

Print vs Digital Reading Comprehension in EFL

Parlindungan Pardede

parlpard2010@gmail.com

*English Education Department, Faculty of Teacher Training and Education,
Universitas Kristen Indonesia, Indonesia*

DOI: <http://dx.doi.org/10.33541/jet.v5i2.1059>

Abstract

Printed texts have long been used as the prime medium of learning to read and reading to learn. However, the ubiquity of technology has emerged digital texts, and the accelerating influx of digital texts requires new comprehension skills and strategies. This article reviews and synthesizes current ideas and research findings on digital reading in EFL context to provide a more solid theoretical basis for digital texts use in reading comprehension programs. Discussion in this article begins with the comparison of the nature of conventional or print reading versus digital reading and the characteristics of printed texts versus digital texts. After that, the discussion proceeds to the findings of relevant studies concerning the effect of digital reading to comprehension, students and instructors' perception of digital texts, and strategies for reading digital texts.

Keywords: *digital reading, hypertext, printed text, reading comprehension, EFL*

INTRODUCTION

Reading is the most vital skill every English as a foreign language (EFL) learner must master due to several reasons. First, EFL learners study English in an environment where English is not the primary language of the society. Their lack of inputs from their daily interaction could be overcome best through reading. Secondly, several studies (Anderson & Pearson, 1984; Decant, 1991; Mullis et.al., 2009) have shown reading significant contribution to one's personal and intellectual development, further studies, job success, and career development, and the capability to meet changes. Next, reading skills boost a learner's mastery of other areas of language learning (Anderson, 2003). It provides the learners with various good sentence structures so many times that they become accustomed to them. It also develops the learners' vocabulary by letting them get the most frequently used and useful words and learn them in context. Also, reading improves writing skills for it enables the learners to figure out how to express ideas through words, how to use punctuation correctly, and so on. According to Elley (1991), there was a "spread of effect from reading competence to other language skills - writing, speaking and control over syntax" (p. 404). Mikulecky (2008) accentuated that reading is the instruction basis in all language learning aspects, including textbooks use for language courses, writing, revising, editing vocabulary development, acquiring grammar acquisition.

Due to the vital role of reading, imparting this skill has long been one of the priorities in EFL learning and teaching. To facilitate it, printed texts have long played a great role in EFL classrooms. However, the current influx of digital texts has caused a fundamental change in the ways today's students read. According to the 2018 Pew Research Center survey, although more Americans read print than e-books, young adults (18-29 years old) tend to prefer reading books in a variety of formats and on a variety of devices (Perrin 2018). They also tend to read digital texts for school, work, and research. Using computer or hand-handled device, students can now easily get digital sources to access information, news, or recreational reading. In the academic setting, the trend of replacing printed textbooks with e-books is increasing. The use of digital tools as reading devices has also driven educational institutions to move to paperless classrooms around the world (Giebelhausen, 2015). The digital age has indeed brought many benefits, including rapid and expanded access to information and untold networking capabilities (Usluel, 2016). In particular to EFL learning and teaching, the availability of digital sources offering a huge variety of information can be essentially valuable. Since the common language in digital sources is English, they can enrich EFL education. Krashen (2003) accentuated that the internet can be the best resource for EFL teachers and learners

However, the use of digital texts requires new ways of learning and teaching because digital texts have essentially changed the act of reading and students' behavior on it. More than a decade ago, Frechette (2002) predicted that digital technology "... will alter our very conception of basic terms such as reading, writing, and text." (p. 3). The trend that technological advancements have changed the way people read, write, attain, act on, use, evaluate, and produce information and the manner how people interact, communicate and engage in society (Coiro, Knobel, Lankshear, & Leu, 2008; Warschauer & Matuchniak, 2010) seems to approve the prediction. Whether current English teachers realize it or not, the changes brought by digital reading have made teachers understanding of reading different from those of their students (Levy, 2017). Such different understanding will likely emerge difficulties for teachers to facilitate reading to their students. Therefore, teachers need to familiarize themselves with digital reading nature and strategies.

This article reviews and discusses current ideas and researches on digital reading to provide a better understanding of digital reading and build a more solid theoretical basis for the use of digital materials in EFL reading programs. The discussion begins with the comparison of the nature of conventional or print reading versus digital reading and the characteristics of printed texts versus digital texts. Using the information presented in these initial subsections as a basis, the discussion proceeds to the findings of relevant studies concerning the effect of digital reading to comprehension, students and instructors' perception of digital texts, and strategies for reading digital texts. Based on these, the discussion is directed to see reading strategies employed in engaging with digital texts. The discussion ends with some conclusions and recommendation. Due to the limited number of accessible studies in the field of EFL relevant to the discussion topics, some studies conducted in various fields but relevant to the topics are included.

