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**| RESEARCH ARTICLE**

## **Digital Reading Among Educated Arabs: A Twitter-based Study**

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**| ABSTRACT**

This study aimed to explore whether educated Arabs prefer to read paper or digital materials and which reading technologies and applications they use. The sample consisted of 272 educated Arabs (81% males and 19% females) who are Twitter users, who gave 437 responses to questions, hashtags and threads asking, "which digital media and digital devices do you use for reading, why, the advantages and disadvantages of digital reading vs reading from paper material". Data analysis showed that 71.5% of educated Arabs in the sample read traditional printed books and 28.5% read digitally and use digital reading technologies as follows: 15% listen to audiobooks, 6.5% use Kindle, and 7% use e-Ink, Audible, Storytel, Feedly, text-to-speech software (Read Aloud, Natural Reader Pro and Kurzweil 1000), Instapaper, Evernote, Raindrop, Pocket, Siri, eBooks, Artificial Intelligence (AI), Tarteel, Wajeez, Sibawayh Reader, and Screen Readers such as JAWS, Window Eyes, VoiceOver, Thunder, and HAL by blind students. Digital readers in this study use smart phones, iPads, tablets, and computer screens and are familiar with digital document formats such as Pdf, Epub, Mobi, IPA and AZW. The percentage of educated Arabs who use digital reading and reading technologies and apps is small, taking into consideration that many Arab people have access to the Internet and have a smart phone, a desktop or laptop computer and should be able to access a plethora of reading apps, digital resources, and reading technologies. It seems that many educated Arabs are not familiar with digital reading, eBooks, e-libraries, online reading resources, reading technologies and applications. Digital readers gave some explanations for their preferences and how they use digital media reading, when and where. Some recommendations for familiarizing children, students and the public with digital reading and reading technologies are given.

**| KEYWORDS**

Reading habits, reading motivation, reading culture, reluctant readers, positive reading experiences, reading technologies, educated Arabs, social media, leisure reading, audiobooks

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### **1. Introduction**

Digital reading<sup>1</sup> refers to the act of reading an article or a book using an electronic device like a smartphone, tablet, computer or eBook reader. The reader can access the books in PDF, HTML, or ePUB format. Instead of searching for the right information on bookshelves in the library, students, nowadays can perform a simple online search, identify a PDF-based ebook, download it, read it and then delete it if they wish. The Amazon Kindle Direct Publishing (KDP) is a major example of digital reading. People can purchase their favorite books in a digital format, and read the book using their portable readers (devices) easily. Digital ebooks seem to be more flexible than paper books. They are easily available, accessible, interactive, environment-friendly, easy to store and share and cheaper than printed books.

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<sup>1</sup> <https://kitaboo.com/what-is-digital-reading/#:~:text=Digital%20reading%20is%20the%20activity,%2C%20HTML%2C%20or%20ePUB%20format>.

Since we are living in the age of the Internet, digital reading has become the new reading norm among readers of all ages, educational levels, and professions. However, it is not clear how many people, especially students and educated adults, use digital reading and whether they prefer digital or traditional paper reading materials.

A review of the literature showed several studies that reported students' preferences for digital and/or paper reading material in some countries. For example, In India, significant differences were found in the reading material and resources used by male and female students studying Arts, Commerce, Humanities, Journalism, Mass Communications, Home Science, Medicine, BBA, and BCA. Social and digital media greatly affected male and female students' reading habits and behaviours (Ahmad, Dar & Lone, 2019). At the Universities in Kerala, the majority of students declared that with the availability of laptops, mobile phones and the Internet, their digital reading has increased. Significant differences existed in the opinion of male and female students about features like search, find, download, save, and bookmark that help them to read digitally. Aspects like font size, type face, text layout, and background colour highly influenced digital reading. Digital reading increased the students' selective, interactive, and superficial reading, and lowered their in-depth, sustained and concentrated reading. Male students' reading practices were significantly more influenced by e-resources than female students at the aforementioned colleges (Mohamed & Divya, 2020).

In Pakistan, the majority of engineering students preferred electronic books for academic reading and had no preference of formats for leisure reading. Most of the students used social networking sites for fun. However, the students had difficulties in searching online reading materials (Mirza, Pathan, Khatoon & Hassan, 2021).

In Malaysia, students at UiTM Puncak Alam preferred digital materials to printed texts due to the plethora of digital materials. Instructors had an impact on students' reading habits and attitudes (Baba & Affendi, 2020). At the International Islamic University, B.A. students majoring in Arts and IT considered websites an increasingly important reading source. Significant differences were found among academic programs, types of reading materials and the reading resources preferred (Karim, & Hasan, 2007). Interestingly, Malaysian Chinese university students preferred electronic media when reading for leisure but printed material for passing their exams (Abidin, Pour-Mohammadi & Lean, 2011). In another study in Malaysia, Annamalai and Muniandy (2013) indicated that electronic materials are the students' favourite source of reading. Social networking sites had a negative impact on the students' reading habits. Engineering and business students had low interest in reading, and they did not enjoy reading as much as they enjoyed doing other technology-related activities.

