

## **Reading on Smartphones: Students' Habits and Implications for Reading Skills**

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### **Abstract**

Since the introduction of the Internet and smartphones, there has been a shift in literacy patterns to digital texts. This change affects students' reading habits. For EFL students in Malaysia, the influence of digital texts is significant for their reading skills because the texts encountered on their smartphones are primarily in English. Hence, the way those texts are handled is slightly different from those in their L1. This is a qualitative case study involving thematic analysis, which investigates the digital reading habits of 12 Malaysian pre-university students on smartphones through observations of their screen recordings and open-ended interviews. The aim was to examine their pre-reading while reading, and post-reading habits while handling texts on smartphones and the implications on their L2 reading skills. Findings revealed that students could read in any environment, and the texts usually involved messages, web articles, and feeds from social networking applications. The selection of texts depended on recommendations and interests, but lengthy texts were generally avoided. Nevertheless, texts with appealing topics were attempted using assistive tools. Students also tended to navigate from one text to another rather quickly and used skimming and scanning methods while reading. To manage distractions, students used designated smartphone applications.

**Keywords:** digital reading habits, digital reading skills, digital texts, smartphones, EFL students

### **Introduction**

In the past, reading activities used to be conducted on print media, such as books, newspapers, and magazines. However, since the introduction of the Internet and smartphones, these knowledge-seeking activities are now conducted in mobile digital environments due to their versatility and convenience. An Internet-connected smartphone is currently viewed by many as a versatile platform for knowledge, and this provides an authentic reading environment that supports and engages readers in meaningful reading and language learning experiences (Coiro 2003). For EFL students in Malaysia, the influence of digital texts on their L2 reading skills is significant because the texts

encountered in the authentic digital environment on their smartphones are primarily in the English language. Hence, the way those texts are handled is slightly different from those in their L1.

Although many people may not consider their use of smartphones as a form of reading practice, Turner and Hicks (2015) pointed out that being online itself does involve digital reading skills. Generally, this is because most forms of information that appear on smartphones, except audio and videos, require some form of reading to navigate through the online digital environment. While the introduction of digital texts in the mobile reading environment has provided readers with new opportunities for further reading and exploration, this has also brought challenges. This is because the multimodal aspects of digital texts present more complex combinations of audio-visual elements which are not present in printed texts. Therefore, these create difficulties when readers encounter and navigate the digital environment (Serafini, 2012). Besides, Castek and Coiro (2015) added other challenges involved in digital reading, such as making decisions to select reading material and evaluating the credibility of information located online. Some researchers highlighted that although digital reading still involved several reading practices similar to print reading, such as meaning-making and self-monitoring, the process was still more complex with additional strategies needed like information evaluation and text location (Cho, 2014; Schmar-Dobler, 2003). The contrast between print and digital reading environments requires the reader to develop additional skills to construct meaning and adopt certain practices unique to digital reading. These tasks and adaptations are challenging for EFL students due to the wide variety and differing levels of difficulties in digital texts. This is especially true for EFL students with lower levels of proficiency in English. This is because not only do students need to navigate and select appropriate types of digital texts to read but also identify the main ideas and specific details and distinguish the relevant from irrelevant information while reading. Nevertheless, studies also suggested no significant differences in reading speed and comprehension between printed and digital texts (Çınar et al., 2021; Schwabe et al., 2021).

Hence, it is important to explore and understand students' digital reading habits that produce successful digital reading skills. Coiro (2011) stressed that it is vital to research students' abilities and practices in acquiring information through reading, understanding, and evaluating digital texts to develop their literacy skills further. Liu and Huang (2016) explained that this was because the increased amount of reading conducted on smartphones instead of print media has brought about new challenges and shaped new habits such as more browsing and scanning, and more selective reading, but less in-depth and concentrated reading. Therefore, this paper aims to investigate the digital reading habits of Malaysian pre-university students on smartphones and seeks to answer the following research question:

What are the EFL students' pre-reading, while reading, and post-reading habits while handling digital texts on smartphones?

This study is significant because it reveals the digital reading habits of EFL students on smartphones. These include the types of texts often read, the reading methods and assistive techniques used to handle texts and aid comprehension in the mobile environment, and implications on their reading skills from the exposure to texts on

smartphones. Valuable insights could be gleaned from understanding how EFL readers construct meaning as they conduct digital reading on their smartphones.