DISCUSSION

The growth of electronic information available online and the increasing use of digital files in academic activities has driven more and more people in society and students to use digital texts. In a blended learning approach most universities have been developing,

digital texts are one of the major components. As a result, the reading of digital texts in comparison to their print counterparts has been studied from different perspectives. In terms of reading comprehension, the departing points of studies on digital reading can be classified into four major themes: the nature of digital reading and text in comparison to the conventional reading and printed text, the effect of digital reading to reading comprehension, and students, teachers' perception of digital reading, and the ways or strategies of reading digital texts.

What is Reading Comprehension?

Numerous studies focusing on reading comprehension have been conducted, but a conclusive agreement on the nature of reading comprehension has not yet reached because reading is a complex, cognitive, internal, and invisible activity taking place inside the mind of the reader (Bernhardt, 1991; Wolf, 1993). The results of studies conducted over the last decades indicate that if the early definitions of reading focus on the reader's effort to comprehend the author's message or idea, more recent concepts accentuate the significance of how each reader understands and interprets the reading material (Carlo & Sylevester, 1996; Grabe, 2009; Urquhart and Weir, 1998).

The early definitions focus on the comprehension of the author's message, to a certain extent, is due to the two predominant views held some decades ago: (1) reading is a product (meaning) and (2) the main purpose of reading is to get the message the authors wanted to deliver. This is confirmed by the bottom-up and top-down reading models representing ideas of reading at that time. Influenced by behaviorist psychology of the 1950s, the bottom-up reading model describes reading as a word-recognition response to the stimuli of the printed words (Pardede, 2013). This view describes that, while reading, the reader pieces together individual units of language to help construct an overall interpretation of the text (Celce-Murcia, 2001). The top-down model can be viewed as a mental map that the reader constructs to meet his/her reading goals and expectations. Within this model, the reader keeps on hypothesizing the meaning of the text he is engaging. He employs the knowledge he possesses and the general cognitive processing strategies to make sense the information segments presented in the text (sentence, paragraph, or passage) he is reading. Therefore, this model is often seen as concept-driven and depends on what the reader brings to the text (Liu, 2010). Widdowson's (1979) definition stating reading as the process of getting linguistic information via print and Carrell's (1988) view defining reading as a decoding process of reconstructing the author's intended meaning; are examples of the early views of reading.

Recent approach, however, emphasizes reading comprehension as an interactive process involving features of the reader, the texts, and tasks. The presumed interaction taking place between the reader and the text, between the bottom-up and top-down processes, between the lower and higher levels of knowledge, and between the text structure and the text genre, is significantly essential to this view (Grabe, 2009; Hudson, 1998; Villanueva de Debat, 2008). According to Grabe and Stoller (2002), the interactive model is based on the idea that from the bottom-up process the reader takes useful ideas and combines them with the main ideas obtaining from the top-down process. In such a way, "word recognition needs to be fast and efficient; and background knowledge serves as a major contributor to text understanding, as does inferencing and predicting what will come next in the text" (p. 8). In line with this view, Yazdanpanah (2007) defined reading comprehension as the reader's attempt to construct

the author's intent by using all resources available in the text and his previous knowledge.

Besides the emphasis on the involved processes, the interactive model of reading is highly affected by the cognitive psychological perspective which views reading as a process or set of processes involving complex mental operations and interactions between the reader and text, and within the reader" (Carrell (1988, p. 245). It indicates that the reader's active role is a major factor in reading. Therefore, in contrast with the early approaches viewing the reader as a passive receiver of information delivered by the author, the current approach views the reader as an active participant who constructs his meaning from the printed text (Bernhardt, 1991; Davey, 1989; Grabe, 1991; Lee, 1990). Therefore, the shift from a focus on the product of reading (e.g. reading comprehension test scores) "to an emphasis on determining the strategies that readers use in various reading contexts" (Anderson, 1991, p. 466) is the most important milestone of recent reading studies. To conclude, reading comprehension refers to a reader's ability to understand and interpret written language through the interactional process of relating new and incoming information to information already actively and constructively stored in memory (Leslie, 1993; Tierney & Pearson, 1994).

Printed Text

The printed text began in the first century AD when literary works were written on sheets of papyrus sewn or glued together and was set in the form of the roll (Clement, 1997). It evolved when monks in the medieval monasteries transcribed texts on paper. Its evolved further due to the invention of the printing machine by Guttenberg in the mid of 15th century. Able to produce 3,600 pages per day, within several decades Guttenberg's printing machine made reading materials easy to access and increased literacy in the whole of Europe. A new development of printed text was the use of "cold typed" in the 1960s, and now texts are reproduced on a paper page via high-resolution digital imaging.

