

University EFL Students' Metacognitive Online Reading Strategies and their Reading Performance on Screen and on Paper

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Abstract

This study explored the most commonly used Metacognitive Online Reading Strategies as perceived by Saudi University Preparatory Year EFL Students at Imam Mohammad ibn Saud Islamic University. The study also investigated the students' performance in reading on screen and reading on paper. The sample of the study consisted of 500 students (14 randomly chosen sections) who responded to the survey of reading strategies, and 4 randomly chosen sections involving 163 students who participated in the reading text; two sections tested online (87 students) and two other sections tested on paper (76 students). The data collection tools consisted of a survey and a reading test. The survey of reading strategies (SORS) by Sheorey and Mokhtari (2001) was adopted for collecting the data. The survey adapts the 5-point Likert scale and consists of 38 items covering global reading strategies, problem-solving strategies and support reading strategies. The study also involved a reading test to compare the performance of the participants when reading on paper and on online. The test consisted of forty multiple choice items and tackled the reading-related constituents of skimming, scanning, vocabulary knowledge and grammatical ability. The findings of the study showed that Saudi University Preparatory Year EFL Students were high users of online problem-solving strategies and moderate users of online global and support reading strategies. The order of the participants' use of the strategies was problem-solving strategies, global reading strategies and support reading strategies respectively. The results of the reading test showed that the groups that were tested online outperformed the ones that set for a paper reading test.

Keywords: reading strategies, metacognitive strategies, online reading, reading on screen, reading on paper

1. Introduction

Reading in English plays an integral role in the learners' academic success in all disciplines particularly in which English is the main channel of instruction. Moreover, reading is one of the integral skills in language learning as it is the means for acquiring knowledge as well as learning other skills. Most commonly, learners access the target language and its culture through reading. Furthermore, learners acquire knowledge and gather information in their academic life mainly through reading. In addition, the reading skill is considered the ground for most constituents of language learning. Many researchers have indicated that reading involved many problems for learners because of the factors involved in the reading skill including the level of reading materials, grammatical content, vocabulary, the students' background knowledge (e.g., Nuttall, 2000). Online reading comprehension has become a crucial component for successful learning achievement, since portable Internet devices provide users with unlimited access to learning resources (Alshumaimeri, 2008). With the technological advancements, new strategies for reading are required to deal with the massive amount of the reading materials available in as well as the persistent need for dealing with the requirements and the nature of online texts.

2. Theoretical Background

2.1 Reading Strategies

Reading strategies can be defined as the thoughts and actions that readers use to store, recall, and employ information gained in a text. Strategic readers according to Celce-Murcia (2001) comprehend the purpose of a reading activity, employ a variety of reading strategies, properly control comprehension, and solve out understanding problems adequately. The strategic reader according to Hinkel (2005) is one that builds up and tests meaning in all stages of the reading process.

The nature of online reading comprehension has sparked debate in the educational community, particularly in language teaching. According to Coiro (2003), research has tackled how we think about reading comprehension, as a result of technological influences. She claims that electronic texts offer new opportunities as well as new obstacles, potentially affecting the readers' ability to grasp what they read.

Reading comprehension tends to vary substantially between paper-based and online reading modes. Anderson (2003) disputes that online reading encourages the of reading strategies. According to Uso -Juan and Ruiz-Madrid (2009), online media enabled readers to facilitate their practice of strategic reading. Similarly, Jamali, Nichols and Rowlands (2009) argue that proficient readers are more likely to apply their paper-based reading strategies to other types of text like the computer environment.

There are several differences between online and printed text. These differences mainly include textual boundaries, linearity, and navigation. Textual boundaries in online reading make the reader see less content at once with the text being shown is restricted to the relatively small size whereas the paper text gives the reader the space to move in all directions. In addition, conventional text progresses in a linear manner between paragraphs

and pages, while paper text shows no fixed order in according to which the content will be read (Sutherland-Smith, 2002).