## **Review of Related Literature**

In the current world of new technologies, access to digital texts is becoming more common, and this has significantly changed students' reading habits. Generally, reading habits refer to repeated behaviour that shows repetitive actions in the way readers manage and organise their reading activities. These may be measured in the number of texts and text types read, the frequency of the reading, and the length of time spent on those reading sessions (Shen, 2006). Nevertheless, with the gradual shift to digital texts, these habits have evolved to portray reading habits that are slightly different from print reading. This shift is due to the kinds of texts that are multimodal in the digital environment, comprising images, audio, and video formats. Hence, these multimodal texts attract and engage readers in different comprehension areas as they are read in various ways, creating better opportunities for EFL students to develop their language and comprehension skills (Kaminski, 2019; Serafini, 2012).

Hassan Mohammed et al.'s (2019) review on Malaysian students' reading habits revealed that many students are reluctant readers, especially with printed materials, although they admitted that it could help them improve their language skills. However, this was in contrast with digital-based materials. Studies found that students' interest increased with digital texts, and they spent more time on them due to easier accessibility through electronic devices and practicality purposes (Baharuddin & Hashim, 2020; Ding et al., 2021). Liu (2005) added that students were attracted to browse through an array of information on the Internet, skim through a variety of texts and download their favourites at the same time. With a purposeful learning attitude, even the use of social networking services on their smartphones alone encouraged EFL students to learn English in academic and non-academic settings, and this improved their language proficiencies due to the interactive environment (Hamat & Hassan, 2019; Vikneswaran & Krish, 2016). Other studies showed that the preference for digital texts was also due to costs, greater ease in locating resources, and portability (Kumara & Kumar, 2018). Nevertheless, the general increase in the time spent on smartphones for reading (Ding et al. 2021) may cause distractions to overall academic performance (Kim et al. 2019) and lead to addiction to non-academic activities such as perceived enjoyment and mindless scrolling (Chen et al., 2017; Chen et al., 2017). Abidin et al.'s (2014) study confirmed that readers prefer browsing social networking sites rather than academic reading, and Iqbal et al. (2014) went so far as to claim that digital reading on the Internet is mainly unproductive and results in a waste of time. Therefore, certain self-regulated practices may be needed to regulate readers' use of smartphones for reading so that they do not become overly addicted to engaging digital texts that may consequently affect their academic work or sleep.

While changes in students' reading habits included more time spent on digital texts, other studies have demonstrated that they did not prefer reading on screens for prolonged hours, and some even experienced a loss of focus (Ding, 2021; Loh & Sun, 2019). Nevertheless, this increased reading interest towards digital texts compared to print,

which brought changes to students' reading habits, is significant to be investigated further due to the profound implications for students' language skills and L2 proficiency levels.

In an attempt to theorise the practice of digital reading, Turner and Hicks (2015) proposed the Connected Reading Theory that conceptualised the skills involved while reading digital texts in a digital environment. The connected reading theory suggested that digital reading habits differ from print reading habits in terms of requiring additional skills, which provides readers with more opportunities for exploration. The connected reading theory identified three main processes that occur when readers approach a digital text. The first involved *encountering* digital texts, and this could mean either searching for them intentionally or passively coming across those texts through suggested links that appeared on the webpage. Then they *engage* with those texts by selecting and reading them. Subsequently, while reading, the readers actively *evaluate* the text and decide whether to continue reading or move to another one. They also determine if additional digital tools would be used while reading, such as referring to an online dictionary or listening to online audio streaming. This cycle then continues back and forth around the processes. Turner and Hicks' (2015) connected reading theory portrays a complete cycle of readers' digital reading habits and targets the core processes involved in the pre-reading stages, while-reading, and post-reading stages. Using this framework, this study sought to adapt the various stages of connected reading in relation to the context of the EFL students in this study while determining the EFL students' reading habits as they read digital texts in the English language and the implications on their reading skills.