A printed text is tangible objects with a beginning and an end. It is also hierarchical, intended for private reading, and provides a very linear and static reading experience to the reader. Different from the web text, in which the navigation of the text can be fluid and reader-driven, printed text is "shaped by the author, and the readers have little choice but to follow the author's intended plot or expository structure" (Coiro, 2003, p.4). Although readers can control their experience in reading printed text in terms of reordering what they read by flipping through the pages, it is "designed to be read in a linear fashion" and its "features are not malleable" (Coiro, 2003, p.4).

In a practical sense, there are two ways of reading printed texts: linear or deep reading and scanning. (driven by the need to locate particular information or fact). Linear reading involves concentration and emotional engagement. It is the one that applies the interactive reading model. Readers do it by starting at the top left-hand corner of the page, vertically descend down, and end at the bottom right-hand corner. During the reading, they interpret and interact with the text to comprehend the author's messages. The text presents the information in sections, thus, to avoid missing parts of the information, readers should follow the logical relationship of the text sections while he moves from paragraph to paragraph and from one page to another. Since the text is linear and static, readers can decide to pause for paying more attention to specific parts or re-read certain parts to maintain focus. This helps them grasp the author's ideas. Scanning is carried out for reading some printed texts (e.g. dictionaries and

encyclopedia) that are designed to permit the readers to skip from page to page for locating specific information.

Digital Reading Theories

Up to now, there are two major theories of online reading skills and content acquisition techniques from online viewing of text: the Information Foraging Theory (IFT) and hypertext theory. Proposed by Pirolli (2007), IFT describes one's behavior while reading online in everyday causal reading or for specific reading tasks within the web ecosystem. This theory assumes that people are biologically rational, and that reader information-seeking mechanisms and strategies adapt the structure of the information environments in which they operate. Its chief objective is to create better-shaped technology to users.

The term "hypertext" used in the second theory refers to "text composed of blocks of words or images linked electronically by multiple paths, chains, or trails in an open-ended, perpetually unfinished textuality" (Hawkes, Murphy and Law, 2001). This definition indicates hypertext key property, i.e. its capacity to create conceptual and literal links among disparate sections of a given text or completely separate texts. Hypertext facilitates great autonomy to readers than printed books, which are arranged in an inescapable order that readers must follow. With autonomy, readers are more active and less controllable due to the increased input they have into the hypertext. Accordingly, they can choose their own path throughout the text and even be considered as "co-creators" of the hypertext (Carusi, as cited in Land and Bayne, 2011).

Also, digital reading requires abilities and tools, which will be used to locate, access, and manipulate resources, and to interpret and evaluate the digital texts as well (Hill and Hannafin, as cited in Cheek & Ortlieb 2014). These abilities and tools establish the resource-based learning theory which underlies the essential principles of digital literacy skills (Cheek and Ortlieb, 2014). They facilitate readers to search, process, manipulate and communicate while reading. Searching enables readers to locate resources; processing offers cognitive support; manipulating and communicating provides mechanisms for exchanging ideas (Hill & Hannafin, cited in Cheek & Ortlieb, 2014).

Since web page readers are exposed to various text structures, in addition to the conventional reading skills used to deal with printed texts, they need to be prepared with different and meaningful ways to conceptualize, understand, retrieve, and interact with these tools (Cheek and Ortlieb, 2014). This is the reason why a person who is proficient in reading printed texts can fail to read web texts if he is not yet familiar with the digital reading tools and has not properly developed the unique techniques.

Digital Text

Digital texts can be the one accessed from the internet in the form a web page, text message, or online postings such as blogs, or those kept in screen reading tools, computers or hand-handled devices. They are electronically generated and multimodal (blending texts with audio, video, image, and hypertext). These features make them more interactive than a printed text and bid the reader explore in a nonlinear way. Hypertext, in particular, makes a digital text interconnected with many other texts which offer the readers various directional choices fitting to their interest. So, a single text can provide different access routes and, therefore, different options of reading. In this context, the hyper-textual nature promotes a flexible pattern of discovery which fosters

readers' greater cognitive effort for they must construct information frameworks based on the nature of the paths chosen (Spire & Estes, 2002). If teachers can develop truly interactive language-learning systems using hypertext to facilitate diverse learning needs and styles, it can be a valuable instructional tool for advancing learners' reading skills. However, since they lack the hierarchical and static structure, digital texts are more ambiguous than printed texts.

Unlike the printed text which is static, digital texts are not in a constant state. The shape, size, location, and color of web text, for instance, can be altered. These features can be advantageous, because the reader can, for instance, adapt the font size to his need. On the other hand, increasing the fonts' size will limit the amount of text visible to the reader. This makes it more difficult to relate the information presented in one section to those in other sections. Thus, the reader's ability to follow the logical connection between ideas will be reduced.

