

Students' Perceptions of Reading Strategies When Engaging With Online Texts in an Undergraduate Academic Reading Class

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ABSTRACT

The increasing use of digital academic materials have changed the way undergraduate students access and understand academic information. Online academic texts provides convenient access to many resources, but students also need to use suitable reading strategies in order to understand the information effectively. This study examines undergraduate students perceptions towards reading strategies when engaging with online academic texts. A quantitative survey was conducted among 115 undergraduate students from Semester 3 and Semester 4 at Universiti Teknologi MARA. Data were collected using a structured questionnaire containing ten reading strategy items and measured using a five point Likert scale. The data was analysed using descriptive statistics, Cronbach alpha, one way ANOVA and Tukey post hoc analysis. The findings showed that rereading difficult sections obtained the highest mean score, followed by vocabulary lookup and adjusting reading speed. Setting reading goals recorded the lowest mean score. The reliability analysis showed an acceptable Cronbach alpha value of .745. The ANOVA result also indicated a significant difference in overall reading strategy scores according to the frequency of online academic reading. The findings suggest that students are using different strategies when reading online, although some strategies especially metacognitive strategies still need more attention in academic reading instruction.

Keywords: online academic reading, reading strategies, undergraduate students, digital reading, metacognitive strategies

INTRODUCTION

Background of Study

The rapid development of digital technology **has** changed the way students access information for academic learning. University students increasingly use electronic books, journal articles, websites, databases, and online learning platforms as part of their academic activities. Online reading provides students with easier access to a large amount of information and allows them to read academic materials across different places and times. However, reading digital materials is not always easy because students need to search, scroll, select, and evaluate information from different online sources. Azmuddin et al. (2023) explained that university students are increasingly required to read large amounts of online materials for academic purposes and that effective online reading requires students to utilise, understand, and respond to digital information. Therefore, reading strategies are important for helping students manage academic reading in online environments.

Reading strategies **refer** to the different approaches used by readers to understand, monitor, and manage a text. In online academic reading, students may perceive and report the use of strategies such as skimming, rereading, vocabulary lookup, note taking, prediction, and summarising depending on the purpose and difficulty of the reading task. Digital tools such as electronic dictionaries, search functions, and annotation tools may also support comprehension. Harputra et al. (2023) reported that EFL university students demonstrated a range of metacognitive strategies when reading online academic texts, with global reading strategies among the frequently reported approaches. This indicates that strategic reading is an important

aspect of academic reading because students need to make decisions about how to approach information and manage comprehension difficulties.

The nature of online texts also **creates** additional demands for students. Digital academic texts may contain hyperlinks, webpages, and different forms of information that require readers to move between sections. Students therefore need to monitor their understanding and determine which information requires greater attention. Azmuddin et al. (2023) examined metacognitive online reading and navigational strategies among Science and Technology university students reading English hypertexts for academic purposes. Their findings showed that problem-solving strategies were reported most frequently, followed by global and support reading strategies. This **suggests** that students need exposure to reading strategies that support both comprehension and the management of digital information during academic reading activities.

Another important aspect is students' metacognitive awareness when engaging with reading strategies. Metacognitive strategies include setting reading goals, prediction, monitoring comprehension, evaluating information, and reflecting on the reading process. These strategies require students to consider their reading process rather than focusing only on the content of the text. Abd Hamid et al. (2025) examined metacognitive awareness of online reading strategies among pre-university students in a Malaysian public university and highlighted the importance of strategic awareness when reading non-linear digital texts. This finding suggests that students may report different levels of perception towards different online reading strategies.

The frequency of online academic reading is also relevant to the present study. Students who frequently engage with online academic materials have more opportunities to encounter and practise different reading strategies, whereas students who rarely engage with such materials may have fewer opportunities to develop familiarity with online reading practices. Raja Yacob and Mohamad (2023) found that Malaysian ESL undergraduates reported different global, problem-solving, and support strategies when engaging with online English texts. Therefore, examining reading frequency as a grouping variable may provide useful information about whether students with different levels of online academic reading engagement report different overall reading strategy scores.

