

IS THERE A RELATIONSHIP BETWEEN READING ANXIETY AND READING STRATEGIES?

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Abstract. Online reading in second and foreign languages has become commonplace in higher education, where learners engage with digital texts independently. In some studies, learners experienced higher levels of anxiety when reading in online environments. Online reading strategies have shown to mitigate this issue, however the findings are inconsistent. Thus, this study aimed to examine learners' perceived levels of reading anxiety and online reading strategies and the relationship between these two variables. A quantitative survey design was employed involving 150 undergraduate students from a Malaysian public university, using a questionnaire measuring reading anxiety (top-down, bottom-up, and classroom reading anxiety) and online reading strategies (global, problem-solving, and support strategies). The findings indicate low to moderate levels of reading anxiety, primarily related to background knowledge, vocabulary, and grammar, while problem-solving strategies were the most frequently used. No significant relationship was found between reading anxiety and reading strategies, and no significant differences were observed across levels of study or reading material preferences. The findings highlight the need to integrate both strategic and affective support in online reading instruction.

Keywords: *reading anxiety, online reading strategies, ESL learners, higher education*

Introduction

Reading is one of the most fundamental skills in higher education and learners are required to be competent in demonstrating this skill for academic success. The traditional mode of reading already has its own challenges and the shift to online reading exacerbates these challenges. Contemporary learners are increasingly expected to navigate, interpret, and comprehend online reading materials independently. Unlike printed texts, online reading environments often involve hyperlinked interfaces, dense information, and limited instructional guidance, which place greater cognitive and affective demands on learners (Solati et al., 2024; Xie and Huang, 2024). One key affective factor influencing reading performance is reading anxiety, which refers to feelings of tension, apprehension, or worry experienced specifically during reading tasks, particularly in second or foreign language contexts (Liu, 2025; Rajab et al., 2012). Reading anxiety or sometimes known as reading apprehension has been shown to interfere with learners' comprehension, motivation, and confidence, thereby negatively affecting reading outcomes (Soares et al., 2023). This state of mind carries negative attributes of fear and worry, which can contribute to avoidance of reading tasks. To cope with reading challenges, learners utilise purposeful and deliberate reading strategies that involve cognitive and metacognitive domains, which can enhance comprehension and regulate reading processes. In online contexts, these strategies

typically include global strategies, problem-solving strategies, and support strategies (Dang, 2024; Amer et al., 2010).

Despite extensive research on reading anxiety and reading strategies, the topic remains relevant due to the increasing reliance on online reading in higher education. The post-pandemic shift toward technology-mediated learning has intensified learners' exposure to digital texts, which may heighten anxiety and influence strategic reading behaviour. Recent studies suggest that online learning environments introduce unique affective and cognitive demands, making it necessary to re-examine learners' reading experiences within contemporary digital contexts (Solati et al., 2024; Xie and Huang, 2024). Therefore, understanding learners' reading apprehension and how these learners read in online settings continues to be important for supporting learners' academic reading development.

Statement of problem

In the context of reading in second and foreign languages, recent studies have consistently reported that reading anxiety negatively affects learners' engagement, motivation, and comprehension outcomes (Xie and Huang, 2024; Kamaruddin and Kaur, 2023; Soares et al., 2023). Research in higher education showed that learners demonstrate higher levels of anxiety especially when they read in online learning contexts, which contribute to lower motivation, reduced confidence, and weaker comprehension outcomes (Xie and Huang, 2024; Kamaruddin and Kaur, 2023). These issues are particularly evident in online environments, where learners must process texts independently with minimal immediate instructor support (Solati et al., 2024). At the same time, reading strategies have been identified as crucial tools that help learners manage reading difficulties and regulate comprehension. Studies on online reading indicate that learners usually implement support and problem-solving strategies to mitigate reading obstacles such as unfamiliar vocabulary, complex sentence structures, and comprehension breakdowns (Dang, 2024; Amer et al., 2010). However, current literature offers inconsistent findings regarding the interplay between reading anxiety and the application of reading strategies in second and foreign language contexts. While some studies suggest that anxiety influences the extent and type of strategy use, others report weak or non-significant relationships, highlighting unresolved issues within this area of research (Dang, 2024; Risanta, 2021; Dung, 2020).

These mixed findings indicate that the relationship between reading anxiety and reading strategies may be influenced by contextual and learner-related factors rather than reflecting a uniform pattern (Chen et al., 2022). Differences in learning environments, learner characteristics, and reading conditions may contribute to variations in how anxiety and strategies interact during reading tasks, particularly in online contexts. Recent research has called for further investigation into affective and strategic factors across diverse learning contexts and learner profiles. For example, Solati et al. (2024) emphasised the need to examine reading anxiety across different instructional environments, while Xie and Huang (2024) highlighted the importance of exploring anxiety-related variables alongside reading behaviours in online reading contexts. These recommendations suggest a need to examine the interdependence of reading anxiety and the application of reading strategies among learners with differing academic levels and reading material preferences. In the Malaysian higher education context, where online reading has become increasingly prevalent, understanding how learners perceive reading anxiety and reading strategies across levels of study and

reading material preferences is essential (Kamaruddin and Kaur, 2023). Addressing these issues can provide insights into learners' online reading experiences and inform pedagogical practices aimed at supporting effective and confident reading in digital learning environments.

Objective of the study and research questions

This study is done to explore the relationship between reading anxiety and reading strategies. Specifically, this study is done to answer the questions: (1) How do learners perceive their reading anxiety? (2) How do learners perceive their reading strategies? (3) Is there a relationship between reading anxiety and reading strategies? (4) Is there a significant difference for reading anxiety and reading strategies across levels of study? (5) Is there a significant difference for reading anxiety and reading strategies across reading material preference?

Literature review

Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT), proposed by Bandura (1986), explains learning as a dynamic interaction among three elements: personal factors, behavioural patterns, and environmental influences. The learners are described as active participants who build knowledge through cognition, affective action, behaviour, and social interaction. SCT explains that personal factors, for example in this study, anxiety, can affect how learners demonstrate their behavior through the use of reading strategies to manage the environmental influences. When the learners succeed with those strategies, eventually the reading anxiety can be minimised and reading skills can be reinforced. The current research is fundamentally based on this theory, which will be used to examine the relationship between reading anxiety and the use of reading strategies in specific learning contexts.