By comparing printed and digital texts features and the reading strategies necessitated to accommodate them, four major differences between printed reading and online reading are identified. First, while print texts are usually linear, online texts are often non-linear or multi-linear (Chen, 2009). Second, different from printed texts usually characterized by a prefixed and predictable path, digital texts' path takes a random and unpredictable manner. Third, readers can see less text at one time in the digital text due to the space limitation of the computer screen through which the reader looks at the text. As a consequence, compared to conventional printed texts readers, online readers face more challenges in their struggle to comprehend what they read (Coiro, 2003). Fourth, the availability of hyperlinks in digital texts makes them more complex for readers to navigate, both in their mind and physically on the screen (Coiro & Dobler, 2007).

Effect of Digital Reading to Comprehension

Studies comparing the effect of reading digital texts versus printed texts to reading speed, accuracy, and comprehension have been carried out since the emergence of computers. These studies showed inconsistent results. The majority of early studies showed that printed text reading tasks were superior to digital text reading tasks in terms of speed, accuracy, and comprehension, while the other studies reported insignificant differences. Dillon (1994), for instance, found that reading performance on the computer screen was about 20% to 30% slower than a paper. Other studies (Creed et al., 1987; Ziefle, 1998) showed printed texts reading tasks accuracy is higher than computer-based texts reading. Keenan (1984) found paper-based reading outperformed computer-based reading, although the gaps were not highly significant. However, some other studies (Askwall, 1985; Gould et al., 1987; Osborne & Holton, 1988) showed no significant accuracy difference between the two formats.

More recent studies (particularly the ones conducted after 2010 when digital technology have far advanced) tend to show more varied results. Although some studies still showed printed reading prevailed digital reading, and some others indicated no significant difference in the effect between the two formats to comprehension, many studies revealed the superiority of digital reading. The study of Mangen et al. (2013) involving 72 tenth graders from two different primary schools in Norway revealed that the students' achievement was higher in paper-based reading than screen-based reading. The study of Aydemir et.al. (2013) on the effect of reading from the digital text with various levels of reading comprehension among 60 fifth graders showed that the text

type caused no significant effect on the averages in both groups. However, Fard and Nabifar's (2011) quasi-experimental study involving 40 Iranian female intermediate EFL learners showed that the students who read from the computer screen significantly outperformed the students who read printed pages in a conventional classroom. Additionally, Bhatti's (2013) experimental study involving 60 ninth-grade male students in Pakistan showed that CALL was 35% more effective than the traditional instructor-led class. Huang's (2014) study demonstrated that the online reading group outperformed the paper-based group on overall reading comprehension.

The evidence reviewed above shows inconsistent results of the effect of reading digital texts versus printed texts on reading speed, accuracy, and comprehension. Early studies tend to indicate printed text reading superiority. However, more current studies tend to reveal that digital text reading outperforms printed text reading. The printed text reading superiority in the early studies might be caused by the fact that computer technology used in these studies were still very simple. Then, although many current studies revealed the superiority of digital learning, some other studies still show that printed text reading outperformed digital text reading. Such deviated finding, therefore, was probably attributed to the levels of technological advancement, subjects' familiarity with computers, and the subjects' mastery of digital reading skills.

Students and Teachers' Perception of Digital Texts

Besides technological advancement, students' familiarity with the tools and digital text reading skills, students and teachers' perception of digital reading is another major factor that might affect the adoption of digital texts and comprehension on them. Stone and Baker-Eveleth (2013) accentuated that their perceptions affect students and instructors to use or reject the text.

Various current studies (Anuradha & Usha, 2006; Jeong, 2012; Lim & Hew, 2014; Shelburne, 2009) investigating students and teachers' perception of digital reading focus on the use of e-books generally revealed that more than 50% of users who had used e-books were satisfied with their experience of using them. Pardede (2019) reported that pre-service English teachers perceived digital modules use in blended learning positive. But they expected the modules to be written in 'easier' language and accompanied by relevant videos. The study of Jeong (2012) indicated Korean students' satisfaction with e-books. The students also admitted the current e-books usefulness. Lim and Hew's (2014) study showed that students generally held positive attitudes toward e-book use. Also, Shelburne's (2009) studies indicated that undergraduate students, compared to faculty, tend to have more positive perceptions towards e-books. Anuradha and Usha (2006) reported that around 90% of e-book users in an Indian academic environment were very satisfied / somewhat satisfied with their use of e-books, and, compared to faculty, students tend to use e-books more often.

Some other studies focused on comparing the preference for digital texts with their counterparts. Abdullah and Gibb (2008) reported that users still prefer reading paper books with various reasons: preference of the feel for real books, disinclination to read on the screen, or difficulty to purchase the equipment. However, Eden and Eshet-Alkalai's (2013) study examining the reading ability of 93 students in postsecondary education by comparing their active reading abilities using digital versus printed formats showed no significant differences in readers' average scores on the two formats, but participants reading the digital format finished their assignments faster. Stonier's (2012) mixed-methods study involving 100 pre-service teachers receiving a semester of

training in digital literacy implementation in K-12 classes indicated that teachers' perceptions increased and were positive toward digital literacy, integrative texts, and the use of tools. Interestingly, the teachers continued to strongly believe that digital text increased reading comprehension.