Statement of Problem

Online academic reading has become increasingly common among university students, but access to digital information does not necessarily indicate that students perceive and report all reading strategies in the same way. Students are required to deal with long texts, unfamiliar terminology, hyperlinks, and large amounts of information when completing academic tasks. Without appropriate strategic approaches, students may experience difficulties in identifying important information and maintaining comprehension. Although previous studies have examined online reading strategies, there is still a need to understand which strategies are more strongly perceived or reported by undergraduate students within their academic reading context. Belaman et al. (2023) examined Malaysian undergraduates' perceptions of online academic reading and reported that students experienced various difficulties while engaging with global, problem-solving, and support reading strategies.

Different reading strategies may also receive different levels of perception among students. Strategies such as rereading and vocabulary lookup may be perceived as useful when students encounter comprehension difficulties, whereas strategies such as goal setting and monitoring require students to plan and reflect on their reading process. Sinas et al. (2022) highlighted differences in students' reported metacognitive online reading strategies, with support and problem-solving strategies among the frequently reported approaches. Therefore, identifying strategies with higher and lower perception scores can provide useful information for understanding students' strategic approaches to online academic reading and for informing academic reading instruction.

There is also limited attention to whether students' overall reading strategy scores differ according to their frequency of online academic reading. Students who frequently engage with digital academic materials may have greater exposure to different online reading practices. However, such differences cannot be assumed without quantitative evidence. Therefore, the present study examines undergraduate students' perceptions of

online academic reading strategies and compares their overall reading strategy scores according to their reported frequency of online academic reading. The findings may provide useful information for understanding online academic reading practices among undergraduate students.

Objectives and Research Questions

1) Research Objectives

1. To identify the reading strategies most highly perceived by undergraduate students when engaging with online academic texts.
2. To examine the level of undergraduate students' perceptions towards online academic reading strategies.
3. To determine whether there is a significant difference in students' overall reading strategy scores based on their frequency of online academic reading.

Research Questions

RQ1: What reading strategies are most highly perceived by undergraduate students when engaging with online academic texts?

RQ2: What is the level of undergraduate students' perceptions towards online academic reading strategies?

RQ3: Is there a significant difference in students' overall reading strategy scores based on their frequency of online academic reading?

LITERATURE REVIEW

1) Online Academic Reading

Online academic reading has become an important part of higher education because students increasingly access digital materials for assignments, research, and independent learning. Digital reading provides convenient access to academic information, but online texts may also present challenges because students encounter multiple sources and different digital features. Freihat (2022) reported that university EFL students demonstrated various metacognitive online reading strategies when engaging with digital texts, highlighting the importance of strategic approaches in managing comprehension during online reading. This suggests that students need to develop appropriate strategies to understand academic texts and identify relevant information from the large amount of material available online.

Recent research in Malaysia has also examined students' reported online reading strategies. Azizan et al. (2025) examined Malaysian undergraduates and reported the presence of global, problem-solving, and support strategies when students engaged with digital academic texts. Problem-solving strategies, including rereading difficult information, were particularly noticeable among higher-proficiency students. These findings indicate that online academic reading involves different strategic approaches depending on students' reading needs and the characteristics of the digital text.

2) Reading Strategies in Online Texts

Reading strategies provide students with different ways of approaching and understanding academic texts. Global strategies may help readers obtain an overall understanding of a text, while problem-solving strategies may be used when readers encounter difficult information. Support strategies can provide additional assistance during reading, including note taking, vocabulary lookup, and annotation. Sinas et al. (2024) reported that metacognitive online reading comprehension strategies are relevant when students interact with digital texts containing hyperlinks and webpages. This highlights the importance of monitoring comprehension and selecting appropriate strategies according to the demands of the reading task.

Several strategies are particularly relevant to online academic reading. Rereading difficult sections may help students revisit information that is not immediately understood, while vocabulary lookup may provide support when unfamiliar academic terms are encountered. Other strategies, such as skimming, prediction, summarising, adjusting reading speed, and highlighting or annotation, may help students manage information and maintain comprehension. Azizan et al. (2025) reported that rereading and focusing on complex sections were among the strongly reported strategies among Malaysian undergraduates. These findings provide support for examining different individual reading strategies rather than assuming that students perceive all strategies in the same way.

3) Metacognitive Online Reading Strategies

Metacognitive online reading strategies involve readers' awareness and regulation of their reading processes. Strategies such as setting reading goals, prediction, monitoring comprehension, and evaluating information require readers to plan, monitor, and reflect on their reading. Unlike strategies that provide immediate assistance, such as vocabulary lookup, metacognitive strategies may require students to consider their reading purpose and evaluate their progress throughout the reading process.