In Indonesia, 43% of the students majoring in English Education at Universitas Kristen reported that the Internet developed their reading habits. However, the majority considered reading as merely an activity for getting information for their school assignments and the Internet as the main source of information for their assignments. About one fifth of the students preferred reading paper material (Bana, 2020).

In Turkey, pre-service language teachers used digital media daily. Psychological factors such as reading interest, motivation, and anxiety occasionally influenced the teachers' reading process using digital media. The teachers read digital materials to obtain information, for entertainment and to chat with friends. Internet use on their smart phone and having a page on social media affected their digital reading habits (Maden, 2018). At Atatürk University, most students learning English and literature were affected by technology. They spent long hours in front of their computer screens. When online, they first checked their Facebook account, played games, listened to music, and so on. Most students asserted that they often read online news and comic strips, check their email and the weather forecast (Akarsu & Daryimez, 2014).

In Chile, university students majoring in human sciences, economic and business reading preferences varied according to the purpose of reading (academic, information seeking or entertainment). Although they used different media, they had a clear preference for paper books and materials. Regardless of the discipline, cognitive processes such as comprehension, memory, and learning had no main effect on their preferences. The researchers concluded that in this day and age, there is a 'Gutenberg-Google' generation, i.e. a generation in transition that still recognizes the importance of paper, especially for academic purposes (Parodi, Moreno-de León, Julio & Burdiles, 2019).

In the Dominican Republic, Amiama-Espailat & Mayor-Ruiz (2017) surveyed 382 grade 10 students from public and private schools to classify four reading purposes in print and digital formats. Most students accessed and used the Internet mainly for academic purposes, regardless of the educational sector. Nevertheless, reading literacy proficiency differed significantly among students from public schools as they had lower levels.

At the City University of New York, Foasberg (2014) reported a diary-based qualitative study on college students' reading habits related to printed and electronic media. It was found that students use print for long-form and academic reading and to engage in it more deeply. They felt more comfortable annotating printed documents. On the other hand, they used electronic resources

and read brief, non-academic materials electronically. Many students' leisure reading consisted of short articles on the Internet with both mobile and stationary devices. Although the students found electronic media convenient, most of them disliked electronic textbooks and did not wish to switch to electronic media for their academic reading. The students were less comfortable using textbooks in an electronic format, and some of them usually printed out the sections they used. The students understand that they live in a changing electronic environment. They are interested in new technologies, some are discovering new ways of reading with electronic devices, and the convenience of being able to access information from home, yet they valued print materials for both reading fiction and serious study. Some were concerned about the price of electronic gadgets.

In Austria, Schwabe, Kosch, Boomgaarden & Stocker (2022) surveyed 779 adult book readers and found that 90.8% of the subjects preferred printed books, either solely or in combination with digital reading media and 9.2% read digital books. They stated that digital reading media fostered reading on the move and that digital reading devices diversified the reading practice. Print readers, digital readers, and readers using both media differed according to age, gender, amount of reading, and genre preference, and the situations in which they read. Digital readers and multi-format users are often men, while print readers are often women. On average, print readers are older than digital readers. Even though digital reading devices offer some features which can meet the needs of elderly people, in particular, such as being light in weight, and the possibility of enlarging the font size, technophobia can hinder their acceptance of digital reading devices. The educational level did not seem to be a crucial factor in the choice of reading medium in Austria.

Moreover, the majority of readers add marginal comments to books for personal and public purposes. They write on their books and want e-readers to support this feature. Now reading and annotation practices are changing with the shift of reading materials to ebooks. Many readers reported that annotating ebooks is awkward, time-consuming and too difficult with the current technology. They added that the way readers annotate books depends on whether they are reading for pleasure or for work and serious studying (Bold & Wagstaff, 2017).

In Saudi Arabia, some Twitter reading surveys revealed that between 50%-60% of the Arab respondents do not read at all. In two Twitter surveys, the percentage of respondents who do not read was even higher (76%-80%); 32.5% read 5 books; 38.5% read more than 20 books; 31% of graduate and undergraduate students read nothing beyond their course textbooks (Al-Jarf, 2022c). Furthermore, there is a dearth of research studies in Saudi Arabia that investigate digital reading among college students, schoolteachers, college faculty and professionals in the digital age. Research on students and young adults' paper and digital reading preferences needs to be updated by including current advancements in ICT, where technology has enabled students and adults to read using digital reading devices such as Kindle readers, mobile phones, tablets, and computers without the presence of any printed documents. Therefore, this study seeks to fill a gap in the literature by exploring the changes in reading patterns of educated adults in Saudi Arabia in the era of technology and social media due to the widespread use of the Internet and digital reading resources particularly hypertexts and multimedia resources, and digital vs print reading preferences. In more specific terms, this study seeks to explore the following: (i) whether educated Arabs prefer to read paper or digital materials; (ii) which reading technologies and applications they use; (iii) why they prefer digital or traditional reading with paper material; (iv) how they interact with the digital or reading text; (v) and their views on the advantages and disadvantages of digital reading; (vi) whether there are significant differences among the subjects' preferences for digital or paper media and the reading technologies and applications in terms of age, gender, educational level, and profession.

