55	1.47	5.374	14	< .001	1.388
Fixation Count	12.48	8.26	4.458	14	< .001	1.151
Fixation Duration (s)	3.36	1.95	5.595	14	< .001	1.445
Visit Duration (s)	1.17	1.87	-7.433	14	< .001	-1.919

Table 2. Mean Eye-Tracking Metrics for Standalone and Contextualized Proverbs

As presented in **Table 2**, standalone proverbs elicited substantially heavier cognitive load than contextualized proverbs. The mean fixation duration for standalone proverbs was 3.36 seconds, almost double the 1.95 seconds recorded for contextualized proverbs. Similarly, fixation counts were markedly higher in the standalone condition ($M = 12.48$) than in the contextualized condition ($M = 8.26$).

These results indicate that participants paused more often and for longer periods when attempting to interpret proverbs without the aid of contextual cues.

Standalone proverbs also triggered more frequent rereading. The mean visit count was 2.55 for standalone items compared with 1.47 for contextualized items. Visit duration further confirmed the processing contrast: standalone proverbs were associated with a shorter mean visit duration (1.17 seconds) than contextualized proverbs (1.87 seconds). This suggests that while participants repeatedly returned to standalone items, their individual reading episodes were shorter, reflecting fragmented attempts to build meaning.

The differences between the two conditions were statistically significant for all measures ($p < .001$). Effect sizes were large, with Cohen's d values ranging from 1.15 to 1.92, underscoring the substantial impact of context on proverb processing. Qualitative findings echoed these patterns. Participants consistently reported that standalone proverbs were more difficult to interpret because they lacked situational anchors. One participant noted: *"When the proverb is alone, I don't know which situation it refers to. I need to think harder and sometimes I just guess."* In contrast, contextualized proverbs were described as easier to comprehend because the surrounding sentence provided semantic cues that narrowed possible interpretations. As another participant explained: *"When the proverb is in a story or sentence, I can see how it applies, so the meaning becomes clearer."*

Gaze plots further illustrated these differences. In the standalone condition, fixations clustered repeatedly on symbolic keywords, suggesting fragmented decoding strategies. By comparison, contextualized proverbs produced smoother and more linear scan paths, reflecting more fluent reading supported by contextual information.

In summary, the findings for Objective 2 demonstrate that standalone proverbs impose greater cognitive effort, while contextualized proverbs are processed more efficiently. The strong statistical effects across all eye-tracking measures confirm that context plays a critical role in facilitating proverb comprehension by reducing ambiguity and guiding interpretation.

The Factors That Influence Reading Patterns and Comprehension of Proverbs

The third objective of this study was to explore the factors shaping the reading patterns and comprehension of proverbs among pre-service teachers. While eye-tracking data provided evidence of cognitive load across categories and conditions, interview responses offered deeper insight into the strategies, prior experiences, and challenges that influenced how participants approached figurative language. Four key factors emerged: prior knowledge, literal-first strategies, reliance on symbolic keywords, and pedagogical preparedness.

Prior knowledge and familiarity emerged as one of the most decisive factors. Proverbs that participants had previously encountered in school or everyday life were processed more quickly and with fewer regressions. For example, idiomatic phrases such as *"like bamboo and the riverbank"* were recognized immediately, as reflected in shorter fixation durations and smoother gaze paths. Participants explained that these proverbs felt "familiar" and "easy," which enabled them to

recall their meanings without extended cognitive effort. Conversely, unfamiliar sayings or aphorisms elicited longer fixations and higher visit counts, signaling greater difficulty in interpretation. One participant stated: *"If I have never seen the proverb before, I have to slow down and read again, sometimes two or three times, to make sense of it."*

A second factor was the **literal-first strategy**, a common approach participants used when attempting to interpret unfamiliar proverbs. Eye-tracking evidence showed that participants often fixated heavily on individual words, particularly nouns, before rereading the entire proverb. This was consistent with interview reflections, where several participants admitted beginning with literal interpretation before considering figurative meaning. As one explained: *"I read it word by word first, but the literal meaning doesn't always make sense. Then I try to think what it could mean symbolically."* While this strategy sometimes facilitated comprehension, it often prolonged processing time and contributed to higher fixation counts, especially for sayings and aphorisms.