Raja Yacob and Mohamad (2023) found that university students' metacognitive awareness of online reading strategies varied according to learner characteristics, and that global, support, and problem-solving strategies were associated with English reading comprehension. This suggests that metacognitive awareness is relevant to how students perceive and manage online academic reading.

Metacognitive awareness may be particularly important in digital environments because online texts may not follow a completely linear structure. Students may need to decide whether to follow hyperlinks, search for additional information, or return to previous sections. Sinas et al. (2023) similarly highlighted the relevance of metacognitive online reading comprehension strategies when students interact with online texts. Therefore, examining students' perceptions of strategies such as goal setting, prediction, and evaluation can provide insight into the strategic approaches they report when engaging with online academic materials.

4) Online Reading Among Malaysian Undergraduates

Online academic reading is increasingly relevant among Malaysian undergraduates because digital materials are regularly used for university learning. Students access online databases, websites, electronic books, and journal articles to support academic tasks. Sain et al. (2023) examined online reading strategies among Malaysian undergraduates and highlighted the importance of strategic approaches when students search for and process online information. Locating information alone may not be sufficient because students also need to understand and evaluate information obtained from online sources. Therefore, online academic reading involves both comprehension and strategic management of digital information.

Malaysian studies also suggest that students may report different levels of preference towards online reading strategies. Azizan et al. (2025) found that Malaysian undergraduates reported global, problem-solving, and support strategies, with differences according to English proficiency. Raja Yacob and Mohamad (2023) similarly examined metacognitive online reading strategies among Malaysian ESL undergraduates. These studies demonstrate the relevance of strategic online reading among Malaysian university students, but they also indicate that students' strategic perceptions may vary according to learner characteristics and reading contexts.

However, less attention has been given to whether students' overall reported reading strategy scores differ according to their **frequency of online academic reading**. The present study therefore examines students' perceptions of ten online academic reading strategies and compares their overall reading strategy scores across four reading-frequency groups: daily, weekly, monthly, and rarely. This provides a more specific examination of the relationship between students' reported strategic reading scores and their frequency of engagement with online academic reading.

Theoretical Framework

This study is grounded in the Metacognitive Awareness of Reading Strategies framework, which focuses on how readers plan, monitor and regulate their reading processes. The framework is relevant to online academic reading because students need to make decisions about how they approach, understand and respond to digital academic texts. Previous research has highlighted the relevance of global, problem-solving and support strategies in understanding students' strategic engagement with online reading.

In the present study, students' perceptions of online reading strategies are examined through ten strategy items: skimming, note taking, rereading difficult sections, highlighting or annotation, vocabulary lookup, prediction, summarising, adjusting reading speed, setting reading goals, and evaluating source reliability. These items represent the specific reading strategies examined in the questionnaire and form the basis for assessing students' overall reading strategy scores.

The conceptual framework also incorporates frequency of online academic reading as a grouping variable. Students are classified according to their reported frequency of reading online academic materials, namely daily, weekly, monthly and rarely. The overall reading strategy scores are subsequently compared across these groups using one-way ANOVA. Therefore, the framework directly reflects the variables measured in the questionnaire and the statistical analysis conducted in the study.