Personal factors

In SCT, the first factor is the personal factor that includes learners' cognitive and affective qualities, such as beliefs, attitudes, and emotions related to academic activities (Bandura, 1986). Self-efficacy moderates effort, perseverance, and adaptive behaviour, as it reflects the belief in the ability to perform a task effectively (Bandura, 1997). Past research has shown that learners with high levels of self-efficacy also report anxiety levels that are lower and have a higher inclination towards participating in challenging academic activities. Li et al. (2024) found that the inverse correlation between self-efficacy and reading anxiety among students is also associated with reduced self-confidence and intrinsic motivation.

Behavioral patterns

Behavioural patterns in SCT are observable actions learners use to complete tasks (Bandura, 1986). These reading strategies include predicting content, monitoring comprehension, summarising, and clarifying meaning. Learners with higher confidence and less anxiety have a wider range of successful reading strategies. On the other hand, high-reading-anxiety learners avoid reading or use less effective strategies, including

skipping difficult passages. Thus, reading tactics are both mental and behavioural responses to emotional states and self-belief.

Environmental influences

The SCT emphasizes the role of environmental determinants in influencing the behaviour of learners, such as instructors and peers, and classroom practices (Bandura, 1986). Observational learning is a basic process by which students can learn new behavioural patterns by observing others and copying them. As a result, learners tend to copy successful reading strategies when they see instructors or classmates using them. Self-efficacy, which accompanies reduced reading anxiety, occurs in supportive learning environments that provide explicit instruction in strategies, unceasing supportive feedback, and affirming reinforcement (Abdullah and Ismail, 2025; Abd Majid and Ismail, 2024; Bandura, 1997). In such a setting, students tend to put their reading strategies into practice and have more of a comprehension of the reading content. In summary, SCT provides a substantial explanatory model to show the relationship between reading anxiety and the use of reading strategies. Personal factors, affective conditions, strategic activities, and the learning environment come together to produce the reading outcome. Thus, instructors can reduce students' anxiety and facilitate strategic reading by strengthening self-efficacy and nurturing a favourable teaching environment.

Reading anxiety

Reading anxiety significantly influences learners' engagement with text and reading outcomes in educational settings. Reading anxiety refers to a type of psychological constraint such as tension, worry or negative affective responses that learners experience when facing reading tasks, especially in a second or foreign language context (Rajab et al., 2012). According to Soares et al. (2023), reading anxiety is not similar to general academic anxiety because it happens during the implementation of reading activities, which contribute to poorer comprehension, lower motivation, and negative self-perceptions. This emotional response can interfere with cognitive processes necessary for decoding and understanding text, making reading a more demanding and stressful experience for learners. Furthermore, reading anxiety often co-occurs with other affective factors like language proficiency and working memory limitations, which together shape the overall reading experience (Liu, 2025). Therefore, reading anxiety extends beyond simple discomfort; it fundamentally alters how learners approach texts and predicts affective and performance outcomes in reading.

In foreign language learning environments, the prevalence and impact of reading anxiety have been documented across diverse learner populations. For example, Chinese secondary school learners, who experienced higher levels of reading anxiety, were associated with lower online reading motivation and comprehension, revealing a clear negative relationship with key instructional outcomes (Xie and Huang, 2024). Similarly, studies that involved university learners suggest that anxiety is also linked to reduced confidence and engagement when participants confront complex reading materials or unfamiliar vocabulary (Kamaruddin and Kaur, 2023). These emotional responses can manifest regardless of the delivery mode, although the online environment may introduce unique stressors such as self-directed learning pressures and isolation from peers and instructors. Hence, it is apparent that reading anxiety in L2 contexts is not just

a classroom phenomenon, but it interacts with motivation and learner behaviours, particularly in digitally mediated learning, thereby affecting comprehension and overall reading performance. The sources and mechanisms of reading anxiety are multifaceted and often tied to text and individual learner factors. Miao and Vibulphol (2021) assert that text-related challenges such as unfamiliar vocabulary, complex grammar structures, and culturally distant content frequently trigger anxiety, especially among learners who lack sufficient language proficiency or familiarity with genre conventions. In addition, cognitive factors like limited working memory capacity can exacerbate anxious responses, as learners may struggle to allocate processing resources efficiently under stress (Liu, 2025). These factors can create a cycle in which increased anxiety further diminishes working memory availability, thereby reducing comprehension and increasing learner aversion to reading tasks over time.

Understanding reading anxiety is crucial for designing pedagogical practices that support learners' affective and cognitive needs. Evidence suggests that the reduction of reading anxiety can improve motivation, engagement, and reading performance, particularly when instructional strategies target language proficiency development, anxiety awareness, and support mechanisms such as instructor feedback (Dang, 2024). Educators should consider integrating supportive practices that enhance learners' confidence and strategic reading abilities, especially in contexts where online reading is prevalent. Addressing reading anxiety is not solely about managing emotions; it is also about equipping learners with linguistic and metacognitive tools that reduce cognitive load and create productive reading behaviours.

Reading strategies

Reading comprehension is one of the most fundamental skills that English as a Second Language (ESL) learners have to acquire in order to gain access to various English written texts, expand knowledge repertoire and succeed in work and academics. To comprehend increasingly challenging texts, especially those written in a foreign language, relying on linguistic knowledge alone is insufficient. Learners must also be competent in applying reading strategies by deploying appropriate cognitive and metacognitive strategies to construct meaning from text. According to Masoodi and Butvilas (2020), research has shown that successful ESL readers are strategic readers who actively monitor their comprehension, modify their reading strategies according to the text level of difficulty and purpose, and employ a repertoire of techniques to overcome comprehension obstacles. Given the strategic nature of successful reading comprehension, it is apparent that reading strategies are essential for ESL learners. Unlike native speakers, who tend to develop reading strategies naturally through extensive first-language exposure, ESL learners often face difficulties related to limited vocabulary, unfamiliar grammatical structure, insufficient cultural knowledge, and slower word recognition processes. Therefore, explicit instructions related to reading comprehension strategies are needed to facilitate learners to become self-regulated and effective readers (Khurram, 2023; Khellab et. al, 2022). In order to operationalise reading strategies in practical context, Amer et al. (2010) have categorized reading strategies into three types: global reading strategies, problem-solving strategies, and support reading strategies. Each of these strategies serve specific yet interrelated roles in facilitating reading comprehension.