This study is highly needed because reading patterns have changed as a result of advances in technology, the extensive use of the internet, the use of various forms of reading materials, the use of social media, mobile apps, and the rising popularity of digital reading materials and devices. Results of the study will shed light on the recent changes in educated Arabs' digital reading preferences, the media from which they read, and the reasons for adopting e-book reading or sticking to traditional paper books are currently not fully unknown. Therefore, exploring the demographic and motivational differences between traditional print readers, digital readers, and those using both types of reading media has become a necessity.

In addition this study is significant because it is part of a series of studies that the author has conducted about reading habits and motivation among educated Arabs in the age of social media and distractions (Al-Jarf, 2023b); educated Arabs' reading interests and preferences (Al-Jarf, 2022c); reading interests of university female students (Al-Jarf, 2022e); what college students read in the global age (Al-Jarf, 2004b); what our youth read in the age of globalization (Al-Jarf, 2004); quality in teaching reading to high school students (Al-Jarf, 2019a) and others. Such studies will give a global view of educated Arab's reading skills, habits, preferences, interest, motivation and so on.

Finally, results of the current study will guide the development of future devices and applications to better satisfy Arab readers' needs. They are also useful to professionals who are developing e-contents, e-resources and a variety of e-learning and reading interfaces.

## 2. Data Collection and Analysis

Data about adult educated Arabs' digital reading practices were collected from Twitter. Responses to questions, hashtags and threads on Twitter asking questions like "which digital media and digital devices do you use for reading, why, the advantages and disadvantages of digital reading vs reading from paper material", were collected. The responses were tweeted by a sample of **272** educated Arabs (81% males and 19% females).

The respondents were graduate and undergraduate students, schoolteachers, college faculty members, and professionals. Some have a Ph.D. degree; others have an M.A. or a B.A. degree. The subjects have different areas of specialties such as business, computer science, education, languages and translation, Arabic literature, and others. Only tweets related to digital and/or traditional reading of books and articles, reading media and reading Apps were included and subjected to analysis. Tweets that focus on reading of emails, general tweets, and comments were excluded from the sample and analysis. Replies to or comments on tweets were computed according to how many responses related to each question of the study were given, as long as they are related to digital reading, reading technologies and devices.

A limitation of the current study is that the Twitter reading surveys of educated Arabs' may not be reliable and valid as the group of respondents is not homogeneous in terms of age, educational level, area of specialty, profession, and number of male and female subjects in the sample and the sample is not representative of the different groups of respondents, because the questions are open-ended, and responses to the questions were unsolicited, i.e., given voluntarily.

A total of 437 responses were collected and analyzed. The responses were classified according to: (i) the type of reading material the subjects read (paper or digital); (ii) the types of reading devices, and applications they use; (iii) why they prefer digital or traditional paper reading material; and (iv) how they interact with the digital or reading text.

The subjects' responses to each question were calculated and are reported in percentages. Results of the data analysis and respondents' views are reported qualitatively as well.

## 3. Results

### 3.1 Digital Reading Devices and Apps That Educated Arabs Prefer

Results of the current study showed that 28.5% of the subjects use digital reading materials, technologies and applications, and 71.5% read traditional printed books. The reading technologies and digital materials that some subjects use include the following:

- 1) 15% prefer to listen to audiobooks.
- 2) 6.5% use electronic readers such as **Kindle** and the Kindle iPhone app.
- 3) **Sibawayh Reader**, a free application that is specifically designed for reading Arabic books on mobile devices such as iPhone and iPad, in addition to features that make the *Sibawayh Reader* a pleasant reading experience.
- 4) **E-Ink (electronic ink) or electronic paper device, a brand of electronic paper (e-paper) display technology. It fits** many e-readers, such as Amazon Kindle and Kobo devices.
- 5) **Audible**<sup>2</sup> which has the world's largest selection of titles ranging from classics to new releases and original podcasts. Users can download or stream their chosen titles with a membership to Audible.
- 6) **Storytel** has thousands of **audiobook** titles covering all genres. Users can listen to a book on their iPhone or Android smart mobile while jogging, cutting the grass, driving and other activities.
- 7) **Feedly**<sup>3</sup>, an application that is available as a cloud-based service and can be accessed from any web browser and mobile devices. It compiles news feeds from a variety of online sources for readers to customize and share with each others.
- 8) **Wajeez** App to listen to podcasts, audiobooks, book and novel summaries, and read on their smart phone.
- 9) **Text-to-speech software** such as:
  - **Read Aloud**, an extension from Google Chrome, that **reads out loud** texts, webpages, pdfs and ebooks with natural sounding voices.
  - **Natural Reader Pro**, a text-to-speech desktop software. Users can listen to natural-sounding voices reading any text such as Word files, PDF files, webpages e-mails.
  - **Kurzweil 1000**, a text-to-speech software for Windows used by normal as well as blind students. It reads a text out loud in natural-sounding voices of different people. It can be adapted to the user's preferences. It combines traditional reading machine technologies such as image processing, scanning, and text-to-speech with communication and productivity tools.
- 10) **Instapaper** to save favorite articles and whatever the user encounters while browsing. It lets the users read, save, and manage what they find on the Internet. Users can highlight and comment on the text in any article. they can easily store

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<sup>2</sup> <https://www.audible.com/>

<sup>3</sup> <https://feedly.com/>

articles, retrieve them, quote them and share them. Instapaper synchronizes the articles a person saves so that he/she can access them on all the devices that he/she uses whether they are Kindle Android, iPhone, or iPad. Users can read anything they save, wherever and whenever they like.