With the advancement of technology, online text is taking the place of printed text. Therefore, students should be given the right training of the necessary literacy skills to be able to deal with online texts. Research suggests that students who do not have the proper online reading strategies encounter real problems when reading online content and they usually suffer with understanding the content of the online reading material (Eagleton, 2001). Most of the current literature in the field of reading research has targeted paper-based reading. Consequently, studies on how students employ comprehension strategies in online reading contexts are lacking (Coiro & Dobler, 2007). Because of this discrepancy in the literature, many educators may be failing to equip their students with the reading strategies and strategies they require.

2.2 Metacognitive Reading Strategies

Metacognitive reading is known as the conscious management of the reader's own cognitive processes. Metacognitive reading strategies assist readers in overcoming obstacles and as a result achieving comprehension. More specifically, metacognitive strategies involve an individual's capability of monitoring his/her reading process, self-evaluating his/her own reading comprehension, and identifying potential problems if necessary. O'Malley and Chamot (1990) defines metacognition as the reader's ability to handle their cognitive processes. These strategies allow readers to consider how to react to a certain task or some tasks (Sternberg, 1986). In short, metacognitive reading strategies are understood as any cognitive strategy attentively utilized to support reading comprehension.

Metacognitive reading strategy consciousness is integral in the reading skill (Mytcowicz, Goss, & Steinberg, 2014). Furthermore, utilizing the metacognitive reading strategies affectively fosters the learners' performance in the reading skill; therefore, it is assumed that students who employ these strategies outperform those who do not. (Tavakoli; 2014). Hence, the need for metacognitive reading strategies is emphasized in language teaching as it could be one way to address the problem of weak reading skill.

The Online Survey of Reading Strategies (OSORS) is the most frequently employed tool of online metacognitive reading. The survey was established by Anderson (2003) for studying subcategories of reading strategies, namely: global cognitive strategies (16 elements), problem-solving cognitive reading strategies (11 elements), and support cognitive strategies (nine elements). Research on metacognitive reading of second language learners (Mokhtari & Reichard, 2002) clarified these categories of metacognitive reading strategies: Global strategies are the actions which involve the reader's intentional and careful global text analysis such as setting a goal for reading, activating existing knowledge, ensuring that the information fits the purpose, deciding on what to read, and fostering reading by employing text clues, text structure and other textual aspects. On the other hand, problem solving strategies are the tactics that readers employ to deal with obstacles when text becomes difficult to comprehend. Examples on this category strategies comprise focusing more intently on reading, modifying the reading speed, pausing to consider the read text, boosting understanding by revisiting the text, loud reading, and attempting to deduce the meaning of

the unknown phrases. Furthermore, support strategies are those that involve using outside sources to support comprehension. Examples of support strategies encompass paraphrasing text information, highlighting text information, using a dictionary, taking notes, composing reading summaries and translating text into mother tongue.

2.3 Problem of the Study

Many language teachers and university instructors complain of their students' weak reading skills. They claim that a lot of the students are unable to read the simplest material and answer comprehension questions correctly. Furthermore, various studies have shown that some Arab students suffer with reading skills although they may excel in the other language aspects and skills (e.g., Alateeq, 2016; Alrabai, 2016; Al-Seghayer, 2014). Consequently, the learners' weakness in the reading skill is usually reflected on their performance in the other language skills.

Unlike paper-based reading, online reading requires new reading strategies. Paper-based reading strategies have been studied and classified thoroughly. However, online metacognitive reading strategies have not gained sufficient attention from researchers, specifically for bilingual Arab language learners who read in two languages on the internet. To the researcher's best knowledge, no study has tackled online metacognitive reading strategies employed by Saudi Freshmen University students and compared their reading performance when reading digital or printed text. Therefore, the current study investigated the online reading strategies used by Saudi freshmen university students. Moreover, the explored the potential significant differences in the students' reading performance that can be attributed to using digital or printed text.

2.4 Purpose of the Study

Literature suggests that reading print texts is different from reading from screens due to the many variations between the two formats of reading texts. Research also indicates that insufficient metacognitive reading abilities lead to poor comprehension of content. Studies tackling metacognitive strategies have produced a wide range of findings. However, with the increasing need for dealing with online material due to changes in the modes of education because of Covid 19, the topic of metacognitive reading strategy employment still needs further studies and better understanding. Therefore, this paper explored online metacognitive reading strategy application among preparatory year Saudi male university students. Furthermore, the study aimed to explore whether there were any differences in the comprehension of two groups Saudi Freshmen language learners taking two formats of the same reading text (digital and print). More specifically, the current study aimed to answer the following research questions:

- 1) What online metacognitive reading strategies are most commonly employed by Saudi male university preparatory year EFL Students?
- 2) Are there any statistically significant differences in the mean scores of Saudi University Preparatory Year EFL Students of different abilities due to using digital or print text?