Global reading strategies

Global reading strategies are defined as a type of reading techniques that require readers to plan, monitor and manage their reading at a metacognitive level (Alkhaleefah, 2023; Berenji, 2021; Zhang and Zheng, 2020). These strategies include checking whether an online text fits one's reading purpose, deciding what to read in detail or what to be ignored, using contextual clues to establish understanding, leveraging orthographic cues such as boldface and italics and textual signposting to identify key information, predicting the content of the text, and scanning a text to evaluate its relevance before reading it closely (Amer et al., 2010). In the academic contexts, understanding the importance of employing global reading strategies when reading, helps learners to approach complex texts more effectively especially when they set clear reading goals and expectations (Alkhaleefah, 2023). By guiding readers to regulate the metacognitive functions to monitor their reading process, these strategies encourage learners to actively engage with the reading content and eventually support effective meaning construction rather than passive decoding.

Problem-solving reading strategies

Another type of reading strategy is problem-solving strategies. These strategies refer to techniques that readers employ to overcome comprehension difficulties encountered during reading, such as adjusting reading speed, rereading sections of the text, guessing the meaning of unfamiliar words, reading aloud, and continuing to read to clarify meaning (Alkhaleefah, 2023). These strategies are reactive in nature and are employed when readers encounter specific comprehension difficulties or obstacles. Daguay-James and Bulusan (2020) describe problem-solving strategies as those that "directly relate to the text," including actions such as regulating reading pace and focusing attention on challenging sections. Some of the problem-solving strategies highlighted by Amer et al. (2010) involve regaining focus when concentration is lost, adjusting reading speed according to text difficulty, pausing periodically to reflect on the content being read, rereading difficult sections to enhance understanding, deducing meaning of unknown words or phrases, and distinguishing facts and opinions in reading texts. For readers who have limited linguistic knowledge and difficulties to grasp the ideas or gist of the reading content, researchers suggest that by introducing problem-solving strategy to readers, it can help them to have better reading skill (Rahmawati et al., 2025; Freihat, 2022).

Support reading strategies

Next, the third category is support reading strategies. Berenji (2021) defines support strategies as techniques or tools used to assist comprehension, such as using reference resources and taking notes. In contrast to global strategies, which focus on planning, and problem-solving strategies, which are used in response to difficulties, support strategies function as supplementary tools that provide external support to strengthen understanding and retention. Some of the techniques included in these strategies are writing down notes or using digital annotation while reading, using resources like online dictionaries or concept mapping to understand and clarify meaning, restating ideas using one's own words, actively reflecting and questioning oneself while reading, translating information from English into one's native language, and engaging in dual-language cognitive processes that using both English language and native language during the reading process (Amer et. al, 2010). Alkhaleefah (2023) emphasizes that support

strategies are particularly relevant for ESL learners who may need additional scaffolding to compensate for limited linguistic proficiency or cultural knowledge. Overall, these three reading strategies highlighted the importance of reading strategies in supporting ESL learners' reading development.

Past studies

Relationship between reading anxiety & reading strategies

Many empirical studies have investigated the relationship between foreign or second language reading anxiety and learners' use of reading strategies, particularly metacognitive strategies such as global, problem-solving, and support strategies. These studies commonly employ established self-report instruments such as the Foreign Language Reading Anxiety Scale (FLRAS) and the Survey of Reading Strategies (SORS) to examine whether learners' anxiety levels are associated with the frequency and type of strategies they use while reading (Dang, 2024; Chen et al., 2022; Risanta, 2021). Overall, findings across contexts indicate mixed results, suggesting the interplay between reading anxiety and reading strategies is not uniform and may be influenced by learner and contextual factors. The study by Dang (2024) investigated the relationship between English foreign language reading anxiety and reading strategy use among 324 Vietnamese university students. In this quantitative study, FLRAS was used to examine the level of perceived reading anxiety and SORS to examine the frequency of using different types of reading strategies among the respondents. From the findings, the learners reported moderate levels of reading anxiety, and problem-solving strategies were the most common reading strategies employed by the Vietnamese university students. Meanwhile, the correlation analysis indicated a significant negative relationship between reading anxiety and overall reading strategy use, suggesting that learners who utilise a wide range of reading strategies, experience lower reading anxiety than those learners who employed fewer strategies. The study highlights the pedagogical importance of explicit strategy instruction to help learners regulate anxiety during reading tasks.

Similarly, Chen et al. (2022) examined reading anxiety in relation to learning strategies, motivation, and attitudes among Chinese ($n = 35$) and Spanish ($n = 37$) EFL undergraduate students. Data were collected using questionnaire-based instruments adapted from established anxiety and strategy scales. The results showed that while reading anxiety was significantly related to attitudes toward reading in both groups, the relationship between reading strategies and anxiety differed across learner populations. The type of reading strategies significantly predicted anxiety levels only among Spanish learners, indicating that the impact of strategies on reading anxiety may vary according to learners' linguistic and educational backgrounds. This study suggests that the anxiety-strategy relationship is context-sensitive rather than universal. In contrast, Risanta (2021) explored the link between reading anxiety and their reading strategies employed among 60 English-major sophomore students at a public university in Indonesia. The study also used the FLRAS and SORS to measure learners' anxiety levels and strategy use. The findings showed that the most common reading strategies used by the students were problem-solving strategies, followed by global strategies, and support strategies were the least used. However, there was no significant correlation between reading anxiety and overall reading strategy use in this study. This finding

suggests that the learners may employ reading strategies regardless of their anxiety level, possibly due to prior exposure to academic reading instruction.

Consistent with this finding, in a survey-based study by Dung (2020), he examined the relationship between reading anxiety, reading strategy use, and academic achievement among non-English major university students in Vietnam. The study reported moderate levels of reading anxiety among participants but found no significant relationship between reading anxiety and reading strategy use. Despite the insignificant result, this study suggested that other factors such as examination pressure, task difficulty, and academic demands may contribute to learners' anxiety independently of their reported strategy use, rather than strategy use directly predicting anxiety levels. These findings further reinforce the notion that reading anxiety does not consistently predict strategic reading behaviour. Taken together, past studies demonstrate inconsistent findings regarding the relationship between reading anxiety and reading strategies. While some studies report a negative relationship, suggesting that frequent use of reading strategies may help reduce reading anxiety (Dang, 2024), others report non-significant relationships, indicating that strategy use may occur independently of anxiety levels (Risanta, 2021; Dung, 2020). These mixed results suggest that the relationship between reading anxiety and reading strategies may be shaped by learner characteristics, academic context, and learning environments, particularly in online or technology-mediated settings. Therefore, further investigation within specific educational contexts is necessary to better understand how reading anxiety and reading strategies interact, especially among learners with different levels of study and reading preferences.