- 11) **Evernote** for taking notes while reading, for saving web pages and marking them up with highlights, arrows, and text. It can be used anytime and offline!
- 12) **Raindrop**, a bookmark manager, that is available as a Chrome, Firefox, Safari, and Edge extension. There is also an Android, iPad, and iPhone app, a Web, Windows, Mac, or Linux extension. Subjects in this study use it to save articles to read them later over the weekend.
- 13) **Pocket**, a social bookmarking device to save interesting stories, read them whenever the user wishes instead of sending themselves links. When a user comes across a long text, a think piece, an interview, or even a recipe, he/she can save it to their personal Pocket library using the Save to the Pocket button in the browser or Pocket app. There is a Pocket extension on all browsers. The subjects who use it indicated that when they find a long text on social media, they can add it to Pocket and during a break at work, they open their Pocket account and read the articles on their computer screen.
- 14) **Tarteel** is an important Islamic application for Android mobile phones. It use Artificial Intelligence to help users read the Holy Qur'an correctly, help them memorize the verses and record them themselves. It corrects their mistakes while reciting. Many people use it due to its specialization in displaying and recitation of the Noble Qur'an. It is also characterized having a daily reminder feature to read the Noble Qur'an in order to help users remember.
- 15) **Siri**<sup>4</sup>, a digital personal assistant integrated within the Apple device operating systems (iOS, macOS, iPadOS, tvOS, watchOS, visionOS, audioOS) that enables Apple device users to send a message, get answers questions, perform searches, answer questions, check the weathercast, confirm flights, complete actions, and others.
- 16) **eBooks**, an iPhone App, i.e. a Book Store and an Audiobook Store (<https://books.apple.com/us/charts/top-free>).
- 17) **Screen Readers** that provide blind students with information about the icons, menus, dialogue boxes, files, and folders. They provide feedback to the user through Speech or Braille. They can read a whole document or part of it out loud, navigate webpages, open and close files, or edit documents. Some examples of Screen Readers for the blind are:
  - **JAWS**, a screen reading software for Windows from Freedom Scientific. It provides speech and Braille outputs for common computer applications such as Word, Excel and Powerpoint. Version 6.0 supports the Arabic language.
  - **Window Eyes**, a screen reading software application that converts components of the Windows operating system into synthesized speech allowing blind and visually impaired people complete access to the Windows- computer system.
  - **VoiceOver**, a screen reader built into the Apple iOS. It helps blind students by using spoken descriptions. It deals with the student's interface as a hierarchy of elements, which the student can use various keystrokes to navigate through. The trackpad helps the user to explore the actual visual layout of screen components by sliding his/her finger around the trackpad to activate the screen components. It supports many Braille displays.
  - **Thunder**, a free screen reader that is used on Windows. It is distributed with the WebBLE software for the blind, which provide a text web-browser, a podcatcher, an RSS news reader, and other tools.
  - **HAL**, a voice output screen reader that helps blind people to peruse their education and work on everyday life activities. It can be used on a PC. It makes Windows menus, icons, buttons, dialogs, controls, Internet, and email easy to use. It recognizes and reads information from a computer screen and displays information in Braille.
- 18) **Artificial Intelligence (AI)** can help form reading habits by providing personalized recommendations based on the user's reading history and preferences. AI can analyze the user's reading habits and suggest books that are similar to the ones they have read before. This can help users discover new books that they might not have found otherwise. AI can also help users track their reading progress and suggest books that are appropriate for their reading level.
- 19) **Devices** such as smart phones, iPads, tablets, and computers.
- 20) **Document Formats:** Pdf, Epub, Mobi, IPA, AZW and others.

### 3.2 Participants' Opinions of digital Reading

The subjects mentioned numerous benefits of using digital reading, when, where, how, and why they use them. Below are excerpts from what the respondents wrote about their preference regarding paper book reading, digital reading, document formats, reading devices, reading applications, and artificial intelligence.

#### 1) Paper book reading

- *There is no pleasure in reading digital books. Paper books are better in this respect.*
- *Digital reading is tiring. I enjoy reading from paper books.*

<sup>4</sup> <https://www.apple.com/siri/>.