2.5 Significance of the study

Recently, online reading has developed into a vital skill for readers. With the Covid-19 Pandemic and academic institutions lock down, it has been inevitable that language learners read many of their materials online. Many studies have tackled Saudi paper-based reading strategies whereas online reading strategies have rarely been studied. The current study extends findings of prior research related to online metacognitive reading strategies. Furthermore, findings of this study help researchers, language planners as well as teachers to better understand EFL students' reading strategies in the online context. Ultimately, such investigation assists participants to become aware of their online metacognitive strategies and accordingly become autonomous learners. In addition, the findings of this study can assist future researchers create resources for teaching online metacognitive reading strategies.

2.6 Limitations of Study

The findings of the current study are limited to the male Saudi male university preparatory year EFL Students at Imam Mohammad ibn Saud Islamic University (IMSIU) in the first semester of the year 2021-2022. Students in the university preparatory year and after 13 years at schools are expected to have been acquainted with all types of reading strategies especially the metacognitive ones. Another limitation of the study is that the OSORS survey used in this study is a self-report one which might affect the security of the participants' reports. Therefore, the researcher added the second question which may support the findings of this study by showing the differences in achievement between reading via the two means.

3. Literature Review

Researchers in the EFL context attempt to understand the strategies EFL students employ when reading English texts. Most of the prevailing literature has focused on paper-based reading. Consequently, there is very little information about the learners' adoption of the online reading comprehension. In addition, the findings of these previous studies were inconsistent. Particularly, because these studies adopted diverse instruments, and a lot of them were conducted on small sample sizes, it is hard to generalize their findings. Furthermore, there is little empirical data on comparing the performance of readers using online and paper-based texts. The current study, therefore, explores Saudi EFL freshmen students' employment of online metacognitive reading strategies. It also compares the reading performance of the participants in two media: printed and online text.

The available research on the readers' usage of the online reading strategies yielded various yet inconsistent results. Several reading strategies found that global strategies were most used (Chen, 2015). However, the bulk of the studies found that online problem-solving strategies were the most commonly employed ones (Zarrabi, 2015; Jounto & Mustapha, 2016; Meniado, 2019; Azmuddin, Nor, & Hamat; 2017; Mukhlif & Zaini, 2017; Marboo, Roohani, & Mirzaei, 2020). In addition, the majority of the studies in the area found that support strategies were the least frequently utilized category among the online metacognitive reading strategies. Furthermore, several recent studies found were concerned with the differences between the two genders and found no significant differences (Alluhaydan, 2019; Altalhab,

2019).

Chen (2015) studied EFL learners' perceived utilization of online reading strategies of 94 language learners in Taiwan. The findings indicated that EFL those who read online use global strategies more frequently. High level readers, on the other hand, tended to use global and problem-solving strategies more than low level readers.

Zarrabi (2015) investigated the metacognitive online reading strategies employed by non-native English-speaking graduate students of different language-related majors. The findings revealed that students employed most of the three categories online metacognitive reading strategies. They employed problem-solving strategies most frequently and support strategies the least.

Jounto and Mustapha (2016) compared Libyan EFL high school students' utilization of metacognitive reading strategies. They found that problem-solving was the most common category in online reading, the participants were moderate users of global strategies while they used support strategies the least used.

Meniado (2019) surveyed the metacognitive reading strategies of 60 randomly selected Saudi male college-level EFL students in the industrial colleges in Saudi Arabia. The study found out that the Problem-Solving Strategies (PROB) were the most commonly used ones.

Azmuddin, Nor and Hamat (2017) surveyed university students' employment of the navigational strategies and metacognitive online reading strategies in reading English Science and Technology online texts for educational purposes. The study showed that the participants used support reading strategies the least followed by global whereas problem-solving strategies were used the most.