## Methodology

This case study employed an interpretive qualitative research design and aimed to explore students' reading habits on smartphones in the pre-reading, while reading, and post-reading stages. These included how texts on smartphones were selected and handled by EFL students, the types of texts read on smartphones, the kind of reading technique, and additional digital tools used to help with comprehension and actions taken after reading. The selection of the sample was based on random sampling. Initially, 86 pre-university students from different parts of West Malaysia answered a survey related to their reading habits. Out of these, 12 students volunteered to participate in-depth. These 18-year-old students were all EFL speakers, and the Malaysian University English Test (MUET) showed that they had B1-C1 CEFR proficiency levels in English. Their proficiency levels meant that they could read and understand texts independently. The in-depth study required them to submit screen recordings of the activities conducted while reading on their smartphones and be further interviewed through a stimulated recall to clarify their reading activity based on the observations from their screen recordings. The sample was considered sufficient because as more samples were analysed, the emerging themes continued to confirm each other, and the later samples showed recurring or no new themes emerging. Additionally, the small sample size allowed a deeper analysis, and more value would come from focusing on each student rather than a casual analysis of many students at a shallow level (Creswell, 2018).

Instruments used in this study consisted of observation logs to record insights observed from the students' smartphone screen recordings and open-ended interview questions. These instruments were first piloted to ensure their feasibility and efficacy to

gather enough relevant data. The data was then collected in two phases. In the first phase, students were given instructions to record their reading activities conducted on their smartphones as an unstructured, independent, and self-regulated activity and in the most authentic setting possible, within the comforts of their own space and time. They were requested to record at least one video (or more) for at least 3 minutes (or more) and were given two months. The recorded videos were then submitted to the researcher through messaging apps. The activities in the recordings were then reviewed, analysed, and recorded in observation logs. In the second phase, the recordings were replayed to the students for clarification, and additional questions were asked during the face-to-face and text message interviews. The semi-structured interview questions were prepared beforehand as a guide (refer to the Appendix), and these questions were adapted accordingly depending on the students' responses and stimulated recall. These questions aimed to provide more comprehensive knowledge and understanding of the students' experiences while reading on smartphones. These may not have been captured solely through the screen recordings. All data collected were then thematically analysed using constant comparative analysis (Charmaz 2014) and systematic procedures proposed by Strauss and Corbin (2015). They were open coding, axial coding, and selective coding methods. These involved reading and reviewing the transcriptions and observation logs until patterns or themes emerged, and these themes were identified by describing, classifying, interpreting, and categorising them (Creswell, 2018) and compared with, for variations, similarities, and differences. Finally, to ensure the validity and reliability of the study, responses from the interviews were triangulated with the observation logs from the students' screen recordings and cross-checked with the students to be verified and determined if the accounts were accurate and complete and if the interpretations were fair and representative. To support the observations from the screen recording recordings, excerpts from the interviews are presented in the discussion. These are labelled 'S1' to indicate Student 1, 'T1' for text message 1 received, and 'Q1' for responses from questions that appeared and numbered accordingly from the interview transcript while referring to the interview protocol (refer to the Appendix).

## **Findings and Discussion**

Turner and Hicks (2015) pointed out that any form of reading on smartphones follows the stages of the connected reading theory to a certain extent and requires comprehension while working towards language learning skills and practice. Based on this definition, students in this study also viewed their daily activities on their smartphones as a form of reading practice and generally preferred texts in their L2. This was because there were more varieties of digital texts and information available if they read in the English language rather than in their L1.

S3, Q10: Basically, nowadays, everything needs to be in English. So I think by reading in English website, I can improve my English.

S6, Q24: If in English, there is variety, more information and accurate.

Based on Turner and Hicks (2015) connected reading processes, the discussion of the findings in this study is generally structured according to the three stages proposed

(encounter, engage, evaluate) but categorises them as the pre-reading stages, while-reading, and post-reading stages.

### ***Pre-reading (Encounter)***

#### *Place and time*

Students indicated that they did not need to have any specific environment for reading as long as they had free time at their disposal to read digitally on their smartphones. Nevertheless, popular reading times were usually after classes and towards the evenings.

S4, Q1: So when I've reached my room, I will put all my thing and then I open my phones

S1, Q8 and Q9: I can do it anywhere, as long as I have the free time...I don't actually care...as long as I'm ok, I read

S10, Q25: I practically can read anywhere. Like, I; I was reading it in class, actually.