Other studies showed that age is one of the major factors which affect users' perception of digital texts use. It is commonly believed that the younger the users the more positive their attitudes towards new or emerging technologies. Jung et al.'s (2012) reported that technology savvy participants (those who were born with technologies) have more positive attitudes towards digital reading. But age alone does not automatically affect perception towards digital texts. It should be related to the users' experience and awareness of digital texts which significantly affect users' perceptions. Chu (2003) found that respondents without any experience in digital reading tend to have negative attitudes towards digital texts. Croft and Davis' (2010) study confirmed it by showing that the main reason for not using digital texts is a lack of awareness. This is confirmed by Pardede's (2017) finding that Indonesian university students majoring in EFL who were familiar with Edmodo highly favored its use as the online learning platform because it enabled them to access and study the digital learning materials anywhere and anytime. This finding indicated that the students' positive perception of digital texts is due to the ease and flexibility for accessing them and their familiarity with the online platform.

Digital Texts Reading Strategies

To effectively understand and interpret a text through the interactional process of relating new and incoming information to information already stored in his memory, a reader needs to apply appropriate reading strategies. In printed reading context, (Barnett, 1988) defined reading strategies as the comprehension processes used by a reader to make sense of what he reads, which may involves skimming, scanning, recognizing cognates and word families, guessing, predicting, activating general knowledge, reading for meaning, inferencing, and differentiating main ideas from supporting ideas. To be proficient in reading comprehension, one should be skillful in applying these reading strategies.

However, one's proficiency in print reading strategies does not guarantee his success in digital reading comprehension because digital texts have richer and more complex components or environment than the printed texts. Murray and McPherson (2004) found that print literacy does not automatically transfer to digital literacy. Afflerbach and Cho (2010) confirmed that digital reading requires traditional print reading strategies to be employed in a more complex way. Based on her literature review, Schmar-Dobler (2003) summed up and compared seven comprehension strategies consistently employed in both printed text reading and online reading: activating prior knowledge, monitoring comprehension, repairing comprehension, determining important ideas, synthesizing, drawing inferences, and asking questions. She also offered 'navigate', an additional strategy to describe the necessary skills in online reading.

Other current studies support the idea that digital reading does involve many strategies employed in conventional printed text reading plus unique skills in digital reading. The combination of these skills is necessary because, unlike print texts that are usually linear and static, digital texts are multi-modal (combine text, static images, animations, embedded videos, and sound) and contain hyperlinks that create non-

sequential page structures. To read such texts, readers are required to have the ability to use digital reading strategies to search for and locate texts, as well as to construct and examine meaning (Cho, 2014; Coiro, 2011; Dalton & Proctor, 2008). Dail (2005) found that students applied two strategies when they read digital texts: (1) digital reading strategy, including navigation strategy and scrolling the pages, and (2) conventional strategies, including skimming, summing the information, note-taking by hand, and referring to previous knowledge. In addition to the 'navigate', another additional strategy uniquely used in digital reading is the 'surf' (Callister & Burbules, 1996). This strategy allows the learner to skim the text to find keywords, phrases, or links without attentively reading line by line. The "surf" technique is probably chosen to read web text because the learners are eager to search through a large volume of information quickly and avoid being overwhelmed by it. The importance of additional strategy uniquely used in digital reading is confirmed by Li, et.al. (2006) who reported that Chinese college EFL readers often went through disorientation in the vast and fluid web-based reading environment of the online English reading and learning acknowledged by the National College English Curriculum Requirements. Such disorientation indicated the critical need for the ability to use reading strategies to construct and examine meaning.

Unlike the studies above which investigated skilled readers' use of online reading strategies, Chen (2010) focused on the online reading strategies of 58 fifth and sixth-grade students with and without learning disabilities. Results showed that the participants were easily disorientated by the online texts' non-linear nature and unfamiliar structure. They also had weak before-reading strategies and found it difficult to distinguish before-and during-reading strategies. Other studies (Grabe & Stoller, 2002; Sheorey & Mokhtari, 2001) revealed that different from their inclination to read word by word when they engage with printed texts, second language learners use skimming and scanning techniques for web text. To a higher extent, this tendency may be related to the eye discomfort many learners often feel while reading intently online (Mercieca, 2004). Some other studies (Johnson, 2013; Tseng, 2008) confirmed that readers attempt to minimize the number of words their eyes have to read when dealing with onscreen texts due to the eyestrain from staring at the monitor screen. Nielsen (2008) found internet users read only about 20% of the web text on the average page.