Mukhlif and Zaini (2017) investigated Iraqi university students' employment of metacognitive online reading strategies. The results showed that problem-solving reading strategies were the most used category succeeded by support reading strategies and global reading strategies.

Alluhaydan (2019) investigated the frequently used online metacognitive reading strategies by Saudi EFL and ESL learners. The study also explored perceived differences in strategy use between Saudi male and female ESL/EFL learners when reading online texts. Male and female participants showed no significant differences in their use of the three categories of online reading strategies. Similarly, EFL/ESL and Arabic speakers showed no significant differences in their use of online metacognitive reading strategies when gender was not considered.

Altalhab (2019) examined the application of reading strategies amongst 148 (75 male, 73 female) Saudi EFL university students, exploring the most used strategies. Furthermore, the research also investigated gender differences in Saudi EFL university students' use of reading strategies. The findings indicated that Saudi EFL university students were acquainted to most categories of online reading strategies. There were no significant variations between male and female students in their usage of the reading strategies.

Roomey and Alhawasawi (2019) studied the reading habits and reading strategy usage of Saudi EFL college students. Participants responded to a questionnaire and were interviewed by the researchers. The results indicated that students were seen as high users of reading strategies. Students used a variety of strategies to deal with the difficulty of the reading material.

Marboo, Roohani and Mirzaei (2020) studied the metacognitive online reading strategies employed by Iranian university students. The results indicated that the EFL university students tended to employ problem solving strategies the most, followed by various global and support strategies separately.

Teachers and students have been forced to conduct teaching and learning remotely due of the COVID-19 pandemic. Recently, there has been a tendency towards reading on electronic devices, such as smart phones, tablets, and laptops. However, few studies have tackled the difference between learners' outcomes in digital reading and paper-based reading. Furthermore, there are conflicting research findings when comparing learning overpaper-based and online media, which makes it difficult to reach generalizations. Some studies (Singer & Alexander, 2017) found that the participants' reading comprehension was better on digital devices than on traditionally, while other studies did not show significant variation between them (Hermena et al., 2017; Porion et al., 2016; Liman & Karadeniz, 2021). Yet a third group of studies showed the superiority of reading on paper (Dahan, Barzillai, & Katzir, 2018; Kong, Seo, & Zhai, 2018; Halamish & Elbas, 2020; Stole, Mangen & Schwippert, 2020).

Aydemir, Öztürk and Horzum (2013) studied the impact of screen reading on elementary school students' reading comprehension. The study found no significant differences between the reading from screen and paper reading according to the results of the students' reading comprehension.

Porion, Aparicio, Megalakaki, Robert and Baccino (2016) studied the efficacy of paper vs. computer on the memorization and reading skill of secondary school learners. The findings showed no differences between the two media.

Hermena, Sheen, Aljassimi, AlFaisal, Matroushi and Jordan (2017) studied the reading performance of learners' reading of Arabic texts given on paper and tablet. The findings showed no reliable differences between the learners' achievement via the two reading media.

Singer and Alexander (2017) studied undergraduate students' reading performance when reading digital and print texts. The findings showed students' preference of the digital text.

Dahan, Barzillai, and Katzir (2018) explored the influence of presentation format (paper or computer screen) on primary school students' reading achievement. The findings demonstrated that the learners performed significantly better on paper than when reading from a screen.

Kong, Seo and Zhai (2018) analyzed the content of 17 studies which compared between students' reading speed and reading comprehension across digital reading and paper-based

reading. The meta-analysis indicated that there was an advantage for the reading on paper in terms of reading speed and reading comprehension.

Halamish and Elbas (2020) examined the effect of the medium used for reading reading from screen and reading from paper on fifth grade students' reading. The students' reading was better on paper than on screen.

Stole, Mangen and Schwippert (2020) studied the effect of the reading medium on the performance of Norwegian children's in reading. The participants were given two reading comprehension tests – a paper-based and a digital one. Results indicated that on average the paper-based scores outperformed the digital test ones.

Liman and Karadeniz (2021) examined the reading performance of four groups of sixth-grade students in Turkey depending on their digital reading habits in school. Three treatment groups read a digital material whereas the control group used read printed texts. The results did not show significant difference between reading comprehension levels of the two groups despite the use of different reading media.