- *If you want to learn something new or remember what you have read better, then printed books are better than digital books. They are also more enjoyable.*

## **2) Digital reading**

- *Goodbye paper reading! Digital reading, welcome!*
- *I like digital reading for the ease of finding materials, the ability to access a lot of information quickly, the reduction of paper usage, and the fact that readers can multitask while reading digitally.*
- *If your goal is to search for information, digital books and websites are faster than printed books.*
- *Digital technology can provide new opportunities for reading and learning. For example, digital tools can help readers access more information and resources than ever before. They can also help readers connect with other readers and share their thoughts and ideas about what they are reading.*
- *It is true that people have started to care about reading again, but I noticed that they have become more inclined towards digital than paper reading. There are people (including myself) who prefer to read newspapers in their digital PDF version and not just read them from the online website of the newspaper.*
- *I only take paper books with me wherever I go and take advantage of every small chance from the mobile and audio to read. This made a difference to me.*
- *Since I have quit my administrative job, I no longer read paper (printed) newspapers.*

Some disadvantages mentioned by some subjects are:

- *My reading speed from digital devices has decreases by 25% compared to reading from paper.*
- *Digital technology eliminates deep reading and replaces it with quick, superficial, and fragmented reading as a result of creating an environment of permanent digital distractions that make it difficult to focus, pay attention, and contemplate while reading.*

## **3) Smart phones**

- *I prefer reading books on a smart phones because they are faster. I can even underline and highlight some sentences. In my opinion, smartphones outperform e-readers.*
- *For reading that does not require underlining and note-taking, I use my mobile phone to read during wait times.*
- *I don't notice eye strain because I don't read for more than an hour at a time.*
- *I leave a mobile browser open and dedicate it to articles so that I can access them directly without searching.*

## **4) Kindle**

About 6.5% of the respondents carry the Kindle device with them and read wherever they go. The Kindle device helps some solve the distraction problem. The Kindle users noted:

- *Kindle helped me read a lot. Recently, I have become keener on taking a paper book with me in addition to the audio version of the book. I noticed that when I combine the two, I finish faster, with more focus and pleasure.*
- *In the past, I used to read a lot because I had free time; but now since I have a lot of work to do, I read twice a week only. Kindle and the Kindle application on my iPhone helped me a lot.*
- *Kindle made a difference with me in terms of books, the speed of accessing books and carrying them everywhere.*
- *Arabic books are now available on Kindle for smart devices. They are not yet available on e-readers.*
- *The book is also available on the Amazon Kindle Store. It is available for reading on all smartphones, tablets and e-readers through the Kindle app.*
- *Kindle is suitable for reading before going to bed, or during dead times such as wait time in the clinic, in the market, and so on.*
- *I stopped reading for a period of time because of the many distractions. The Kindle device helped me solve the problem, I carry the device with me and read anywhere. The places where I read the most are the mosque and public transportation.*
- *I often read through Kindle or the Kindle application on the iPad because it makes it easy for me to translate texts in English books fast.*

## **5) Preferred ebook formats**

- *Most of us certainly use PDF files all the time because they are easy to read and they are compatible with all devices, whether smart phones or computers.*
- *I like the Epub format because it can be used with most devices such as smart phones and tablets.*
- *Epub is the most popular and oldest book format. Its only weakness is that it does not work on most Kindle devices.*
- *MOBI (a Mobipocket eBook file) is well-known and is characterized by its ability to work on most reading devices. Its weakness is that it does not support audio and video.*

- AZW (a Kindle eBook format file) owned by Amazon and is used on some devices on a narrow scale.
- IPA is owned by Apple and is used in its books in the Apple Store.

## 6) Audiobooks

Findings of the current study revealed that 15% of educated Arab adult sample listen to audiobooks while driving, working out, walking, cooking, commuting to work or running errands. Some subjects bookmark the articles that they would like to read, save them in Favorites and read them while waiting for their appointments. Some use Kindle a combination of Kindle and Audible and read anywhere. Some respondents said:

- *I used to have a problem with sustained reading when I use paper books. So, I started to listen to audiobooks, and they work for me very well,*
- *My endeavours to read and complete several books have failed, so I started to listen to podcasts and audiobooks, and I found them beneficial.*
- *I read whenever I have a chance. By virtue of my job, I listen to audiobooks the most, whether it is a podcast, a course, or interviews.*
- *I listen to audio stories in the car especially if the journey is long. I have listened to many books and novels because I do not have time to read.*
- *In the event that I am busy the whole day, I take advantage of my driving time and complete a book from the audiobook library.*
- *In times of inactivity such as when I am driving home, while cooking, or when exercising, I use the audio reader on the phone to listen to long articles. I record important points as an audio clip for myself while listening. This is especially useful if I go back to listen to my summary of points that are important to me.*
- *I am a designer and I started to listen to many audiobooks while working on my design. My job allows me to focus on two things.*
- *Audiobooks are a good alternative, especially for those who travel a lot or go out for a walk.*
- *I don't like to read a lot; I like to listen while I am working or while I am in the car.*
- *Audiobooks heighten my excitement and enthusiasm. I don't have to pay money for them.*