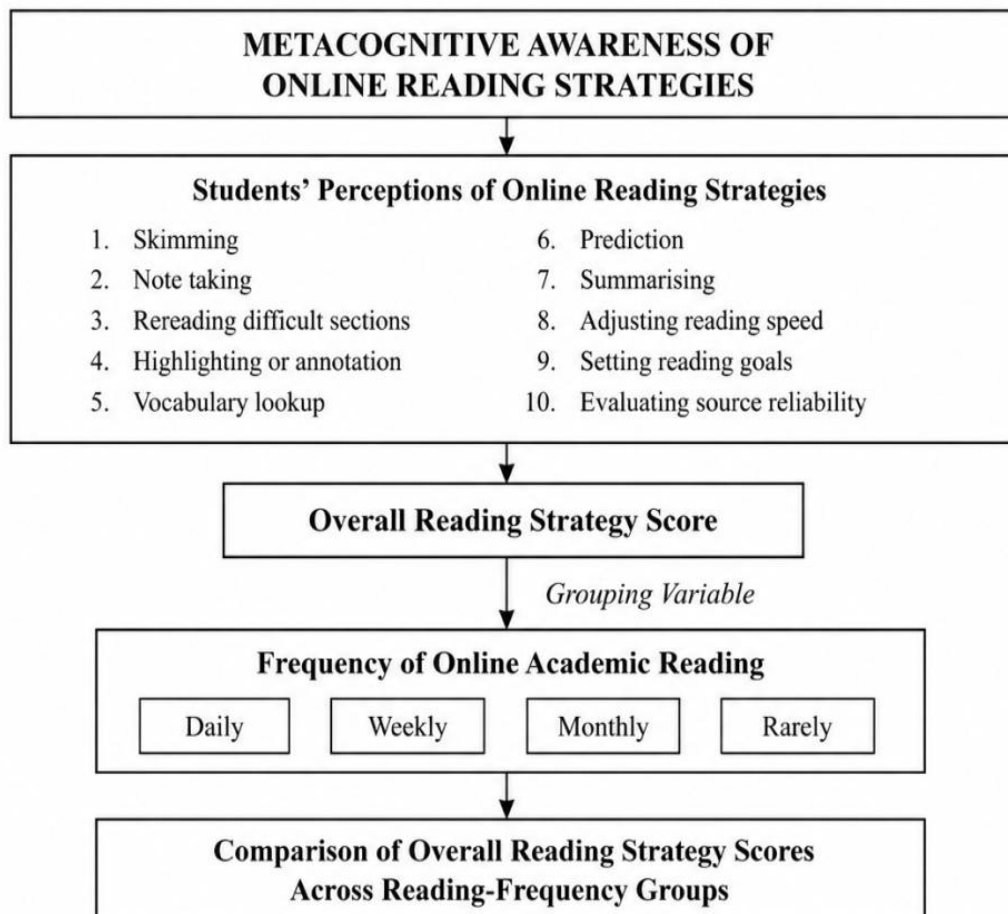


Figure 1: Theoretical Framework of Online Reading Strategies

The framework illustrates the relationship between the theoretical perspective of metacognitive reading strategies, students' perceptions of the ten measured online reading strategies, and the comparison of overall strategy scores across different online academic reading-frequency groups. The framework does not assume a causal relationship between reading frequency and strategy scores; rather, reading frequency is used as a grouping variable to examine whether statistically significant differences exist between groups.

METHODOLOGY

1) Design and Setting of the Study

This study employed a quantitative survey design to examine undergraduate students' perceptions of online academic reading strategies. The study was conducted among students enrolled in the LCC401 English for Mediating Texts course at Universiti Teknologi MARA. A quantitative survey design was considered appropriate because the study aimed to obtain numerical responses regarding students' perceptions of online reading strategies and to compare overall reading strategy scores across different frequencies of online academic reading. Data collected through the questionnaire were analysed using descriptive and inferential statistical procedures.

2) Participants

The study involved 115 undergraduate students enrolled in the LCC401 English for Mediating Texts course at Universiti Teknologi MARA. The participants consisted of 93 Semester 3 students (80.9%) and 22 Semester 4 students (19.1%). In terms of faculty, 70 respondents (60.9%) were from FSKM, while 45 respondents (39.1%) were from FPA. The respondents were between 21 and 25 years old, with a mean age of 22.12 years ($SD = 0.86$). In terms of online academic reading frequency, 5 students (4.3%) reported reading academic materials online daily, 63 (54.8%) weekly, 24 (20.9%) monthly, and 23 (20.0%) rarely.

The participants were recruited from students enrolled in the LCC401 English for Mediating Texts course. census sampling approach was employed, whereby all available students enrolled in the course were invited to participate. Participation was voluntary, and respondents completed the questionnaire based on their own online academic reading experiences.

Of the 115 responses, 114 complete responses were included in the analysis of the overall reading strategy score. One response was excluded from this analysis because of a missing response to one of the ten reading strategy items. Therefore, the ANOVA analysis was based on 114 valid cases.