4. Methodology and Procedures

4.1 Population and Sample

The population of the current study targeted all students in the preparatory year program at IMSIU in the first semester of the academic year 2021-2022. The participants of the current study are twofold. First, the students who responded to the Survey of Reading Strategies consisted of 500 male students in the preparatory year at IMSIU. All students studied 16 English language hours a week. The total number of those students, according to the records of the Department of Admission and Registration at IMSIU was 2430. The sample of the study, which represented one fifth (20%) of its population, consisted of 500 students. In other words, 14 sections of the preparatory year program at IMSIU were chosen randomly to respond to the first part of the study which involved a questionnaire. Second: the students who participated in the reading pre- and post-tests consisted of four male sections of the preparatory year program; two sections were tested online and involved 87 students and the other two were tested on paper and involved 76 students. The four sections were all assigned purposefully as they were all taught by the same instructor to maintain a level of equivalence of treatment between the groups.

4.2 Instruments

Two instruments were used for collecting the data of the study:

Survey: The Survey of Reading Strategies (SORS) by Sheorey and Mokhtari (2001) was employed in this study. This survey studies the readers' perceived utilization of the metacognitive strategies for digital texts. The instrument consists of 38 items and adopts a 5-point Likert scale ranging from 1 to 5 (never to always). In addition, the instrument deals with three types of online metacognitive reading strategies, namely: problem solving strategies, global reading strategies and support reading strategies. A pilot study was done and involved 50 students, and the Cronbach's Alpha was obtained. The overall reliability measure

was (.84). Reliability of the global metacognitive strategies was (.85), the reliability measure of problem-solving reading strategies was (.81), and that of the support strategies was (.87). The pilot study's statistics showed that the instrument was satisfactorily reliable. Furthermore, the internal consistency of the instrument was (.86) which shows is quite satisfactory. In addition, the final format of the survey was shown to three specialists in language teaching and they all indicated it was valid and proper for the purpose of the study.

Reading Test: The second research question tackled the potential significant differences between digital reading and paper-based reading. To answer this question, a reading comprehension test was prepared. The test involved a reading passage followed by 40 multiple choice questions with four options each. The test was prepared in two formats (a paper-based one and an online format). The test tackled both the micro and macro-reading skills to test both high-level and low-level reading skills and subskills. The macro-skills encompassed scanning and skimming. The micro-skills understanding unknown vocabulary and identifying pronoun referents. The test involved four main questions. The first question tested students' ability of skimming for the main idea. The second question was directed to tap the students' grammatical knowledge. The third question tested the students' ability of scanning the text, and the fourth question was dedicated for testing the students' vocabulary. Four sections of the participants took two formats of the same test twice (two sections took the online version twice whereas the other two sections took the paper format twice) with a time span of two weeks between the two times for each group. The validity of the test was guaranteed by showing the test to three specialists and their recommendations were into consideration. The reliability of the test was also checked through a pilot study of 20 students and the Cronbach's' Alpha was (.88) which satisfactory.

4.3 Data Collection

The survey was administered to the participants online via their classroom management system (Blackboard). On the other hand, the reading comprehension of four sections of the participants was tested twice with a gap of two weeks between the two tests. Two of the groups were tested online whereas the other two groups were tested onsite using paper format of the test. The researcher himself checked and corrected the participants' answers on the test, and the test was then double checked by another instructor.

4.4 Data Analysis

To analyze the results of the questionnaire, the researcher employed SPSS. Means and standard deviations of the participants' responses were obtained along with their averages. Furthermore, Table 1 show that the researcher used the scale below to decide the level of agreement with the items in the questionnaire: "Never" = 1 Point, "Occasionally" = 2 points, "Sometimes" = 3 points, "Usually" = 4 points, and "Always" = 5 points. Furthermore, the researcher employed the following interpretation scale to determine levels of importance for the means of items and subscales obtained from the responses of the participants.

Table 1. Interpretation scale for the levels of importance for means of items and subscales

Range of Values	Level of Importance
1-2.5	Low
2.51-3.75	Moderate
3.76-5	High

Regarding the results of the test, the cross tabulations were first conducted. Means and standard deviations were calculated, and the t-test statistic was performed to decide whether there were any statistically significant differences between the groups.