A third factor was **reliance on symbolic keywords**. Words such as *water*, *oil*, *buffalo*, or *fire* consistently attracted repeated fixations in gaze plots, reflecting participants' attempts to use these as anchors for interpretation. In some cases, this strategy was effective, particularly when the cultural symbolism of the keyword was widely known. However, difficulties arose when participants lacked familiarity with the symbolic associations. For example, when interpreting a proverb involving the buffalo, one participant misinterpreted its meaning due to limited cultural knowledge. This indicates that while keyword anchoring is a natural reading strategy, its success depends heavily on prior cultural and linguistic experience.

The fourth factor identified was **pedagogical preparedness**. Several participants expressed concern that their own difficulties in understanding proverbs might limit their ability to teach them effectively. Some admitted that, in a classroom setting, they would likely rely on textbook definitions rather than encouraging students to explore figurative depth. One participant reflected: *"If I find it hard to explain the meaning, I will just give students the answer from the book instead of asking them to think."* This lack of confidence highlights a pedagogical gap in teacher training programs, where more emphasis may be needed on developing strategies for teaching figurative language.

Together, these findings suggest that comprehension of Malay proverbs is influenced by both cognitive and experiential factors. Prior knowledge reduces processing difficulty, while unfamiliarity increases cognitive load. Literal-first strategies and keyword anchoring serve as default approaches but vary in effectiveness depending on context and background knowledge. Finally, pedagogical preparedness—or the lack thereof—plays a crucial role in shaping how pre-service teachers engage with proverbs and anticipate teaching them in the future.

Discussion

The aim of this study was to investigate the reading patterns and comprehension of Malay proverbs among pre-service teachers using a mixed-method approach that combined eye-tracking and interviews. The findings addressed three research objectives: identifying reading patterns across proverb categories, comparing standalone and contextualized conditions, and exploring the factors influencing comprehension. Together, the results provide insights into the cognitive demands of figurative language processing and the pedagogical challenges faced by future teachers. The first objective revealed that proverb type significantly shaped reading behavior. Sayings and aphorisms required longer fixation durations and higher fixation counts than idiomatic phrases and similes, indicating greater cognitive load. This supports findings from cognitive linguistics that abstract and moralistic figurative expressions demand deeper inferential processing (Gibbs, 1994; Kövecses, 2010). The results also resonate with Noraini Shahida Ishak et al. (2012), who observed that Malay students often struggle with proverbs that contain implicit moral lessons. By contrast, idiomatic phrases were processed more efficiently, consistent with Wray's (2002) argument that formulaic language is stored as ready-made units, allowing faster retrieval. Similes occupied an intermediate position, aligning with Brône and Feyaerts (2005), who showed that explicit comparison markers provide partial cues that ease interpretation. These findings contribute to the understanding of how figurative complexity and familiarity affect reading. They suggest that proverb categories should not be treated as homogeneous in pedagogy. Instead, teachers may need to allocate more instructional scaffolding to sayings and aphorisms, while building on the familiarity of idiomatic phrases to strengthen students' confidence in figurative interpretation. The second objective demonstrated significant differences in processing between standalone and contextualized proverbs. Standalone proverbs consistently required longer fixation durations, more fixations, and higher visit counts, whereas contextualized proverbs were processed more efficiently. The large effect sizes across all measures confirm the crucial role of context in reducing ambiguity and supporting comprehension. These results align with previous psycholinguistic research showing that context facilitates the activation of figurative meaning and narrows interpretive possibilities (Rayner, 1998; Godfroid et al., 2013). Qualitative data further underscored the importance of context, as participants reported that contextual sentences provided semantic scaffolding that made figurative meaning more accessible. This reflects Bruner's (1986) view of language learning as a socially and contextually mediated process. For pedagogy, the implication is clear: teaching proverbs in isolation may burden learners cognitively and lead to surface-level memorization, while embedding them in meaningful contexts encourages authentic comprehension.