However, S10 further noted that if she needed to understand the text in further depth, she would need a quiet environment. Hence, some students tend to put in the effort to create a conducive environment, especially while studying digital notes on their smartphones or enjoying their reading sessions on their smartphones. The environmental preparation included finding somewhere familiar and quiet or lying down in a comfortable position. This attempt was carried out in addition to adjusting their smartphone settings (e.g. 'do not disturb' mode).

S10, Q25: If I'm reading something very interesting and I would really want to understand that, I would need a quiet environment to focus

S8, Q19: If about study, I'm need the specific place, like my room (S8, Q19)

The location for reading depended on the reading purpose and focus needed to handle the particular digital texts. Sometimes, students would also adjust the lighting in the room to avoid straining their eyes.

S2, Q25-27: I will make a condu-, conducive environment... I will switch on the light every time if I want to check on my phone or start reading.

Others pointed out that the physical posture of their bodies, such as sitting or lying down, was significant for concentration and the digital reading experience. This resonates with Chen and Lin's (2016) study, which emphasised that sitting held higher sustained attention than standing or walking.

S12, T25 & T26: I love to sit and read at my dressing table... But any chairs also can la as long as I'm sitting

Some of the reading sessions were targeted at researching academic information, especially when there was a need to do further reading or complete assigned tasks by their teachers. At other times, these reading sessions were for pleasure and used as a form of relaxation in between studies or after a long day of attending classes. Therefore, depending on students' preferences and reading purpose, it was observed that some students prepared certain reading conditions to a certain extent. However, students pointed out that their reading activity on smartphones would be reduced when they had many assignments.

S9, Q15: If something urgent come up. Like yesterday night, I got work to do....I didn't scroll my phone, I had to do, focus on that.

From here, it can be observed that students were aware of pending tasks to be completed and were able to prioritise their assignments while keeping their reading sessions in control. They used these reading sessions as short breaks to energise themselves between their studies and strike a balance between their reading time and completing their tasks.

### *Types of texts*

Observations from the screen recordings and students' responses revealed that the kinds of digital texts that were frequently accessed on their smartphones usually comprised text messages from social messaging applications, namely WhatsApp and Telegram, and updates from social networking applications, namely Instagram and Twitter. Texts from social messaging apps are composed of communication messages or forwarded information/ stories, whereas texts from social media accounts were mainly thoughts, opinions, or trending news shared by friends or the general public.

S9, Q2: I just take whatever that comes, because uh, usually the scroll, uh, feed is random. So depends on what is there, and then I just go for it lah, and read  
S5, T5: I don't have to search for reading material. It randomly pops up in my social media

They indicated that these digital texts were discovered either through recommendations by friends or while scrolling through their social media feeds. However, some texts were also actively or randomly searched and selected through the Google Search Engine Results Page (SERP), consisting of a list of web pages responding to the search query. Students revealed that these search results were usually used to guide or recommend which texts to read. Additionally, some of the topics they scrolled for were sometimes suggested by the dynamic Google feature "People Also Ask" (PAA) and "People Also Searched For" box. These appear as part of the Search Engine Results Page (SERP) and contain questions related to the original search query.

S5, Q12: There's like, Google option where they say like, 'People also searched for...' these topics, right? So if I find it interesting, then I'll click on it and then keep on reading on it.

It is important to note that most of these texts selected are mainly in the English language and not their L1 because they found that reading texts in the L2 was more beneficial and helpful to improve their language skills.

S3, Q10: Mostly I read in English, because I think like, if I read in Malay it won't help me to grow up.

S11, Q14: Give me a chance to learn English more, and makes my English improve... even though it's not a huge improvement, but I think it's quite, quite good for me

The kinds of texts encountered by EFL students on their smartphones illustrated that they generally preferred leisure reading on any text or topic that randomly appeared on their smartphone screens (especially on social media) or through a casual search on the Internet rather than on academic texts. They may also read on various topics that randomly surfaced in their thoughts. This confirms Wang et al.'s (2018) findings that mobile reading is a leisure-oriented and fragmented activity with multiple reading styles and individualised occurrences.

#### *Text selection strategies*

Although certain texts were recommended in the search process, the number of digital texts available in the online environment is still extensive. As a result, the process of selecting texts could sometimes be overwhelming. To decide which texts to read, students pointed out that they would usually choose popular web pages with many visitors (known as hits), and these usually appeared at the top of the search page. Screen recordings showed that students usually selected among the first few titles which appeared in the search engine results and scanned through before returning to the results page to explore other additional titles or to change their search key terms if the results did not yield what they wanted. They also tended to select texts of relevant interest and with easy reading.