5. Results and Discussion

The results of this study are presented according to the questions of the study.

5.1 Results Related to the First Research Question

The first research question investigated the most commonly used online reading comprehension strategies as perceived by the participants. The results of the first research question are presented -below in tables 2- 4 in three categories: global reading strategies, problem- solving reading strategies, and support reading strategies. Table 5 shows the summary and the averages of tables 2-4. Table 2 shows the participants' perceptions towards the global reading strategies.

Table 2. Means and standard deviations of the participants' perceived use of online Global Reading strategies

Global Reading Strategies	M	SD	Level of Importance
1. I have a purpose in mind when I read online.	4.84	0.57	High
2. I participate in live chat with other learners of English.	2.10	0.58	Low
3. I participate in live chat with native speakers of English.	3.79	0.71	High
4. I think about what I know to help me understand what I read online.	2.95	0.53	Moderate
5. I take an overall view of the online text to see what it is about before reading it.	2.06	0.52	Low
6. I think about whether the content of the online text fits	3.06	0.54	Moderate

my reading purpose.			
7. I review the online text first by noting its characteristics like length and organization.	2.99	0.48	High
8. When reading online, I decide what to read closely and what to ignore.	2.06	0.52	Moderate
9. I read pages on the Internet for academic purposes.	3.89	0.59	High
10. I use tables, figures, and pictures in the online text to increase my understanding.	2.76	0.65	High
11. I use context clues to help me better understand what I am reading online.	2.95	0.53	Moderate
12. I use typographical features like bold face and italics to identify key information.	4.84	0.57	High
13. I critically analyze and evaluate the information presented in the online text.	3.89	0.59	High
14. I check my understanding when I come across new information.	2.91	0.54	Moderate
15. I try to guess what the content of the online text is about when I read.	3.79	0.71	High
16. I check to see if my guesses about the online text are right or wrong	3.03	0.59	Moderate
17. I scan the online text to get a basic idea of whether it will serve my purposes before choosing to read it.	3.06	0.54	Moderate
18. I read pages on the Internet for fun.	2.09	0.57	Low
Total	3.17	0.57	Moderate

Table (2) shows that the average mean of the participants' perceived use of the global strategies is moderate ($M=3.17$, $SD=.57$). The strategy with the highest mean was "I have a purpose in mind when I read online" ($M 4.84$, $SD .57$) whereas the strategy with the lowest mean was "I take an overall view of the online text to see what it is about before reading it" ($M 2.06$, $SD .52$). Table 1 also shows that there was a variety of levels of levels of importance in the global reading strategies subscale. Table (2) also shows that eight strategies were perceived as important, seven strategies were viewed as moderately important whereas the importance of four strategies was seen as low. Table (3) below presents results related to the problem-solving strategies.

Table 3. Means and standard deviations of the participants' perceived used of online Problem-solving strategies

Problem-solving strategy	M	SD	Level of Importance
19. I read slowly and carefully to make sure I understand what I am reading online.	4.82	0.65	High
20. I try to get back on track when I lose concentration.	3.91	0.61	High
21. I adjust my reading speed according to what I am reading online.	2.91	0.54	Moderate
22. When online text becomes difficult, I pay closer attention to what I am reading.	4.78	0.66	High
23. I stop from time to time and think about what I am reading online.	3.89	0.59	High
24. I try to picture or visualize information to help remember what I read online.	4.78	0.66	High
25. When online text becomes difficult, I reread it to increase my understanding.	3.89	0.59	High
26. When I read online, I guess the meaning of unknown words or phrases.	4.75	0.68	High
27. I critically evaluate the online text before choosing to use information I read online.	1.34	0.81	Low
28. I can distinguish between facts and opinions in online texts.	2.97	0.50	Moderate
29. When reading online, I look for sites that cover both sides of an issue.	3.79	0.71	High
Total	3.80	0.63	High

As for the problem-solving strategies, Table (3) reveals that the participants' perception about these strategies was high ($M= 3.80$, $SD= .63$). It is apparent from the results that seven

strategies in the problem-solving subscale were perceived as highly used, whereas two strategies were viewed as moderate. On the other hand, two strategies were perceived as low. The item with the highest mean in this category is “I read slowly and carefully to make sure I understand what I am reading online.” (M 4.82, SD. 56). The lowest item, however, was “I critically evaluate the online text before choosing to use information I read online” (M 1.34, SD. .81). Table (4) below shows the results related to the support strategies.