## 7) Audible and Storytel

- *I consider Storytel the best app for audiobooks and ebooks on the Apple Store.*
- *As for foreign books, I like to listen to them on Audible when I am driving. If I like the book, I would listen to it again, because sometimes I am not focusing. For Arabic, the best thing is to devote time to reading.*
- *If Audible is available, I listen to and read the book at the same time, because it is faster.*

## 8) Pocket

- *I use the Pocket extension on all browsers and as a mobile app. So, when I find a long article on social media applications or a browser, I easily add it to Pocket. During my breaks at work, I sign into my Pocket account and read some articles on the computer screen.*
- *I think Pocket is good and helps me a lot in reading English articles.*
- *Personally, I started using Pocket, especially artificial intelligence for audiobooks. It is excellent.*
- *Pocket helps me read any time.*

## 9) Text-to-Speech software

- *I can listen to a text while working or browsing something else.*
- *I use an app called Natural ReaderPro that reads articles for me.*
- *If the books are in a website or are electronic, I use "Read Aloud" which I add to the Chrome browser. It saves me a lot of time because I listen to a book rather than reading it, and at the same time I can work or browse something else.*

## 10)

## 11) Siri App

- *If the article is long and is in English, I select each part, and choose Speak and let Siri read it for me. I speed up the reading from the settings. I understand the summary and do not waste time on unimportant ideas. If I feel something needs concentration, I pause it and read the part myself.*

## 12) The eBooks app

- *I upload books to the eBooks application on the iPhone, which I find excellent because it gives me the percentage of accomplishment for each book I read.*

- *I use the books application on the iPhone, I set at least 10 minutes per day for reading, which is the first thing I start my day with. This way I read two books per month.*

**13) Instapaper and Raindrop**

- *I am linking more than one account as Twitter and Feedly accounts to Instapaper in order to read them later.*
- *When I don't read articles right away, I rely on the Raindrop application to save important articles for me to read them later over the weekend.*

**14) Electronic Ink Devices**

- *Reading from smart devices is tiring if I read for more than 15 minutes, especially before going to bed. On the contrary reading from electronic ink devices is very convenient.*
- *Electronic ink reading devices do not emit blue light that is harmful to the eyes, as in the case of tablets, ipads, and smart phones.*
- *During long reading, the glare from smart phones and tablets, and looking at the back light screens such as TV and computers hurts the eyes. The best alternative for a comfortable, eye-healthy is the e-ink technology used by e-readers such as the Kindle and others.*
- *Electronic reading from smartphones, tablets, and computers are very harmful to the eyes, because these screens are not intended for long reading that strains the eyes and causes them to become dry. E-Ink screens are radically different and are designed for extended reading and less eye strain.*
- *E-ink readers have an eye-friendly front light that differs from the back light on smartphones, tablets, and computers.*
- *The use of electronic ink devices such as the Kindle is better than better than reading on smart devices. The light emitted from mobile screens destroys the eyes, but with electronic ink, the eye is very comfortable and the use is smooth.*

**15) Artificial Intelligence**

- *Artificial intelligence can be used to improve our reading experience of printed newspapers. For example, we can use augmented reality and virtual reality technologies to make printed news more interactive and attractive.*

**16) WhatsApp Reding Groups**

- *I created a group on WhatsApp dedicated to books. I transfer anything that comes to me or that I need to read.*

**3.3 Differences Among Respondents in Digital Reading**

No significant differences were found among respondents in the sample in terms of gender, age, being a student or professional and their area of specialty in their preference for digital and paper reading, the reading devices, reading aps and digital reading formats they use.

The above finding contradicts other prior studies in the literature which found significant differences between Indian male and female students at colleges of Medicine, Arts, Humanities, Commerce, Home Science, BCA, BBA, Mass Communications and Journalism in the reading material and reading resources used. Social and digital media greatly impacted students' reading habits and behaviour for male and female students (Ahmad, Dar & Lone, 2019). In Mohamed & Divya (2020), significant differences were obtained in the opinions of male and female university students in Kerala, India in features like search, find, download, save, and bookmark that help students to read digitally. Font size, type face, text layout, and background colour highly affect digital reading. Digital reading increased the students selective, superficial, and interactive reading, and reduced their in-depth, concentrated and sustained reading. Reading practices of male students were significantly more influenced by e-resources than female students. Similarly, significant differences were found between academic programs, types of reading materials and reading resources preferred (Karim, & Hasan, 2007).

**4. Discussion**

In the current study about 71.5% of adult educated Arabs in the sample read traditional printed books, i.e., paper books and 28.5% prefer digital books, audiobooks, reading devices and reading applications. Educated Arabs' preference for printed books is consistent with findings of another study by Al-Jarf (2022c) in which Twitter surveys reported that 80.7% of educated Arabs (students, faculty, and professionals) prefer to read paper books as opposed to 19.3% who prefer electronic books. It can be noticed that the percentage of Arab adults who prefer digital reading is increasing and the percentage of those who prefer printed book reading is decreasing. In addition, findings of the current study are consistent with findings of prior studies in the literature conducted in other countries. As in this study, Chilean university students majoring in human sciences, economic and business prefer paper books and materials regardless of their major even though they use different media (Parodi, Moreno-de León, Julio & Burdiles, 2019). Likewise, Schwabe, Kosch, Boomgaarden & Stocker (2022) found that 90.8% of adult readers in Austria prefer

printed books, either solely or in combination with digital reading media and 9.2% read digital books. The researchers indicated that digital reading media foster reading on the move and that digital reading devices diversify the reading practice.