Conceptual framework of the study

Figure 1 shows the conceptual framework of the study. This study investigates if there is a significant relationship between reading anxiety and reading strategies. According to Rahmat et al. (2020) reading anxiety stems from readers' difficulties in their reading. Instructors have introduced the use of reading strategies to overcome this anxiety. This study is rooted from the social cognitive theory by Bandura (1986) which states that learning begins with the learner (person), and if there is anxiety in the learning, the learners exhibit anxiety (behaviour). The teaching of strategies by the instructors in the classroom setting (environment) helps learners cope with the anxiety; in this case-reading anxiety. This study adopts the instrument on reading anxiety by Miao and Vibulphol (2021) as well as Zoghi (2012). The instrument is presented with three main variables such as top-down reading anxiety, bottom-up reading anxiety and classroom reading anxiety. Reading anxiety is supported by two constructs such as (i) background and cultural knowledge and (ii) general reading ability. Next, bottom-up reading anxiety is supported by two constructs such as (i) vocabulary, and (ii) grammar. Classroom reading anxiety is supported by the variable teaching methods. The instrument for reading strategies is adopted from Amer et al. (2010) and is supported by three variables such as (i) global strategies, (ii) problem-solving strategies and (iii) support strategies.

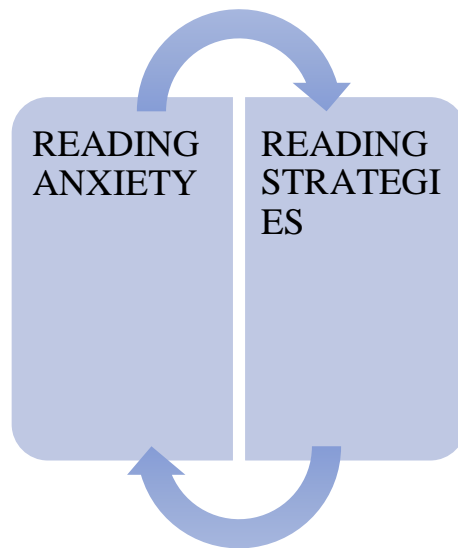


Figure 1. Conceptual framework of the study relationship between reading anxiety and reading strategies.

Materials and Methods

The current study aimed to explore the relationship between reading anxiety and reading strategies through descriptive and correlation analysis. Questionnaires that were adopted from Miao and Vibulphol (2021), Zoghi (2012) and Amer et al. (2010) were used to investigate the relationship between these two variables. This questionnaire was administered to 150 higher education students through convenience sampling. For the instrument of this study, the questionnaire was divided into three sections: Section A was demographic information (6 items), Section B was about reading anxiety (21 items) and Section C was about reading strategies (18 items). *Table 1* showed the 5-Likert scale that was used in this study. *Table 2* presents the distribution of items in the questionnaire on reading anxiety and reading strategies. For the reading anxiety in section B, there were three categories namely top-down (7 items), bottom-up (9 items), and classroom reading anxiety (5 items). Meanwhile, reading strategies in Section C consist of global (6 items), problem-solving (6 items) and support (6 items).

Table 1. Likert scale use.

Category	Description
1	Never
2	Rarely
3	Sometimes
4	Very often
5	Always

Table 2. Distribution of items in the survey.

Section	Variable	Category	Construct	Item	CA
B	Reading anxiety (Miao and Vibulphol, 2021; Zoghi, 2012)	Top-down reading anxiety	Background and cultural knowledge	3	21 .953
			General reading ability	4	
		Bottom-up reading anxiety	Vocabulary	5	
			Grammar	4	
		Classroom reading anxiety	Teaching methods	5	
C	Reading strategies (Amer et al.,		Global	6	18 .908
			Problem-solving	6	

2010)	Support	6	39	.924
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Note: CA=Cronbach Alpha.

The questionnaires utilized are widely recognized and accepted as reliable instruments. To ascertain the internal reliability of these instruments, a reliability analysis, specifically using Cronbach's Alpha, was conducted. *Table 3* illustrates the distribution and interpretation of the Cronbach's Alpha range. As per Ahmad et al. (2024), Cronbach's Alpha scores falling between 0.7 and 0.9 are deemed to be acceptable to excellent. A pilot test was administered to establish the reliability of the instruments used in this study. The reliability analysis showed Cronbach alpha values: .953 for reading anxiety and .908 for reading strategies. The overall Cronbach Alpha for all 39 items is .924; thus, revealing a good reliability of the instrument used. Further analysis using SPSS is conducted to present findings to answer the research questions for this study. The reliability analysis yielded high Cronbach's alpha values: .953 for reading anxiety and .908 for reading strategies. The overall Cronbach's alpha for all 39 items was .924, confirming the instrument's good reliability. Subsequent analysis using SPSS was then conducted to generate findings pertinent to the study's research questions.

Table 3. Reliability levels, Cronbach's Alpha ranges, and their interpretations.

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

Results and Discussion

Demographic analysis

According to Ziegenfuss et al. (2021), reporting demographic data in percentages is useful to demonstrate sample representatives, and allow for generalizability to a larger population. The reporting includes an overview of participant characteristics, using percentages to clearly illustrate the sample's composition. The demographic profile presented in *Table 4* indicates a relatively balanced representation of respondents, with some noticeable trends that may influence reading behaviour. Female participants are slightly more than males, accounting for 54% of the sample, while male respondents comprised 46%. In terms of academic background, degree students formed the majority at 58%, compared to 42% diploma students, indicating stronger representation from higher levels of study. Most respondents were in their first and second years of study, which together constituted 93% of the sample, whereas only a small proportion were in the third and fourth years. With regard to self-rated English reading proficiency, the majority perceived themselves as having average to good proficiency, each at 41%, while a smaller group rated themselves as excellent, and very few reported poor or fair proficiency. Additionally, more than half of the learners preferred online reading materials over physical books, reflecting increasing engagement with digital texts. This preference is further supported by the frequency of online reading, as a substantial proportion reported engaging in online reading at least one to five times per week or on a daily basis. Collectively, these findings suggest that the participants were

predominantly early-year students with moderate to strong perceived reading proficiency and frequent exposure to online reading environments, which provides a meaningful context for examining reading anxiety and online reading strategies.