3) Data Collection Instrument

Data were collected using a structured questionnaire consisting of demographic questions and ten items measuring students' perceptions of online academic reading strategies. The ten strategies examined were skimming, note taking, rereading difficult sections, highlighting or annotation, vocabulary lookup, prediction, summarising, adjusting reading speed, setting reading goals, and evaluating source reliability. Each item was measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The questionnaire was used to obtain students' self-reported perceptions of the reading strategies they employ when engaging with online academic texts. The items were organised to capture different strategic behaviours involved in online academic reading, while the combined scores provided an overall indication of students' reported perceptions across the measured strategies. The internal consistency of the ten-item measure was assessed using Cronbach's alpha. The analysis produced a Cronbach's alpha coefficient of **.745**, indicating acceptable internal consistency for the measure.

4) Data Analysis

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Frequencies and percentages were used to summarise the demographic characteristics of the respondents. Mean scores and standard deviations were calculated for each of the ten online reading strategy items to determine the pattern and level of students' reported perceptions. Cronbach's alpha was calculated to assess the internal consistency of the ten-item reading strategy measure. The analysis produced a Cronbach's alpha value of **.745**. The ten item scores were also combined to obtain an overall reading strategy score for the group-comparison analysis.

One-way analysis of variance (ANOVA) was conducted to determine whether the overall reading strategy scores differed significantly across four online academic reading-frequency groups: daily, weekly, monthly,

and rarely. Before interpreting the ANOVA, the assumption of homogeneity of variance was assessed using Levene's test. As the ANOVA result was statistically significant, Tukey's HSD post hoc test was conducted to identify the specific groups that differed significantly. The statistical significance level was set at .05.

5) Scoring of the Reading Strategy Measure

The ten reading strategy items were scored from 1 to 5, with higher scores indicating stronger agreement with the use or perceived relevance of the respective reading strategy. An overall reading strategy score was calculated by combining the ten item scores. This overall score was used in the ANOVA to provide a single summary measure of respondents' reported perceptions across the ten strategies. The use of the overall score was supported by the acceptable internal consistency of the ten-item measure (Cronbach's $\alpha = .745$). However, because the items represent different reading behaviours, the overall score is interpreted as a general indicator of reported perceptions across the measured strategies rather than as evidence that all ten strategies constitute identical behaviours.

FINDINGS

The findings of this study present the quantitative results obtained from the questionnaire. The results are presented according to the reading strategy ratings, reliability of the instrument and differences in overall reading strategy scores based on online reading frequency.

1) Students' Perceptions of Online Reading Strategies

The first analysis examined the mean and standard deviation of the ten online reading strategies. The results indicate that students perceived some strategies more strongly than others. Rereading difficult sections obtained the highest mean score, followed by vocabulary lookup and adjusting reading speed. In contrast, setting reading goals recorded the lowest mean score.

Table 1: Students' Perceptions of Online Reading Strategies

Reading Strategies	Mean	Standard Deviation	Rank
Skimming	3.59	0.81	4
Note taking	3.30	0.89	9
Rereading difficult sections	4.18	0.87	1
Highlighting or annotation	3.45	0.91	7
Vocabulary lookup	4.17	0.71	2
Prediction	3.41	0.91	8
Summarising	3.54	0.89	5
Adjusting reading speed	4.07	0.79	3
Setting reading goals	3.06	0.91	10
Evaluating source reliability	3.52	0.82	6

The results indicate that students reported different levels of perception towards the ten online reading strategies. Rereading difficult sections recorded the highest mean score ($M = 4.18$, $SD = 0.87$), followed by vocabulary lookup ($M = 4.17$, $SD = 0.71$) and adjusting reading speed ($M = 4.07$, $SD = 0.79$). In contrast,

setting reading goals recorded the lowest mean score ($M = 3.06$, $SD = 0.91$), followed by note taking ($M = 3.30$, $SD = 0.89$) and prediction ($M = 3.41$, $SD = 0.91$).

The three highest-rated strategies obtained mean scores above 4.00, indicating that respondents expressed relatively strong agreement towards rereading difficult sections, vocabulary lookup, and adjusting reading speed as online academic reading strategies. Rereading difficult sections recorded the highest mean score, suggesting that this strategy was the most strongly perceived among the ten strategies examined.

2) Reliability of Online Reading Strategy Instrument

The reliability analysis was conducted to determine whether the ten questionnaire items were consistent enough to measure online reading strategy perceptions.