Based on the studies reviewed above, it is obvious that digital reading involves many strategies used in print reading, but they are employed in a more complex way. Besides, reading web texts requires readers to employ two unique techniques, i.e. navigate and surf. The employment of these strategies consequently demands harder mental work from the digital reader. This can be one of the reasons why some people got lower comprehension outcome in digital text reading than they did in printed text reading. DeStefano and LeFevre (2007) stated that the structure of digital texts, especially the web page, inclines to increase cognitive demands of decision making and visual processing, and such additional cognitive load sequentially lowers reading comprehension performance.

CONCLUSIONS

Reading comprehension is crucial to succeed in EFL learning, and printed texts, especially books, have long been used to promote reading. They have also served as the major language input for learners, the language practice in the classrooms, and the main supporting tool for teachers in structuring teaching and learning, preparing materials,

etc. However, the emergence of digital texts and the huge influx of digital learning tools in recent years have transformed the ways today's students read and construct, process and communicate knowledge and information. To optimize digital texts use, teachers need to be familiar with the nature of digital reading, features of digital texts, and the reading strategies required to engage with digital texts so that they can help their students develop their digital reading proficiency.

The studies comparing the effectiveness of reading printed texts versus digital texts have not yet given a conclusive agreement. Many early studies tended to show printed text reading superiority over digital text reading tasks in terms of speed, accuracy, and comprehension, while the other studies revealed insignificant differences. However, the majority of studies conducted after 2010 tended to show digital reading superiority, although a smaller number of study still showed printed reading advantage or insignificant difference in the effect between the two formats to comprehension. Some probable factors causing this inconsistency are: the advancement level of the technology employed as the tools for reading, participants' familiarity with the technology, participants' mastery of digital reading strategies, and participants' perception of digital reading.

In terms of perception, the reviewed studies revealed that younger users who are technology savvy generation tend to have more positive attitudes toward digital reading. However, to affect their perception towards digital reading, the factor of age should be related to users' experience and awareness of digital texts.

In terms of reading strategies, the reviewed research evidence revealed that digital reading involves many strategies employed in the conventional printed text reading, such as skimming, scanning, recognizing cognates and word families, guessing, predicting, activating general knowledge, reading for meaning, inferencing, and differentiating main ideas from supporting ideas. Yet, these strategies are employed in a more complex way to accommodate the characteristics of digital texts which are inconstant, multi-modal, and contain hyperlinks that create non-sequential page structures. Also, digital reading also employs unique techniques i.e. navigating and surfing.

Due to technological ubiquity in all life sectors, digital texts are unavoidable. The best choice is to use them as a complement or a substitute for resources teachers have already have. However, since digital texts are a relatively new phenomenon in education in general and in EFL learning and teaching in particular, sound foundational concepts of digital reading are still limited. Therefore, to empower EFL teachers in facilitating students' learning through digital reading, more and more studies are required.

References

- Anderson, N.J. (1991). Individual differences in strategy use in second language reading and testing. *Modern Language Testing*, 75, 460–472
- Anderson, N.J. (2003). The role of metacognition in second/foreign language teaching and learning. *ERIC Digest*. Washington, DC: ERIC Clearinghouse on Languages and Linguistics. Retrieved May 2015, from <http://www.cal.org/ericcll/digest/0110anderson.html>
- Anderson R., and Pearson P. D. (1984). Schema-theoretic view of basic processes in reading comprehension. *Handbook of reading research* (pp. 255-291). New York: Longman.