Table 4. Percentage for demographic profile.

Question	Demographic profile	Categories	Percentage (%)
1	Gender	Male	46%
		Female	54%
2	Level of Study	Diploma	42%
		Degree	58%
3	Year of Study	1	46%
		2	47%
		3	3%
		4	4%
4	Self-Rating Reading in English Proficiency	Poor	1%
		Fair	4%
		Average	41%
		Good	41%
		Excellent	13%
5	When I read I prefer	Physical Books	44%
		Online Materials	56%
6	Frequency of Online Reading (per week)	Rarely	9%
		1-2 times	35%
		3-5 times	29%
		Daily	27%

Descriptive statistics

According to Vetter (2017), the Mean (M) serves as a measure of data set, or representing the average. The Standard Deviation (SD) measures the variability or spread of the data by indicating the typical distance of individual observations from the mean. A small SD suggests that data points are tightly clustered around the mean, while a large SD indicates greater data dispersion. It is generally desirable to have a low SD to show consistency, although a high SD may be desirable in certain contexts depending on the research goal.

Findings for reading anxiety

This section presents data to answer research question 1: How do learners perceive their reading anxiety? Within the context of this study, this is measured by (a) top-down anxiety, (b) bottom-up anxiety and (c) classroom reading anxiety. Top-down anxiety is measured by (i) background and cultural knowledge and (ii) general reading ability. Bottom-up reading anxiety is measured by (i) vocabulary and (ii) grammar. Classroom reading anxiety is measured by teaching methods. *Table 5* shows the mean and standard deviation for one of the items related to Top-Down Reading Anxiety which is the Background and Cultural Knowledge. The mean scores for these items range from 2.64 to 3.17. The first item, BCKQ1, which assesses whether feel at ease with unfamiliar text title, and BCKQ2 which explores readers' feelings to ideas that are culturally unclear share similar mean scores of 2.64 (SD = 0.99) and 2.94 (SD = 0.93), respectively. The third item, BCKQ3 which highlights readers' feelings when they lack prior knowledge about the ideas expressed in a text, recorded the highest mean score of 3.17 with standard deviation of 1.07. This implies compared to unfamiliar text and culture, a lack of prior knowledge is the factor that causes the most significant level of anxiety in this section. These results indicate that learners experience mild to moderate top-down reading anxiety when they lack background or cultural knowledge related to the text.

Table 5. Descriptive analysis of mean and standard deviation.

Category	M	SD
Background and Cultural Knowledge		
BCKQ1 I do not feel at ease when the title of the text is unfamiliar to me.	2.64	0.99
BCKQ2 It is worrying to me when the ideas expressed in the text are culturally unclear	2.94	0.93
BCKQ3 I get upset when I lack the previous knowledge about the ideas expressed in the text.	3.17	1.07
General Reading Ability		
GRAQ1 I worry when I cannot get the gist of the text although no new vocabulary items or grammatical points exist in the text.	2.95	0.99
GRAQ2 When I cannot recognize minor ideas (details) of the text, it is worrying to me.	3.013	1.03
GRAQ3 I am nervous when I cannot spot the main idea of a paragraph.	2.99	1.10
GRAQ4 It bothers me when I cannot express my opinions or feelings about the text.	3.01	1.04
Vocabulary		
VQ1 It bothers me when I encounter a lot of words whose meanings are unclear	3.17	0.99
VQ2I get upset when I cannot figure out the meaning of a word that I feel I have seen before	3.09	1.12
VQ3 I get confused when the word that I know has a different meaning in the sentence.	2.95	0.95
VQ4 I get upset when I come across idioms that are unfamiliar to me.	2.78	1.16
VQ5 I feel worried when the unknown word is difficult to pronounce.	2.89	1.11
Grammar		
GQ1 I am nervous when a certain sentence is long and has a complex structure	2.75	1.12
GQ2 When a certain sentence is grammatically unfamiliar is worrying to me.	2.86	1.09
GQ3 I feel upset when the tense of a certain sentence is unclear to me.	2.79	0.95
GQ4 I worry when I am unable to recognize different parts of speech such as adjectives, adverbs, or connective words.	2.82	1.09
Teaching Methods		
TMQ1 It bothers me when the instructor calls on me to read out.	2.50	1.07
TMQ2 It worries me when the instructor calls on me to translate a piece of an English text into our first language.	2.72	1.02
TMQ3 When the instructor asks me reading comprehension questions, it is worrying to me.	2.51	1.06
TMQ4 It upsets me when the instructor chooses uninteresting texts to read in class.	2.45	1.06
TMQ5 I am nervous when the instructor uses English as a medium of instruction and hardly ever makes use of our first language	2.20	1.08
Global Strategies		
GSQ 1I think about whether the content of the on-line text fits my reading purpose	3.63	0.97
GSQ 2When reading on-line, I decide what to read thoroughly and what to ignore	3.46	1.00
GSQ3I use context clues to help me better understand what I am reading online	3.68	1.00
GSQ4I use typographical features like boldface and italics to identify key information.	3.44	1.13
GSQ5I try to guess what the content of the on-line text is about when I read.	3.77	0.93
GSQ6 I scan the on-line text to get a basic idea of whether it will serve my purposes before deciding to read it.	3.61	1.08
Problem-Solving Strategies		
PSSQ1 I try to get back on track when I lose concentration	3.85	0.90
PSSQ2 I adjust my reading speed according to what I am reading on-line	3.87	0.84
PSSQ3 I stop from time to time and think about what I am reading on-line	3.51	0.98
PSSQ4 When on-line text becomes difficult, I re-read it to increase my understanding	4.00	0.96
PSSQ5 When I read on-line, I guess the meaning of unknown words or phrases	3.68	0.96
PSSQ6 I can distinguish between fact and opinion in on-line texts	3.73	0.90
Support strategies		
SSQ1 I take notes while reading on-line to help me understand what I read	3.08	1.09
SSQ2 I use reference materials (e.g. an on-line dictionary) to help me understand what read on-line.	3.64	0.96
SSQ3 I paraphrase (restate ideas in my own words) to better understand what I read on-line.	3.50	1.02
SSQ4I ask myself questions I like to have answered in the on-line text	3.39	1.03
SSQ5 When reading on-line, I translate from English into my native language	3.07	1.12
SSQ6 When reading on-line, I think about information in both English and my mother tongue	3.57	1.05
SSQ1 I take notes while reading on-line to help me understand what I read	3.08	1.09

Note: M=Mean; SD=Standard Deviation.