Table 2: Reliability Statistics

Cronbach's Alpha	Number of Items
.745	10

The Cronbach alpha value was **.745** for the ten items. This indicates that the instrument had acceptable internal consistency for the present quantitative study. All ten items were retained for further analysis because the reliability value was considered adequate. The result suggests that the items were sufficiently related to represent students' perceptions of online reading strategies. However, the items still represent different types of reading behaviour, which explains why the scale does not need to obtain an extremely high reliability value.

3) Differences in Reading Strategy Scores Based on Online Reading Frequency

A one-way analysis of variance (ANOVA) was conducted to examine whether students' overall reading strategy scores differed according to their frequency of online academic reading. The four reading-frequency groups consisted of daily ($n = 5$), weekly ($n = 63$), monthly ($n = 24$), and rarely ($n = 23$) readers. The mean overall reading strategy scores were 31.72 for daily readers, 34.59 for weekly readers, 32.35 for monthly readers, and 30.51 for rarely readers. The ANOVA results indicated a statistically significant difference in overall reading strategy scores across the four reading-frequency groups, $F(3, 110) = 6.624$, $p < .001$. Levene's test was not significant ($p = .659$), indicating that the assumption of homogeneity of variance was satisfied.

As the ANOVA result was statistically significant, Tukey's HSD post hoc test was conducted to identify the specific groups that differed. The results showed a statistically significant difference between weekly and rarely readers, with a mean difference of **4.08** ($p < .001$). The other pairwise comparisons were not statistically significant.

Table 3: One Way ANOVA of Overall Reading Strategy Scores

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	427.704	3	142.568	6.624	< .001
Within Groups	2,367.800	110	21.525		
Total	2,795.504	113			

Note. $p < .05$ indicates a statistically significant difference.

A one-way ANOVA was conducted to determine whether students' overall reading strategy scores differed according to their frequency of online academic reading. The results revealed a statistically significant

difference among the four reading-frequency groups, $F(3, 110) = 6.624$, $p < .001$. Levene's test was not significant ($p = .659$), indicating that the assumption of homogeneity of variance was satisfied.

Tukey's HSD post hoc analysis showed that the statistically significant difference occurred between the weekly and rarely reading groups, with a mean difference of 4.08 ($p < .001$). The other pairwise comparisons were not statistically significant. Therefore, the significant overall ANOVA result appears to be primarily associated with the difference between the weekly and rarely groups.

4) Tukey Post Hoc Comparison

Since the ANOVA result was statistically significant, Tukey post hoc analysis was conducted to identify the specific groups which showed significant differences.

Table 4: Tukey Post Hoc Comparison

Comparison	Mean Difference	Significance
Daily vs Weekly	2.13	Not significant
Daily vs Monthly	-0.63	Not significant
Daily vs Rarely	1.21	Not significant
Weekly vs Monthly	2.76	Not significant
Weekly vs Rarely	4.08	p < .001
Monthly vs Rarely	1.84	Not significant

The Tukey post hoc result showed that a significant difference was found between students who read online academic materials **weekly and rarely**, with $p < .001$. Weekly readers obtained a higher overall reading strategy score compared to rarely readers. The other comparisons did not show significant differences. This finding indicates that the significant ANOVA result was mainly due to the difference between the weekly and rarely reading groups.

DISCUSSION

The findings indicate that students reported different levels of perception towards the ten online reading strategies examined. Rereading difficult sections received the highest mean score ($M = 4.18$, $SD = 0.87$), followed by vocabulary lookup ($M = 4.17$, $SD = 0.71$) and adjusting reading speed ($M = 4.07$, $SD = 0.79$). The relatively high ratings of these strategies suggest that students expressed stronger agreement towards strategies that can provide direct support when dealing with difficult or unfamiliar academic information. Rereading allows readers to return to information that may not be immediately understood, while vocabulary lookup can provide assistance when unfamiliar terminology is encountered. This finding is consistent with Azizan et al. (2025), who reported strong use of problem-solving strategies such as rereading and focusing on complex sections among Malaysian undergraduates.

Vocabulary lookup also received a high mean score, which may reflect the demands of academic texts that contain specialised terminology and unfamiliar vocabulary. In an online environment, students have convenient access to digital dictionaries and search functions that can provide immediate assistance. However, the present finding should be interpreted as a reported perception of the strategy, rather than direct evidence of students' actual behaviour. The high mean indicates stronger agreement with the vocabulary-lookup strategy among the respondents, but it does not establish how frequently students actually perform the behaviour. This distinction is important because the questionnaire measured students' perceptions of online reading strategies.