Moreover, the current findings are partially consistent with findings of prior studies in other countries. As an example, students at the City University of New York use print materials for long text and academic reading and to engage in it reading more deeply. They felt more comfortable annotating printed documents. On the other hand, they used electronic resources and read brief, non-academic materials electronically. For many, leisure reading consisted of short articles on the Internet with both stationary and mobile devices. They did not like electronic textbooks and did not wish to switch to electronic media for their academic reading, although the students found electronic media convenient. They valued print for both reading fiction and serious study (Foasberg, 2014).

By contrast, results of this study are different from results of a poll conducted with 1036 people (64% males and 36% females) in 2021 by the National Center for Public Polls<sup>5</sup> in Saudi Arabia which reported that 42.3% read paper books; 1.6% paper read magazines and newspapers; 28.2% read from internet websites; 22.8% read ebooks; 4.2% read e-magazines and e-newspapers; 30.5% read paper material; 44.6% read from their mobile phones; 6.9% read on the computer screen (desktop and/or laptop); 7% read from their tablet or Kindle devices. In another poll conducted in 2022<sup>6</sup> with 1155 respondents in Saudi Arabia, 32% read printed books, magazines and newspapers; 32% read electronic books, magazines and newspapers; and 36% read on the Internet. The poll also reported that 62% prefer mobile reading; 23% prefer paper material; 8% read from hand-held devices such as tablets or Kindle; and 8% read on the computer screen (desktop or laptop). It is noteworthy to say that the percentages within each poll (responses to different questions) are inconsistent with each other such as the percentage of people who read paper books, magazines and newspaper in one question, and the percentage of people who read paper material in another. There is also overlap in the categories where paper and electronic genres are mentioned. The poll says "digital reading" in one question, and "Internet reading" in another.

Unlike the present study, college students in some countries have a clear preference for digital reading. In India, the majority of university students in Kerala have access to laptops, mobile phones and the Internet as a result their digital reading has increased. Digital reading increased their selective, superficial, and interactive reading, and lowered their in-depth, concentrated and sustained reading. The font size, type face, text layout, and background colour which influence students' digital reading (Mohamed & Divya, 2020). Pakistani engineering students prefer electronic books for academic reading and had no preference of formats for leisure reading. The students had problems in searching online reading materials (Mirza, Pathan, Khatoon & Hassan, 2021). At UiTM Puncak Alam in Malaysia, students prefer digital materials to printed texts due to the plethora of digital materials. The instructors have an impact on their students' reading habits and attitudes (Baba & Affendi, 2020). At the International Islamic University, B.A. students majoring in IT and Arts consider websites an increasingly important reading source (Karim, & Hasan, 2007). At Universitas Kristen, the majority of Indonesian students considered the internet and reading as the main source of information for their assignments. 43% of Indonesian students declared that the internet developed their reading habits, but one-fifth preferred paper-based reading (Bana, 2020). In the Dominican Republic, most students at public and private schools have access to and use the Internet mainly for academic purposes (Amiama-Espailat & Mayor-Ruiz, 2017).

In other studies in the literature, college students have mixed preferences and in some cases digital media has a negative effect on their reading habits and preferences. Malaysian Chinese university students prefer electronic media when reading for leisure but prefer the printed material to pass exams (Abidin, Pour-Mohammadi & Lean, 2011). In another study, electronic materials are Malaysian engineering and business students' favourite source of reading, but social networking sites negatively affect students' reading habits. In general, the students have low interest in reading and do not enjoy reading as much as they enjoy doing other technology-related activities (Annamalai & Muniandy, 2013). At Atatürk University, most students learning English and literature were affected by technology. They spent long hours in front of their computers. They often read online news, read comic strips, the weather forecast and their email. When online, they used the internet for non-academic activities such as checking their Facebook account, playing games, and listening to music (Akarsu & Daryemez, 2014). Professionals such as pre-service language teachers utilise digital media daily. They read digital manuscripts to obtain information, for entertainment and to chat with others. Internet use on their mobile phone and having a page on social media affect their digital reading habits (Maden, 2018).

A disadvantage of digital media reported by readers in Bold & Wagstaff's (2017) study is that annotation of digital books is difficult, time-consuming, or awkward, whereas some subjects in the present study mentioned that they use Evernote for taking notes while

<sup>5</sup> [HTTPS://WWW.ALYAUM.COM](https://www.alyaum.com)

<sup>6</sup> <https://www.spa.gov.sa/2390358>

reading; use their mobile phones to underline and take notes; and some make voice comments and summarize main points while listening to audiobooks.