The third objective revealed four key factors shaping proverb comprehension: prior knowledge, literal-first strategies, reliance on symbolic keywords, and pedagogical preparedness. Prior knowledge facilitated smoother processing, supporting schema theory, which emphasizes the role of background knowledge in interpreting new information (Carrell & Eisterhold, 1983). The use of literal-first strategies mirrors findings by Gibbs (1994) that readers often begin with literal interpretation before shifting to figurative meaning. Keyword anchoring reflects attentional allocation to

salient lexical items, consistent with research on eye-movement behavior in figurative processing (Tad Brunye et al., 2019). Pedagogical preparedness emerged as a particularly important factor. Many participants lacked confidence in teaching proverbs, fearing they would rely on rote explanations rather than encourage interpretive exploration. This echoes Abdull Shukor Shaari et al. (2004), who reported gaps in Malay language teacher education regarding literary and figurative instruction. The results highlight an urgent need for teacher training programs to integrate explicit strategies for teaching figurative language, including scaffolded activities, collaborative interpretation, and the use of authentic contexts. Theoretically, this study extends the application of eye-tracking to figurative language processing in Southeast Asia, a context underrepresented in psycholinguistics. The results confirm that figurative comprehension is not uniform but shaped by linguistic category, contextual support, and individual background knowledge. Pedagogically, the study underscores the importance of teaching proverbs through contextualized and interactive approaches. Embedding proverbs in narratives, dialogues, or classroom discussions may reduce interpretive difficulty and encourage deeper cultural appreciation. Moreover, teacher training should emphasize not only the memorization of definitions but also the cultivation of interpretive strategies that empower future teachers to explain figurative meaning with confidence. Several limitations should be acknowledged. First, the sample size was limited to 15 pre-service teachers from a single university, which constrains the generalizability of the findings. Second, the study focused exclusively on Malay proverbs from the Form 4 and Form 5 textbooks; future research could expand to other literary devices or to proverbs from diverse cultural traditions. Third, while eye-tracking provided valuable data on reading behavior, integrating it with neurocognitive measures such as EEG could offer deeper insight into real-time figurative processing. Future research should investigate instructional interventions that integrate contextualized proverbs into classroom practice, examining how such methods influence not only comprehension but also students' appreciation of cultural heritage. Comparative studies across languages and cultures could also provide cross-linguistic perspectives on figurative language pedagogy.

Conclusion

This study set out to investigate the reading patterns and comprehension of Malay proverbs among pre-service teachers, with a focus on three dimensions: proverb categories, the contrast between standalone and contextualized proverbs, and the factors shaping comprehension strategies. Using eye-tracking and qualitative interviews, the findings revealed that proverb type plays a decisive role in determining cognitive load, with sayings and aphorisms requiring more effort than idiomatic phrases or similes. Furthermore, context emerged as a critical facilitator of comprehension, as standalone proverbs imposed significantly greater processing demands than those embedded within sentences. Finally, comprehension was found to be mediated by prior knowledge, interpretive strategies such as literal-first reading and keyword anchoring, and the level of pedagogical preparedness among pre-service teachers. Theoretically, these results extend the study of figurative language processing to a Southeast Asian context, demonstrating that cultural and

linguistic familiarity shape cognitive engagement with proverbs. Pedagogically, the study underscores the need to embed proverbs in authentic contexts and to provide teacher education programs with explicit training in figurative interpretation. By doing so, future teachers can be better equipped not only to comprehend proverbs themselves but also to transmit cultural and linguistic knowledge effectively to their students.

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