Adjusting reading speed was ranked third, with a mean score of 4.07 ($SD = 0.79$). This relatively high score indicates that respondents expressed strong agreement towards adjusting their reading pace when engaging with online academic materials. Online academic texts may vary in length and complexity, and readers may perceive adjusting their reading speed as useful when dealing with more difficult information. Freihat (2022) similarly examined metacognitive online reading strategies among university EFL students and highlighted the role of strategic approaches in online reading.

In contrast, setting reading goals recorded the lowest mean score ($M = 3.06$, $SD = 0.91$), followed by note taking ($M = 3.30$, $SD = 0.89$) and prediction ($M = 3.41$, $SD = 0.91$). The lower score for setting reading goals may indicate that respondents expressed weaker agreement towards this strategy compared with strategies that provide more immediate assistance during reading. Goal setting requires readers to establish a purpose before engaging with a text, whereas rereading and vocabulary lookup can be perceived as direct responses to comprehension difficulties. Therefore, the difference in ratings may reflect different levels of perceived emphasis on immediate problem-solving and advance planning strategies.

This finding is relevant to the metacognitive perspective underlying the study. Metacognitive strategies require readers to plan, monitor, and evaluate their reading processes. Anggia and Habók (2024) highlighted the importance of metacognitive awareness in online reading, while Raja Yacob and Mohamad (2023) reported that global, support, and problem-solving strategies were associated with English reading comprehension. The relatively lower perception of goal setting therefore suggests that greater attention could be given to planning-oriented strategies in academic reading instruction. However, because the present study measures perceptions rather than observed reading behaviour, the result should not be interpreted as evidence that students do not actually set reading goals.

The ANOVA results showed a statistically significant difference in overall reading strategy scores across the four online academic reading-frequency groups, $F(3, 110) = 6.624$, $p < .001$. The descriptive results showed that weekly readers obtained the highest overall strategy score ($M = 34.59$), followed by monthly readers ($M = 32.35$), daily readers ($M = 31.72$), and rarely readers ($M = 30.51$). The Tukey HSD analysis showed that the significant pairwise difference occurred between the weekly and rarely groups, with weekly readers recording a higher overall strategy score than rarely readers ($p < .001$). The remaining pairwise comparisons were not statistically significant.

One possible explanation is that students who engage with online academic reading more regularly may have greater exposure to different reading strategies. Repeated engagement with online academic materials may provide students with more opportunities to encounter different types of texts and reading demands. However, this finding should not be interpreted as evidence that reading frequency causes higher strategy scores. The study compared existing reading-frequency groups and did not employ an experimental design. Other factors, such as English proficiency, academic workload, previous online learning experience, and individual reading preferences, may also contribute to differences in students' reported strategy scores.

The significant difference specifically between weekly and rarely readers is also important. Although weekly readers recorded the highest overall score and rarely readers recorded the lowest, the post hoc analysis indicates that the statistically significant difference was limited to these two groups. Therefore, the findings should not be interpreted as showing that every increase in reading frequency results in a corresponding increase in reading strategy scores. Instead, the results suggest that the weekly and rarely groups differed significantly in their overall reported strategy scores within the present sample.

The findings have implications for academic reading instruction. Since rereading difficult sections, vocabulary lookup, and adjusting reading speed received relatively high perception scores, instructors can continue to incorporate these strategies into online academic reading activities. At the same time, the comparatively lower rating for setting reading goals suggests that planning-oriented strategies may require greater instructional attention. Students can be guided to identify their reading purpose before beginning an academic text and to reflect on whether the reading purpose has been achieved. Such activities may help strengthen students' awareness of the planning, monitoring, and evaluation aspects of online reading. Sinas et al. (2024)

demonstrated the relevance of metacognitive online reading comprehension strategies when students engage with online texts.

Instructors may also provide structured opportunities for students to practise different online reading strategies before, during, and after reading. For example, students can set a reading goal before accessing an academic text, predict the content based on available information, monitor their comprehension while reading, and evaluate the reliability of information after completing the reading task. These activities can complement strategies such as rereading and vocabulary lookup and provide a more balanced approach to online academic reading instruction.

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