- Anuradha, K. T. and Usha, H.S. (2006). Use of E-books in an academic and research environment: A case study from the Indian Institute of Science, Program: electronic library and information systems, 40(1), 48-62
- Askwall, S., (1985). Computer supported reading vs. reading text on paper: A comparison of two reading situations. *International Journal of Man-Machine Studies*, 22, 425–439
- Atlantic Graphic Systems (2016). A Brief History of the Printing Press. Retrieved April 2019 from <http://www.atlanticgraphicsystems.com/history-of-the-printing-press/a-brief-history-of-the-printing-press/>
- Aydemir, Z., Ozturk, E., & Horzum, M. (2013). The effect of reading from screen on the 5th grade elementary students' level of reading comprehension on informative and narrative type of texts. *Educational Sciences: Theory and Practice*, (13)4, 2272-2276.
- Barnett, M. A. (1989). *More than meets the eye: Foreign language reading: Theory and practice (language in education)*. Englewood Cliffs: Prentice-Hall Regents
- Bhatti, T. M. (2013). Teaching Reading through Computer Assisted Language Learning. *The Electronic Journal for English as a Second Language*, 17, (2), 1-11. Retrieved April 11, 2017 from <http://www.tesl-ej.org/wordpress/issues/volume17/ej66/ej66a3>
- Callister, T.A. and Burbules, N.C. (1996). Public Spaces and Cyberspace: Issue of Credibility in Educational Technologies. *Insights: A Publication of the John Dewey Society for the Study of Education and Culture*, 32 (9), pp.9-11.
- Carlo, M., and Sylevester, E.S. (1996). Adult second-language reading research: how it may inform assessment and instruction? (ERIC Document Reproduction Service No. 412-373)
- Carrell, P.L., (1988). Interactive text processing: Implications for ESL/second language reading classrooms. In: Devine, J., Carrell, P.L., Eskey, D.E. (Eds.), *Interactive approaches to second language reading*. Cambridge University Press, New York, pp. 239–259.
- Celce-Murcia, M. (2001). *Teaching English as a second or foreign language*. Boston: Heinle and Heinle.
- Cheek, E., and Ortlieb, E. (2014). Theoretical models of learning and literacy development (Vol. 4). Emerald Group Publishing. Retrieved October 2017 from books.google.com.ec/books?isbn=1783508221
- Chen, H.Y. (2009). Online reading comprehension strategies among general and special education elementary and middle school students. Unpublished Doctoral Dissertation, Michigan State University.
- Cho, B-Y. (2014). Competent adolescent readers' use of Internet reading strategies: A think-aloud study. *Cognition and Instruction*, 32(3), 253-289. DOI:10.1080/07370008.2014.918133
- Chu, H. (2003). Electronic books: viewpoints from users and potential users. *Library Hi Tech*, 21(3), 340-346.
- Clement, R.W. (1997). Medieval and Renaissance book production. Library Faculty & Staff Publications. Paper 10. Retrieved June 2016 from https://digitalcommons.usu.edu/lib_pubs/10
- Coiro, J., (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56, pp.458-464

- Coiro, J. (2011). Predicting reading comprehension on the Internet: Contributions of offline reading skills, online reading skills, and prior knowledge. *Journal of Literacy Research*, 43(4), 352-392. DOI:10.1177/1086296X11421979
- Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). *Handbook of research on new literacies*. Mahwah, NJ: Lawrence Erlbaum
- Creed, A., Dennis, I., & Newstead, S. (1987). Proof-reading on VDUs. *Behaviour & Information Technology*, 6, 3–13.
- Croft, R., & Davis, C. (2010). E-books Revisited: Surveying Student E-book Usage in a Distributed Learning Academic Library 6 Years Later. *Journal of Library Administration*, 50(5/6), 543-569. DOI:10.1080/01930826.2010.488600
- Dail, J. S. (2005). Reading in an online hypertext environment: A case study of tenth-grade English student. Unpublished doctoral dissertation, Florida State University, 2003). *Dissertation Abstracts International*, 65(7).
- Davey, B. (1989). Assessing comprehension: selected interaction of task and reader. *The Reading Teacher*, 42, 694–697.
- Dechant, E. (1991). *Understanding and teaching reading: An interactive model*. New Jersey: Lawrence Erlbaum.
- Dillon, A. (1994). *Designing usable electronic text: Ergonomic aspects of human information usage*. London: Taylor & Francis.
- Eden, S. and Eshet-Alkalai, Y. (2012). The effect of format on performance: Editing text in print versus digital formats. *British Journal of Educational Technology*, 44(5), pp. 846-856. <https://doi.org/10.1111/j.1467-8535.2012.01332.x>
- Elley, W. B. (1991). Acquiring literacy in a second language: The effect of book-based programs. *Language Learning*, 41(3), 375-411.
- Fard, H. E., & Nabifar, N. (2011). The Effect of Computer Assisted Language Learning on Reading Comprehension in Iranian EFL Context. *Journal of Academic and Applied Studies*, 1-8. Retrieved April 2017 from <http://www.academians.org/articles/november1.pdf>
- Frechette, J.D. (2002). *Developing media literacy in cyberspace*. London: Praeger.
- Giebelhausen, R. (2015). The paperless music classroom. *General Music Today*, 29(2), 45–49.
- Gould, J.D. et al., (1987). Reading is slower from CRT displays than the paper: Attempts to isolate a single-variable explanation. *Human Factors*, 29, 269–299.
- Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. Cambridge University Press, Cambridge.
- Grabe, W., 1991. Current developments in second language reading research. *TESOL Quarterly* 25, 375–406.
- Grabe, W., and Stoller, F. L. (2002). *Teaching and researching reading*. New York: Longman
- Hawkes, L., Murphy, C., & Law, J. (2001). *The Theory and Criticism of Virtual Texts: An Annotated Bibliography, 1988-1999* (No. 14). Greenwood Publishing Group. Retrieved October 2017 from books.google.com.ec/books?isbn=0313312249
- Huang, H. C. (2014). Online Versus Paper-based Instruction: Comparing Two Strategy Training Modules for Improving Reading Comprehension. *RELC Journal*, 45(2), 165180. Retrieved June 2016 from <http://sci-hub.cc/10.1177/0033688214534797>
- Hudson, T. (1998). Theoretical perspectives on reading. *Annual Review of Applied Linguistics*, 18, 43–60.