Table 4. Means and standard deviations of the participants’ perceived use of online support strategies

Support reading strategy	M	SD	Level of Importance
30. I take notes while reading online to help me understand what I read online.	2.99	0.48	Moderate
31. When online text becomes difficult, I read aloud to help me understand what I read.	1.21	0.65	Moderate
32. I print out a hard copy of the online text then underline or circle information to help me remember it.	2.79	0.65	Low
33. I use reference materials (e.g., an online dictionary) to help me	2.76	0.65	Moderate
34. I paraphrase (restate ideas in my own words) to better understand what I read online.	2.97	0.50	Moderate
35. I go back and forth in the online text to find relationships among ideas in it.	4.82	0.65	High
36. I ask myself questions I like to have answered in the online text.	2.08	0.56	Low
37. When reading online, I translate from English into my native language.	4.67	0.85	High
38. When reading online, I think about information in both English and my mother tongue.	2.76	0.65	High
Total	3	0.62	Moderate

With regards to the support strategies, Table (4) shows that these strategies were perceived as Moderate (M 3, SD .62). The strategy with highest mean was “I go back and forth in the online text to find relationships among ideas in it” (M 4.82, SD .65), whereas the strategy that gained the least mean was “When hen online text becomes difficult, I read aloud to help me

understand what I read” (M 1.21, SD .65). Table (5) summarizes the results of the three categories and shows the averages of the means, standard deviations as well as the levels of importance for the three categories as perceived by the participants.

Table 5. Means, standard deviations and levels of importance for the three categories of online metacognitive strategies as perceived by the participants

Strategy category	Mean	SD	Level of importance
Problem-solving metacognitive Reading Strategies	3.80	0.63	High
Global Reading Strategies	3.17	0.57	Moderate
Support Reading Strategies	3	0.62	Moderate

Table 5 shows that the Problem solving strategies were perceived as the most commonly used ones among the participants (M 3.80, SD 0.63). Global reading strategies were the second preferred category according to the participants’ perceptions (M 3.17, SD 0.57). The least preferred category was the Support reading strategies (M 3, SD, 0.62).

The findings of the first question showed that the participants perceive their application of the problem solving online metacognitive strategies as “high” whereas they see that their usage of the global and support online metacognitive reading strategies as “moderate”. These findings support the findings of previous studies (Zarrabi, 2015; Jounto and Mustapha, 2016; Meniado, 2019; Azmuddin, Nor and Hamat, 2017; Mukhlif and Zaini, 2017; Marboo, Roohani and Mirzaei, 2020). These researchers found that problem solving metacognitive reading strategies were the most commonly used among their participants. Yet, the findings of this study contrast with the findings of other studies like Chen (2015) who found that global strategies were the most employed ones. In addition, the results of this study agree with the findings of other studies which found that support reading strategies were the least commonly used ones as perceived by the participants (Marboo, Roohani and Mirzaei, 2020; Azmuddin, Nor and Hama, 2017; Jounto and Mustapha, 2016). The moderate use of the metacognitive reading strategies hinders their text comprehension. The researcher thinks that these results are significant can be somehow attributed to the traditional educational system followed by the instructors in the prep year program that does not introduce strategic learning to the learners.

5.2 Results Related to the Second Research Question

The second research question addressed the potential significant differences between the scores of the reading performance of the paper-based group and the internet-based group.

Table 6 shows the results differences in performance in the reading test between the two groups.

Table 6. Descriptive statistics for the difference in performance in the reading test between the two groups

Question	Test Format	Correct answers	Percentage
Q1: skimming	Paper based	48	63%
	Internet based	59	67%
Q2: Scanning	Paper based	47	61%
	Internet based	56	64%
Q3: Vocabulary knowledge	Paper based	52	68%
	Internet based	67	77%
Q4: Grammatical ability	Paper based	58	76%
	Internet based	71	81%
Total	Paper based	51	67%
	Internet based	63	73%

Table 6 shows that online-test ($n = 87$) outperformed the paper-based test ($n = 76$) in all sections of the experiment. To find whether the findings were significant, the researcher conducted t-test whose results are shown in Table 7.