Table 5 shows the mean and standard deviation for the General Reading Ability (GRA). Item GRAQ1, which examines learners' concern when they cannot understand the gist of a text despite no new vocabulary or grammatical points, recorded the lowest mean score of 2.95 with standard deviation of 0.99. Similarly, GRAQ3, which highlights learners' nervousness when they are unable to spot the main idea of a paragraph, recorded a mean of 2.99 with standard deviation of 1.10. GRAQ2, which explores learners' feelings when they fail to recognize minor ideas or details in a text, and GRAQ4, which examines discomfort when learners cannot express their opinions or feelings about the text recorded the highest and almost the same mean score of 3.013 (SD = 1.03) and 3.01 (SD = 1.04), respectively. These results indicate that learners

experience moderate top-down reading anxiety, particularly when they struggle to understand the gist, details, or main ideas of a text and to express personal responses to it. *Table 5* shows the mean and standard deviation for the items related to bottom-up reading anxiety, specifically vocabulary. The mean scores for the five items range from 2.78 to 3.17, indicating varying levels of anxiety related to vocabulary difficulties. Item VQ1, which examines learners' feelings when encountering many words with unclear meanings, recorded the highest mean score of 3.17 with a standard deviation of 0.99. This is followed by VQ2, which measures learners' frustration when they cannot figure out the meaning of a word they feel they have seen before, with a mean score of 3.09 (SD = 1.12). Item VQ3, which highlights confusion when a familiar word carries a different meaning in context, recorded a mean score of 2.95 (SD = 0.95). Lower mean scores were observed for VQ5 (M = 2.89, SD = 1.11) and VQ4, which examines anxiety when encountering unfamiliar idioms, recorded the lowest mean score of 2.78 with a standard deviation of 1.16. These findings indicate that learners experience mild to moderate bottom-up reading anxiety, particularly when dealing with unclear word meanings and unfamiliar vocabulary during reading.

Table 5 shows the mean and standard deviation for the items related to bottom-up reading anxiety, specifically grammar. The mean scores for the four items range from 2.75 to 2.86, indicating relatively consistent levels of anxiety related to grammatical difficulties. Item GQ2, which examines learners' concern when encountering grammatically unfamiliar sentences, recorded the highest mean score of 2.86 with a standard deviation of 1.09. This is followed closely by GQ4, which measures learners' anxiety when they are unable to recognise different parts of speech such as adjectives, adverbs, or connective words, with a mean score of 2.82 (SD = 1.09). Item GQ3, which highlights learners' discomfort when the tense of a sentence is unclear, recorded a mean score of 2.79 (SD = 0.95). The lowest mean score was observed for GQ1, which examines nervousness when sentences are long and structurally complex, with a mean of 2.75 and a standard deviation of 1.12. These findings indicate that learners experience mild bottom-up reading anxiety related to grammatical features, particularly when dealing with unfamiliar grammatical structures and difficulty recognising parts of speech. *Table 5* shows the mean and standard deviation for the items related to classroom reading anxiety, specifically teaching methods. The mean scores for the five items range from 2.20 to 2.72, indicating generally low to moderate levels of anxiety associated with classroom instructional practices. Item TMQ2, which examines learners' anxiety when instructors call on them to translate an English text into their first language, recorded the highest mean score of 2.72 with a standard deviation of 1.02. This is followed by TMQ3, which measures learners' worry when instructors ask reading comprehension questions, with a mean score of 2.51 (SD = 1.06), and TMQ1, which examines discomfort when being called on to read aloud, recording a mean of 2.50 (SD = 1.07). Lower mean scores were observed for TMQ4, which relates to instructors choosing uninteresting texts to read in class (M = 2.45, SD = 1.06), while TMQ5, which examines nervousness when English is used as the sole medium of instruction with minimal use of the first language, recorded the lowest mean score of 2.20 (SD = 1.08). These findings indicate that learners experience low to mild classroom reading anxiety, particularly in situations involving translation tasks and instructor-directed questioning.

Findings for reading strategies

This section presents data to answer research question 2: How do learners perceive their reading strategies? In the context of this study, reading strategies are measured by (i) global, (ii) problem-solving and (iii) support strategies. *Table 5* presents the means and standard deviations for the items related to "Global Strategies" in the reading strategies section. Item GSQ1, which examines whether readers consider the relevance of online content to their reading purpose, has a mean score of 3.63 with a standard deviation of 0.97. The other items show similar mean scores, with Item GSQ2 (deciding what to read thoroughly when reading online) having a mean of 3.46 (SD = 1.00), and Item GSQ3 (using context clues for better understanding) scoring a mean of 3.68 (SD = 1.00). The item with the lowest mean score, GSQ4 (using typographical features like bold and italics), has a mean of 3.44 (SD = 1.13), while GSQ5 (guessing content based on the text) and GSQ6 (scanning online text to determine its relevance) have mean scores of 3.77 (SD = 0.93) and 3.61 (SD = 1.08), respectively. These results indicate that participants generally use global strategies when reading online, with moderate consistency in their responses. *Table 5* presents the mean scores and standard deviations for the items related to problem-solving strategies in online reading. The mean scores range from 3.51 to 4.00, indicating that participants use these strategies to a moderate extent. The highest mean score, 4.00, is for PSSQ4, which focuses on rereading online texts to increase understanding when they become difficult. Other items, such as PSSQ2 (adjusting reading speed) and PSSQ1 (getting back on track after losing concentration), show mean scores of 3.87 and 3.85, respectively. Participants also moderately engage in strategies like stopping to think (PSSQ3, mean = 3.51) and guessing the meaning of unknown words (PSSQ5, mean = 3.68). The ability to distinguish between fact and opinion in online texts (PSSQ6) has a mean score of 3.73. The standard deviations, ranging from 0.84 to 0.98, suggest moderate consistency in the responses.