S5, T1: I clicked the very first option because I think that the best website with the best reviews will pop up first.

S1, T2 & Q24: I used to read any pages that have a lot of visitor first...I will find the one that more easy to understand, and, uh, will give me more information

Students also indicated that titles that were catchy, specific, or had attractive descriptions and interesting layouts were mainly selected compared to those with general titles.

S5, T4: It depends on how catchy/attractive the article is.

Nevertheless, students admitted that they tended to avoid complex and lengthy texts because they found them difficult to comprehend and might be boring.

S1, Q24: I will go through first, if it's, if the article is so long, I will not look into it

Although short texts were preferred, students noted that this was still a good exposure that kept them constantly in touch with their L2. They revealed that if they did not own smartphones, they would cease to read anything due to the social and environmental factors surrounding them. Hence, smartphones caused them to read more than books because it was convenient to access reading materials without searching for them. Instead, the materials were “volunteered” to them through “push” feeds.

S3, T6: Having smartphones make me read more bcs it's easy to access from different platforms

For L2 students, between actively searching for or passively receiving texts, it was observed from screen recordings that L2 students generally preferred the latter. This was because they usually choose to visit their social networking apps or social messaging platforms and passively receive texts posted there. Nonetheless, when they actively searched for texts, they relied on recommendations from search results on the browser or attractive titles based on their interest. However, students indicated that they still actively read when they encountered the texts, regardless of whether those texts were actively searched for or passively received.

### ***While-reading (Engage)***

#### *Reading method*

The kind of reading involved with digital texts on smartphones was usually skimming and scanning. The students revealed that most of the time, the purpose of reading digital texts on smartphones was to obtain an overview of the main ideas in the text rather than to read extensively. Therefore, they deemed this reading method most suitable for digital comprehension. It helped them improve their reading skills as they practised identifying main ideas and supporting details quickly through keywords while learning to distinguish between relevant and irrelevant information.

S10, Q6: I usually skim and scan, because, er, y-, like if you see the website, they, they write it in point form. So it's easier for me to read, more than like, a long passage.

S9, Q10: I can usually detect key points faster. So when I read, I just read through; and then I find any key points, I just remem-, try to remember.

Students tended to aim at efficiency when approaching texts on their smartphones by getting it done as quickly and with as little effort as possible. There was more focus on retrieving content while reading digitally. They confirmed that this kind of selective reading method was more time-efficient and helpful for memory retention. Screen recordings also showed that students tended to read digital texts in a non-linear way, with more focus on keywords or subtitles. This meant skipping to different parts or sections of a text while reading. The non-linear reading method also included scrolling to the end of the text first or reading any available text summary beforehand before going back to the beginning of the text.

S10, Q7: Just to get information, basically...Cause I think it's better for, for us to read in point forms than reading like, a whole passage.

While skimming and scanning was a good practice to save time, some scholars may argue that this reading style does little to improve reading skills because there is less focus on in-depth reading and may lead to a somewhat shallower understanding of the entire content (Liu & Huang, 2016). This is because the skimming and scanning reading technique centres on picking up words in isolation and not in context. However, students added that they would still read in further depth if the text highlighted something essential or needed more specific information.

S8, T6: I read deeply if that information is about what I am really, really looking for, or something that can give me a good and useful information

This, in turn, would help in language and meaning-making, although they tend to prioritise more on receiving content.

#### *Vocabulary and grammar*

Students indicated that, although most of their digital reading sessions on smartphones involved skimming and scanning, their language proficiency levels were still positively affected. They asserted that since most published online texts, especially those from reputable websites, had gone through proofreading and editing, they were presented with opportunities to learn how new words were used accurately. They could also observe examples of grammatically correct sentences used in authentic, real-world contexts. They noted that this had undeniably helped their language skills improve because, while reading, students were able to familiarise themselves with appropriate sentence structures and grammar usage. They, in turn, were able to practice using those words in their daily contexts while replying to text messages and writing comments on social media posts.

S9, SR1: This one also helps me improve my English, because most of the texts are in English, so; and has, it, uh, helps me improve my vocabulary.