Table 7. T-test results for the variation between internet reading group and paper-based reading group

	N	M	SD	df	t	P
Online	87	.63	.24	21	2.03	.041 (Sig)
Paper-based	76	.51	.26			

Table 7 shows the t-test results that compare the scores of the online-test ($M=63$, $SD=.24$) and that of the paper-based test ($M=51$, $SD=.26$). The results showed statistically significant differences between the two mean $t(21)=$, $p=.41$ in favor of the online reading group.

The findings of the second research question indicated that the group of participants who were tested online outperformed the group who were tested traditionally using paper and pencil in the total reading comprehension mark and in all divisions of the test, namely: skimming, scanning, vocabulary knowledge and grammar. The findings of this part of the study are supported by other studies' findings like (Aydemir, Öztürk, & Horzum, 2013; Singer & Alexander, 2017). These studies found that the readers performed better when they dealt with screen than on paper. The current study also contradicts with the findings of some studies which found no significant differences between the two media (Hermena et al., 2017; Porion et al., 2016; Liman & Karadeniz, 2021). On the other hand, the results of this study do not agree with the findings of some studies (Dahan, Barzillai, & Katzir, 2018; Kong, Seo, & Zhai, 2018; Halamish & Elbas, 2020; Stole, Mangen, & Schwippert, 2020) which showed that the group of participants who were involved with paper-based reading outperformed those who were involved with the hypertext.

The findings of the second research question indicate that young adults tend to understand what they read on devices better than what they read on paper. Several factors could have influenced this finding. One of these findings could be students' advanced digital skills and experience due to the widespread exposure to the digital devices. Secondly, students' digital skills have been developed and prioritized in KSA for many reasons amongst which is the pandemic situation. Digital devices have become common learning devices in schools and universities in KSA. There is also evidence of the Saudi students' abundant exposure to digital devices in their houses.

6. Conclusion and Implications

This study uncovered several issues about the students' online metacognitive reading strategies and their literacy. With the Internet becoming a primary learning tool and source in the language learning process, it is important for students to develop new literacy skills and strategies to accommodate the new literacy demands. As mentioned above, there are many differences between online texts and paper-based ones. There are many challenges in dealing with the internet text. Therefore, language pedagogues should take into consideration these new challenges and how learners can overcome them and benefit from the expanding reading sources on the internet. In conclusion, the current research is an exploratory study to investigate online reading comprehension strategies and the learners' performance differences when reading traditional text in contrast to reading hypertexts. The findings of the study emphasize the importance of developing innovative methods that lay the groundwork for the future of reading curricula, strategies and instruction methods. There is no longer any room for the traditional elements of teaching reading. These days, should involve enabling learners for the challenges of huge sources, expanding knowledge and the need for speed reading.

On the other hand, the findings of this study have some significant pedagogical implications. Unlike traditional readers, online readers need to be highly strategic ones. In other words, they should be equipped with the most recent strategies and techniques that help them to absorb the text in the least period of time. On the other hand, a teacher's responsibility involves introducing the most useful strategies that assist them to interact with the online

reading environment. In addition, teaching guides and manuals should also incorporate methods of training learners on using metacognitive reading strategies.

The researcher feels that language instructors should be trained on how to teach online metacognitive reading strategies their students. Furthermore, reading textbooks should include online reading sections that train the learners on the process of online reading overcoming challenges of reading online. The reading process in the education process and language textbooks should also balance between the online and the paper-based content of reading.

As for the recommendation for further research, more research might be conducted to find out if online texts bring any additional challenges in the reading process. Furthermore, further research is needed to fully understand the divergent thinking processes involved in internet reading. There is also a need for further studies that investigate the effect of an instructional program that is based on the online metacognitive reading process on the learners' reading achievement. In addition, a further study is also needed to analyze the content of the reading textbooks of the prep-year program from the perspective of their inclusion of the metacognitive reading strategies.

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