The mean scores for support strategies presented in *Table 5* indicate that learners employed a range of cognitive and linguistic techniques to assist their understanding during online reading, although the frequency of use varied across strategies. Overall, the findings suggest moderate use of support strategies, with most mean values falling slightly above the midpoint of the scale. The most frequently used strategy was consulting reference materials such as online dictionaries (M = 3.64, SD = 0.96), indicating that learners relied on external resources to resolve comprehension difficulties while reading online texts. Similarly, thinking about information in both English and the mother tongue (M = 3.57, SD = 1.05) and paraphrasing ideas in one's own words (M = 3.50, SD = 1.02) were commonly employed. In contrast, strategies such as taking notes while reading online (M = 3.08, SD = 1.09) and translating directly from English into the native language (M = 3.07, SD = 1.12) were used less frequently, suggesting that learners may prefer immediate comprehension support rather than more time-consuming strategies. Asking self-questions during reading showed a moderate level of use (M = 3.39, SD = 1.03), indicating some degree of metacognitive engagement. Taken together, these findings suggest that learners tended to favour accessible and cognitively supportive strategies when reading online, particularly those that reduce comprehension difficulty and cognitive load, which may be closely related to their perceived reading confidence and anxiety levels.

Exploratory statistics

Correlation, as defined by He (2024), is a statistical technique used to measure the strength and degree of association between two variables. It is a common tool used for

describing straightforward relationships without making a cause-and-effect link. The data presented in this section addresses the research questions concerning correlation.

Findings for relationship between reading anxiety and reading strategies

This section presents data to answer research question 3: Is there a relationship between reading anxiety and reading strategies? (H1: There is no relationship between reading anxiety and reading strategies). To determine if there is a significant association in the mean scores between reading anxiety reading strategies, data is analysed using SPSS for correlations. Results are presented separately in *Table 6*; which shows there is no association between reading anxiety (p=0.99) and reading strategies. Null hypothesis is accepted.

Table 6. Correlation between reading anxiety and reading strategies.

Category		Reading anxiety	Reading strategies
Reading anxiety	Pearson correlation	1	0.99
	Sig. (2-tailed)		.226
	N	150	150
Reading strategies	Pearson correlation	0.99	1
	Sig. (2-tailed)	.226	
	N	150	150

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

Inferential statistics

According to He (2024), T-tests and ANOVA serve three primary functions: comparing means, testing hypotheses, and identifying significant differences. Both tests are used to compare average scores or values between two groups (or one group against a known value) to determine if any observed difference is statistically meaningful rather than due to random chance. Researchers also employ these tests to examine hypotheses about means, such as assessing the impact of a new treatment or comparing performance between distinct groups. The output includes a p-value; if this value is below a set threshold (typically 0.05), it signals a statistically significant difference, enabling researchers to draw conclusions about the broader populations from their sample data. Findings for reading anxiety and reading strategies across levels of study. This section presents data to answer research question 4: Is there a significant difference for reading anxiety and reading strategies across levels of study? (H2: There is no significant difference for reading anxiety and reading strategies across levels of study). With reference to *Table 7*, a one way ANOVA was conducted to examine the effects of reading anxiety and reading strategies across levels of study. The analysis shows there is no significant difference between reading anxiety (F=0.54,p=0.647) and reading strategies (F=0.313, p=0.571) across levels of study. That therefore means the null hypothesis is accepted.

Table 7. T-test for reading anxiety and reading strategies across levels of study.

C	LT		t	df	t-test for equality of means				95%	
	F	Sig.			1p	2p	MD	SED	L	U
RA										
EVA	0.054	0.816	-0.458	148	0.324	0.647	-0.05758	0.12558	-0.30573	0.19058
EVNA			-0.460	135.153	0.323	0.646	-0.05758	0.12521	-0.30519	0.19004
RS										
EVA	0.013	0.911	0.568	148	0.285	0.571	0.05854	0.10308	-0.14516	0.26223

EVNA	0.557	123.909	0.289	0.578	0.05854	0.10506	-0.14941	0.26648
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Note: C=Category; RA=Reading Anxiety; RS=Reading Strategies; EVA= Equal variance assumed; EVNA=Equal variances not assumed; LT=Levene’s Test for equality of variance; 1p=one-sided p; 2p=two-sided p; MD=Mean Difference; SED=Standard Error Difference; 95%=95% confidence interval of difference; L=Lower; U=Upper.

Findings for reading anxiety and reading strategies across reading material preference

This section presents data to answer research question 5: Is there a significant difference for reading anxiety and reading strategies across reading material preference? (H3: There is no significant difference for reading anxiety and reading strategies across reading material preference). With reference to Table 8, a T-test was conducted to examine the effects of reading anxiety and reading strategies across levels of study. The analysis shows there is no significant difference between reading anxiety (F=0.54, p=0.647) and reading strategies (F=0.013, p=0.571) across levels of study. This therefore means the null hypothesis is accepted.

Table 8. T-test for reading anxiety and reading strategies across reading preference.

C	LT		t	df	t-test for equality of means				95%	
	F	Sig.			1p	2p	MD	SED	L	U
RA										
EVA	0.030	0.864	0.653	148	0.257	0.515	0.08148	0.12477	-0.16508	0.32804
EVNA			0.653	139.880	0.257	0.515	0.08148	0.12473	-0.16512	0.32808
RS										
EVA	1.957	0.164	0.440	148	0.330	0.661	0.04509	0.10254	-0.15753	0.24772
EVNA			0.444	144.032	0.329	0.658	0.04509	0.10158	-0.15569	0.24588

Note: C=Category; RA=Reading Anxiety; RS=Reading Strategies; EVA= Equal variance assumed; EVNA=Equal variances not assumed; LT=Levene’s Test for equality of variance; 1p=one-sided p; 2p=two-sided p; MD=Mean Difference; SED=Standard Error Difference; 95%=95% confidence interval of difference; L=Lower; U=Upper.

Research Question 1: How do learners perceive their reading anxiety?

The findings indicate that reading anxiety was perceived as low to moderate by learners in online reading contexts with anxiety arising mainly when they lacked background knowledge, vocabulary, and grammar. Anxiety associated with classroom instructional practices was comparatively lower. This result suggests that cognitive and linguistic challenges remain the main factors of reading anxiety regardless of settings, and even when it takes place in online environments. This finding aligns with Dang (2024), who reported moderate levels of reading anxiety among EFL learners, particularly in response to lexical and textual difficulties. Similarly, Chen et al. (2022) found that reading anxiety was influenced by learners’ affective reactions and contextual influences. This is also consistent with Xie and Huang (2024), who emphasized that online reading environments may increase anxiety due to greater cognitive demands and lack of immediate instructional support. From the perspective of Social Cognitive Theory, this reflects the role of personal affective factors, whereby learners’ emotional responses influence their engagement with reading tasks (Bandura, 1986).