This learning process was unlike learning in academic settings, where new vocabularies were usually learnt in isolation and based on textbook examples in the classroom. Instead, language learning is proven more effective and meaningful when it occurs in authentic, real-life settings (Richards, 2015).

#### *Using digital tools*

Although it was pointed out previously that students tended to avoid texts that were difficult to read, those that highlighted topics that appealed to their interests would still be attempted. In these kinds of reading sessions, students used assistive tools such as Google translate and online dictionaries to help with comprehension when they encountered unfamiliar words and lookup Google search for illustrations. In addition,

students added that they sometimes noted down new words learnt in a notebook to aid memory retention and expand their vocabulary range more effectively.

S1, Q36: Sometimes I use the Google Translate, ah. So it helps me in English.

S2, T1: I will try to look up the words that I am not familiar with through google or Cambridge dictionary and note them down in my small notebook

Screen recordings showed that the students would interrupt their reading and exit from the text to either visit a dictionary or translation tool. For example, in a 35-minute video from S2, she exited the text six times to look up words and phrases that she did not understand. Each lookup session took an average of 2 minutes. This meant that a third of their reading time was spent on this vocabulary enriching activity. This proactive reading habit facilitated their vocabulary-building efforts even though limited language proficiency levels sometimes hampered EFL students' comprehension of digital texts.

### *Navigation pattern*

Observations from students' screen recordings also showed that students tended to frequently alternate between different texts while reading on smartphones rather than completing a specified text in one sitting. This was especially true if the texts encountered did not fulfil their reading interest, purpose or were boring.

S1, Q25: Sometime if I feel that the article do not give me, um, the thing that I really want to know, I will move on to the next article on the same topic.

S8, T6: After i bored with that app and i already scroll and scroll, i decided to use another app

Additionally, the digital reading environment is organised so that texts continuously stream from one article to another. On websites, suggested articles are usually displayed after the text, making it convenient for readers to click easily from one article to another.

S5, Q12: Keep on going, and then from there, it's like, di-, directing to another topic... So if I find it interesting, then I'll click on it and then keep on reading on it.

These digital texts are also embedded with hyperlinks which allow the readers to click into another article for further reading if they want to. In social networking applications such as Twitter and Instagram, on the other hand, various texts appear as feeds. As long as readers continue to scroll the page, new or repeated content continues to appear on the page in a never-ending fashion. Considering this layout, there is no end to how much a user can read.

Students mentioned that they also moved out from the application when they wanted to research something interesting that they came across within the application. This meant reading multiple sources to obtain different information from each source while comparing their content to form a better understanding.

S5, Q6: So while I'm like, scrolling the po-, posts, and then, uh, I'll find like, something interesting ... then I'll go to Google and then I'll search for that topic, and then I'll just go through a bit.

Sometimes, students also decided to move to a different application because either they had finished reading or there was nothing new, or the app displayed repeated content. This was an indication for them to stop and move on to another platform. Table 1 presents examples of the navigation sequence of some students during a particular reading session, which were observed from the videos of the students' screen recordings.

**Table 1**

*App navigation patterns from students' screen recordings*

| Student | Navigation pattern  |
|---------|---|
| S2, V2  | YouTube -- Google Chrome -- Facebook -- Notepad -- OpenLanguage -- Google Chrome -- YouTube -- WhatsApp           |
| S6, V1  | WhatsApp -- Google Chrome -- WhatsApp - Google Chrome -<br>- Google Classroom -- Instagram -- Telegram -- Twitter |
| S11, V1 | Facebook -- Instagram -- WhatsApp -- Telegram -<br>- YouTube -- Instagram -- TikTok                               |

It could be observed that many applications were explored within one digital reading session, and this involved reading multiple texts from various applications almost simultaneously. The digital environment somehow encourages multitasking, but this could also be due to on-screen distractions. As observed from the screen recordings, whenever notifications from messaging applications appear, students tend to navigate out to read texts from those apps instead, rendering yet another movement in their navigation.

The students' practice of continuously moving from one text to another generally demonstrates the current reading pattern of digital texts today, where students rarely spend prolonged time or focus on lengthier texts. For example, video data showed that each student spent an average of 20 seconds to 4 minutes reading through an app before moving on to another. Although this kind of reading style helps obtain large amounts of information quickly and saves time, the findings confirmed Levy's (1997:202) observation that society is generally moving towards a "shallower, more fragmented and less concentrated reading", predominantly occurring more in the digital environment. This could bring severe implications for memory retention and learning (Liu 2015).