## **5. Recommendations**

The current study found that 71.5% of adult educated Arabs in the sample read traditional printed books and only 28.5% use digital reading technologies (15% listen to audiobooks, 6.5% use Kindle, and 7% use e-Ink, Audible, Storytel, Feedly, text-to-speech software (Read Aloud, Natural Reader Pro and Kurzweil 1000), Instapaper, Evernote, Raindrop, Pocket, Siri, eBooks, Artificial Intelligence (AI), Tarteel, Wajeez, *Sibawayh* Reader, and Screen Readers such as JAWS, Window Eyes, VoiceOver, Thunder, and HAL by blind students. Those who read digitally use their smart phones, iPads, tablets, and computers and read digital formats such as Pdf, Epub, Mobi, IPA, AZW and others. It is obvious that the percentage of educated Arabs who use digital reading, reading technologies and apps is small taking into consideration that many Arab people have access to the Internet and have a smart phone, therefore they should be able to access a plethora of reading apps, digital resources, and reading technologies. It seems that many educated Arabs are not familiar with digital reading, eBooks, e-libraries, reading resources, reading technologies and applications. To familiarize children, students and the public with digital reading and reading technologies, the current study recommends the following:

At home and school, parents and teachers should enhance digital learning capabilities in the young generation, and encourage them to explore digital resources (Sharma, 2021). To do that, reading technologies mentioned in this study can be integrated in reading instruction at the school and university levels. In addition, the integration of online resources in the teaching and learning process has become a necessity because the Internet is an integral part of our lives and instructors and students must benefit from the unlimited amount of resources on the Internet where they can obtain definitions, statistics, reports, news, newspaper articles, research articles and dissertations for all kinds of courses offered to students. Abundant and diverse information resources are available on the Internet as well such as digital libraries, electronic databases, ebooks, e-periodicals, online dictionaries, online encyclopaedias, video, and audio recordings and others. Such resources are renewed and updated fast, and they are accessible from any place and at any time. Therefore, college instructors should integrate Internet information resources into their courses (Al-Jarf, 2017).

All students, especially graduate and undergraduate students, should be able to search for resources online. For that purpose, a course in Internet searching skills should be offered to undergraduate and graduate students in which they are trained to search for specific topics in OPACS, specialized electronic databases, digital libraries, Internet websites, online magazines, e-periodical and ebooks. Students of all ages should be encouraged to visit public and school libraries to practice their searching skills in OPACS and specialized electronic databases in the different areas of specialty, to improve college students reading habits and enable them to access different types of reading materials that are suitable for their reading preferences and meet their diverse reading purposes. The students can participate in reading and book campaigns for students and teachers and can form digital reading groups on social media (Abimbola, Shabi & Aramide, 2021; Al-Jarf, 2013a; Al-Jarf, 2004a).

Mobile reading applications and audiobooks can be integrated in reading instruction, where the students choose the audiobooks that they like to listen to and discuss their content orally or in writing. The students can be encouraged to read texts and books in various disciplines such as fiction, multicultural literature, and children's stories, to develop the students' global awareness (Al-Jarf, 2022d; Al-Jarf, 2021e; Al-Jarf, 2015; Al-Jarf, 2012).

The students may read online using online course and videoconferencing platforms such as Blackboard and Elluminate, Zoom, WebEx, and google Meet, where they read what they like outside the classroom and post a summary of it or answers to comprehension questions in the online course. They may engage in online or mobile collaborative reading activities whether with their classmates or with students from other universities within the country or abroad. For that purpose, instructors can connect students taking the same course at different schools and universities within the country or in different countries (Al-Jarf, 2021b; Al-Jarf, 2019b; Al-Jarf, 2018; Al-Jarf, 2014; Al-Jarf, 2013b; Al-Jarf, 2010; Al-Jarf, 2009a; Al-Jarf, 2009b; Al-Jarf, 2009c; Al-Jarf, 2009d; Al-Jarf, 2007; Al-Jarf, 2005). A class blog can be used to post reading material about topics related to the course or for extensive reading purposes. The students can read the assigned material, post a summary of it or answer comprehension questions, and discuss what they have read in the blog (Al-Jarf, 2022a; Al-Jarf, 2022b).

The students can be trained to make mind maps using mind-mapping software to summarize and connect ideas in the reading text as few respondents in the current study stated (Al-Jarf, 2021f).

Children in kindergarten and at the elementary school level may use their iPads to read in English and/or Arabic using reading apps and audiobooks of interest to them (Al-Jarf, 2023a; Al-Jarf, 2021c; Al-Jarf, 2021d).

Students with special needs such as blind students can be introduced to digital reading using a variety of screen readers and reading applications for the blind such as the iPhone VoiceOver App, Braille Sense, Window Eyes, Thunder, HAL, and/or JAWS in order to be able to surf the internet and read using a refreshable Braille display (Al-Jarf, 2021a).

Since only three Arabic readers and reading apps (Sibawayh, Wajeez and Tarteel) were reported by the respondents, this study recommends that IT specialists design more Arabic ebook readers and advanced Arabic reading applications and digital libraries to enable Arabic language readers to access and read Arabic books and resources easily. Reading devices, applications and extensions that are currently available should support the Arabic language and digital reading in Arabic.

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