Research Question 2: How do learners perceive their reading strategies?

With regard to reading strategies, the findings show that most learners perceived themselves as actively using a range of reading strategies with problem-solving strategies perceived as the most frequently used, followed by global strategies and support strategies. This indicates that learners are more prone to employ strategies that are reactive in nature to help them overcome comprehension difficulties during reading. This finding is consistent with Dang (2024), who reported that problem-solving strategies were the most frequently used among EFL learners. Similarly, Risanta (2021) found that learners frequently employed problem-solving strategies regardless of their anxiety levels. This pattern aligns with the categorisation proposed by Amer et al. (2010), which emphasises the importance of problem-solving strategies in managing comprehension difficulties. In line with Social Cognitive Theory, the frequent use of these strategies represents behavioural regulation, where learners actively adjust their reading behaviours to cope with comprehension challenges in online reading contexts (Bandura, 1986).

Research Question 3: Is there a relationship between reading anxiety and reading strategies?

The findings reveal that there was no significant relationship between reading anxiety and reading strategies. This suggests that learners may continue to employ reading strategies regardless of their anxiety levels, and that strategy use alone does not necessarily reduce reading anxiety in online reading contexts. This finding is in line with Risanta (2021), who reported no significant relationship between reading anxiety and reading strategy use, and Dung (2020), who similarly found that anxiety did not significantly influence learners' strategy use. However, this result differs from the findings of Dang (2024), who observed a notable negative correlation between reading anxiety and reading strategies. The inconsistency across findings supports Chen et al. (2022), who suggested that the relationship between reading anxiety and reading strategies is context-dependent. Overall, the findings indicate that reading anxiety is shaped by multiple factors beyond strategy use alone, including cognitive demands and learning conditions.

Research Question 4: Is there a significant difference in reading anxiety and reading strategies across levels of study?

The findings indicate that there was no significant difference in reading anxiety and reading strategies across different levels of study. This suggests that learners at different academic levels experienced similar levels of reading anxiety and employed comparable reading strategies in online reading contexts. This finding supports Chen et al. (2022), who suggested that affective and strategic reading behaviours may not differ substantially across learner groups when instructional contexts and reading demands are similar. From a Social Cognitive Theory perspective, this indicates that shared learning environments and instructional practices may influence learners' affective and behavioural responses in similar ways, regardless of academic level.

Research Question 5: Is there a significant difference in reading anxiety and reading strategies across reading material preference?

The findings further show that there was no significant difference in reading anxiety and reading strategies based on learners' reading material preferences. This indicates

that learners' anxiety levels and strategy use were not strongly influenced by the type of reading materials they preferred. This finding suggests that reading anxiety and strategy use may be more strongly shaped by task demands and learning conditions than by reading preferences alone. Consistent with Social Cognitive Theory, this highlights the influence of environmental and situational factors in shaping learners' emotional responses and reading behaviours (Bandura, 1986).

Theoretical and conceptual implications

From a theoretical perspective, the findings of this study provide empirical support for Social Cognitive Theory (SCT) as an appropriate framework for understanding reading anxiety and reading strategy use in online learning contexts. SCT emphasises the interaction between personal factors, behavioural patterns, and environmental influences (Bandura, 1986), all of which were reflected in the findings of this study. The low to moderate levels of reading anxiety reported by learners highlight the role of personal affective factors, such as linguistic confidence and background knowledge, in shaping learners' reading experiences. At the same time, the frequent use of problem-solving strategies reflects behavioural regulation, whereby learners actively adjust their reading behaviours to manage comprehension difficulties. However, the absence of a significant relationship between reading anxiety and reading strategies suggests that behavioural strategies alone may not sufficiently address affective challenges, indicating that the interaction between affect and behaviour is more complex than a linear cause-and-effect relationship. Conceptually, the findings also support the conceptual framework of the study, which positions reading anxiety and reading strategies as related but distinct constructs. The lack of significant differences across levels of study and reading material preferences further suggests that environmental conditions, such as online instructional settings and task demands, may exert a stronger influence on learners' affective and behavioural responses than individual background variables. Overall, the findings extend existing theoretical understanding by demonstrating that reading anxiety and strategy use operate within a dynamic system shaped by multiple interacting factors rather than functioning independently.

Pedagogical implications

The findings of this study carry important pedagogical implications for teaching reading in online and higher education contexts. Although learners actively employ reading strategies, the absence of a significant relationship between strategy use and reading anxiety suggests that strategy instruction alone may not be sufficient to reduce learners' anxiety. Therefore, instructional practices should move beyond teaching strategies as isolated skills and instead integrate affective support into reading instruction. Educators should consider creating supportive learning environments that reduce anxiety by providing clear instructions, scaffolded tasks, and constructive feedback. Explicit modelling of reading strategies, combined with reassurance and encouragement, may help learners build confidence while engaging with complex texts. In addition, instructors may need to address linguistic challenges, such as vocabulary and grammar difficulties, more systematically, as these were identified as key sources of reading anxiety. Given that problem-solving strategies were the most frequently used, instructors can further strengthen learners' strategic competence by guiding them on when and how to apply strategies effectively, particularly in online reading contexts

where immediate support may be limited. Encouraging reflective practices, such as discussing reading difficulties and strategy use, may also help learners become more aware of their reading processes and reduce anxiety over time.

Conclusion

Based on the findings of the present study, several directions for future research are suggested. Firstly, employing qualitative or mixed-methods approaches to investigate reading anxiety and reading strategies would provide a richer, more profound understanding of learners' emotional experiences. Strategic decision-making during reading tasks. Interviews, think-aloud protocols, or learning journals could provide richer explanations for why learners continue to use strategies despite experiencing anxiety. Second, future research could examine additional affective variables, such as self-efficacy, motivation, or resilience, to better understand how these factors interact with reading anxiety and strategy use. Investigating these variables may help explain the inconsistent findings reported across studies. Finally, future studies may consider examining reading anxiety and reading strategies across different instructional contexts, such as fully online, blended, or face-to-face learning environments, as well as across different disciplines or proficiency levels. Such investigations would contribute to a more comprehensive understanding of how contextual factors influence learners' reading experiences and support the development of more effective instructional practices.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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