*Managing distractions*

While reading on smartphones, students noted that distractions sometimes occurred, such as incoming text messages and notifications from various smartphone applications. Nonetheless, students sometimes managed these distractions by ignoring them or using designated applications on their phones to turn them off.

S11, Q19: I will turn up the 'do not disturb' mode... if you turn on the mode, the call will be, um, we, they cannot call inside us, and the message are all auto-mute.

S10, Q13: I would just check them later...if it's urgent, then I'll go back lah.

Most of the time, when incoming calls, notifications from text messages, or advertisements appeared, students evaluated and decided whether it was essential or worthy of their time to attend to them. By managing these distractions on their smartphones, they were then able to complete their reading despite these interruptions. However, Fox et al. (2009) pointed out that even glancing at interactions from text messages would still affect the reading process, causing the reader to take a longer time to complete the reading and even affecting the reader's comprehension levels. Nevertheless, the students in this study indicated that the on-screen distractions did not pose as significant problems to their reading activity.

### *Self-regulation*

Students indicated that the length of time spent reading on their smartphones varied from 5 minutes to a few hours, depending on the available time. This was spent reading any form of digital text, from scrolling through text messages to social media updates and internet articles.

S9, Q16: I spend most, uh, nearly ten, ten to 15 minutes on this, reading, one, uh, one or two chapters. Then I'll move on to the next app... Usually I set two hours to use

S10, T5: I control myself by checking the time if I feel that I'm on the app for quite some time and then I stop and proceed to do other things.

Although Ding et al.'s (2021) study found that there was generally an increase in the time spent by students reading on mobile devices, this study showed that they were reasonably mature enough to limit their reading sessions so that they would not get carried away with overuse. This indicates that as older pre-university students, they could generally regulate their reading time to a certain extent without being overly addicted to engaging digital texts that may consequently affect their academic work or sleep.

### ***Post-reading (Evaluate)***

#### *Checking for credibility*

As a further reading development, students pointed out that they occasionally conducted additional research to check on the source of the text or the credibility of certain websites, especially on information that needed further clarification. This was considered part of the reflection process that they go through after reading an article.

S9, SR2: And sometimes if not, if it's not credible, I'll just go check it online, I'll read an article about it.

It was observed that students in this study were able to evaluate if some texts were inaccurate or false by comparing the information with other trustworthy sources before reading and receiving the information from articles posted. This practice helped train

students to conduct independent Internet research and evaluate the content they come across. Additionally, students indicated that they have either been exposed to the dangers of fake news or taught by their parents or teachers about them. Hence, they would only visit well-known and trusted websites for authentic news and information. This gesture revealed the evaluation standards used by students to determine the value and reliability of the various websites from the search results. They also used their prior knowledge of the multiple sources to inform their decisions about the trustworthiness of those pages.

S11, Q10: If I get it from a official, official newspaper, uh, pages, I will trust it lah. If it is some, only some, only some papa-, paparazzi magazine, or paparazzi pages, I won't, I won't believe it

However, the students pointed out that they might occasionally question how the news was sourced. Hence, students specified that their source texts while reading were usually not limited to a few, but many. Students would move from one text source to another while reading on their smartphones to check for credibility, even on the same topics. Apart from reading the same issue from different viewpoints, this habit helped them confirm the information read and learn to differentiate between fact and opinion.

#### *Responding to texts*

It was interesting to note that, apart from reading, students also responded to the texts through interactions with other users by 'liking' the content, writing comments, or sharing those texts with other readers.

S1, T2: If i found it useful i would share it with my friends who need it.”

S6, T3: I liked the tiktok videos and i leaved a comment too😊”

Generally, it was observed that students are accustomed to sharing information amongst themselves and with the public. This common trait is seen especially among students of the younger generation. Screen recordings revealed that the digital texts and contents shared were usually informative, funny, or unusual. They viewed this as a form of public service, hoping that the same benefit they received from the same article would also benefit others.

S10, Q27: I think it can cheer people up, and it can actually make people happier lah, through the text.

In sum, observations from the above findings revealed that although the stages of digital reading suggested by Turner and Hicks's (2015) connected reading theory were observed (encountering, engaging, evaluating), the detailed processes within those stages slightly differed for EFL students. For them, elements such as the type of text encountered and language abilities influenced the L2 reading experience.

## **Implications and Conclusion**

In conclusion, findings from this study demonstrated the habits of Malaysian EFL pre-university students before reading, while and after reading texts on smartphones. Findings revealed that these students were not particularly selective of the place and time to use smartphones as reading tools except for a few preferences. They were also able to regulate their use so that it did not become excessive. This renders smartphones a versatile reading tool. Besides, their reading method and navigation styles also demonstrated that, to a certain extent, these students had developed specific digital literacy skills to adapt to multimodal texts on their smartphones while keeping up with the dynamic transformation of mobile technologies and the rapid growth of the Internet. Additionally, the strategies used to select various reading materials illustrated abilities in evaluating and filtering content, and this habit can help them practise critical reading skills (Rosenshine, 2018).

Besides, the expansion of their vocabulary repertoire and familiarisation with the English language grammar and sentence structures highlighted by the students demonstrated that consistent digital reading habits on smartphones could improve reading skills to a certain extent. Hence, digital texts on smartphones have remarkably provided an immense source of reading materials that not only attracted students with various topics but also provided a reading practice that could hone their reading skills at the same time. Additionally, the interactive environment allows for additional language practise in real-world settings.

The findings from this study have added additional variables to existing studies on digital reading in mobile reading environments. These could be a springboard for researchers and educators seeking to formulate practical digital reading strategies to assist students even further in their handling of digital texts in the mobile environment. For educators, one way to develop successful reading skills in students is to go directly to the source of students' attraction. A source in which students are already reading and immersed and holds great interest to them. Therefore, utilising the multimodal environment on smartphones may be effective for developing good digital reading habits.

Although some educators have cynically chosen to be against smartphones in classrooms (e.g. Park & Slater 2014), studies have shown that using smartphones for learning could bridge the gap between school and real life (Leis et al. 2015). This could further encourage self-regulated, phone-mediated learning outside of the classroom and in environments that occur in authentic, real-life settings. In addition, especially for EFL students, forming excellent and practical digital reading habits results in better language acquisition and contributes to building knowledge and information. In fact, good digital reading skills are considered an asset that could bring many benefits that last for a lifetime.

On a final note, one of the limitations which arose from the primary data source using screen recordings was the students' awareness which might have altered their behaviour when recording content to be more acceptable for display to the public eye. The awareness might have also inhibited more volunteers for the study. This is referred to as social desirability bias (Paulhus 1984). Turner et al. (2019) highlighted that such issues are common in research. However, future studies could consider ways to minimise the social desirability bias as much as possible.

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## Appendix

### Leading questions from the interview protocol

#### Pre-reading

- Why did you choose to use a smartphone to read/ for this particular reading session?
- Where do you prefer or often find yourself reading on your smartphone? Is there a favourite place?
- Are there any specific things you do to create a conducive reading environment/ behaviour on your smartphone?
- What were you looking for when you used your smartphone?

- Did you usually have an intention when you use your smartphone? If so, what was it?
- How do you decide which apps to use first?
- What kinds of apps do you usually visit? Why?
- Do you get recommendations for texts to read from other people? Do you read texts recommended by other people?
- How did you find and select what to look at? Was it difficult to find what you are looking for?
- How did you decide to read/not read the text?
- Why did you decide to select the particular link?

### **While-reading**

- How did you determine your reading focus (reading deeply vs skimming)?
- How much of this text did you read and why?
- How did you decide where to move on from there to another app?
- Do you plan to continue reading about the topic? Why or why not?
- How do you determine when to stop using your smartphone?
- How difficult was it to understand what you read? Explain.
- Was the text easy, intermediate, or difficult? Explain why.
- Did you encounter any distractions as you were reading? If so, what did you do? How did you handle them?
- Were there any strategies that you use to help you read/scroll on your smartphone?

### **Post-reading**

- Do you save websites or texts that you encounter online? If so, how?
- Did you share any texts you encountered with any other readers? Why or why not?
- What do you like the most and dislike the most about the digital texts that you read online?
- Did you do anything else after that based on what you have read?
- Did you find that you learnt anything or felt satisfied with your time spent there? Explain.