- Jeong, H. (2012). A comparison of the influence of electronic books and paper books on reading comprehension, eye fatigue, and perception. *Electronic Library*, 30(3), 390-408
- Jung, J., Chan-Olmsted, S., Park, B., & Kim, Y. (2012). Factors affecting E-book reader awareness, interest, and intention to use. *New Media & Society*, 14(2), 204-224. DOI:10.1177/1461444811410407
- Keenan, S.A. (1984). Effects of chunking and line length on reading efficiency. *Visible Language*, 18, 61–80.
- Krashen, S. (2003). *Explorations in language acquisition and use: The Taipei lectures*. New York: Heinemann.
- Land, R., & Bayne, S. (Eds.). (2011). Digital difference: Perspectives on online learning (Vol. 50). *Springer Science & Business Media*. Retrieved September 2017 from books.google.com.ec/books?isbn=9460915809
- Lee, J.F. (1990). Constructive processes evidence by early stage nonnative readers of Spanish in comprehending an expository text. *Hispanic Linguistic* 4 (1), 129–148.
- Leslie, L. (1993). A developmental interactive approach to reading assessment. *Reading & Writing Quarterly* 9, 5–30
- Levy, J. B. (2017). Reading in the Digital Age: A Review of ‘Words on Screen’. Available at SSRN: <https://ssrn.com/abstract=3063497>
- Lim, E. and Hew, K.F. (2014) Students’ perceptions of the usefulness of an E-book with annotative and sharing capabilities as a tool for learning: a case study, *Innovations in Education and Teaching International*, 51:1, 34-45, DOI: 10.1080/14703297.2013.771969
- Liu, F. (2010). A Short Analysis of the Nature of Reading. *English Language Teaching*, 3(3), pp.152-157.
- Mangen, A., Walgermo, B., and Bronnick, K. (2013). Reading linear texts on paper versus computer screen: effects on reading comprehension. *International Journal of Educational Research*. 58, 61–68. DOI:10.1016/j.ijer.2012.12.002
- Mikulecky, B. (2008). Teaching Reading in a Second Language. Retrieved May 2016 from [http://www.longmanhomeusa.com/content/FINAL-LO%20RES-Mikulecky Reading%20 Monograph%20.pdf](http://www.longmanhomeusa.com/content/FINAL-LO%20RES-Mikulecky%20Reading%20Monograph%20.pdf)>
- Mullis, I. V. S., et.al. (2009). *PIRLS 2011 Assessment framework*. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA)
- Murray, D. E., & McPherson, P. (2004). Using the Web to support language learning. Sydney: NCELTR
- Nielsen, J. (2008). How Little Do Users Read? Nielsen Norman Group. Retrieved July 2016 from <https://www.nngroup.com/articles/how-little-do-users-read/>
- Pardede, P. (2019). Pre-Service EFL Teachers’ Perception of Blended Learning. *Journal of English Teaching*, 5(1), pp. 1-14.
- Pardede, P. (2015). Pre-Service EFL Teachers’ Perception of Edmodo Use as a Complementary Learning Tool. Paper presented at *UKI English Education Department Collegiate Forum* held on Friday, June 12, 2015
- Pardede, P. (2013). A review of reading theories and its implication to the teaching of reading. Retrieved April, 2017 from <http://parlindunganpardede.wordpress.com/articles/language-teaching/a-review-on-reading-theories-and-its-implication-to-the-teaching-ofreading/>.
- Pirolli, P. (2007). *Information foraging theory: Adaptive interaction with information*. Oxford University Press, New York, NY

- Schmar-Dobler, E. (2003). Reading on the Internet: The link between literacy and technology. *Journal of Adolescent & Adult Literacy*, 47(1), 80-85.
- Shelburne, W. (2009). E-book usage in an academic library: User attitudes and behaviors. *Library Collections, Acquisitions, & Technical Services*, 33(2/3), 59-72. DOI:10.1016/j.lcats.2009.04.002
- Sheorey, K. and Mokhtari, K., 2001. Differences in the Metacognitive Awareness of Reading Strategies among Native and Non-native Readers. *System*, 29, pp.431-449.
- Stone, R.W. and Baker-Eveleth, L. (2013). Students' expectation, confirmation, and continuance intention to use electronic textbooks *Computers in Human Behavior*, 29 (3) (2013), pp. 984-990
- Sutherland-Smith, W., 2002. Weaving the literacy Web: Changes in Reading from Page to Screen. *The Reading Teacher*, 55, pp.662-669.
- Tierney, R. J., and Pearson, P. D. (1994). "Learning to learn from a text: A Framework for Improving Classroom Practice." In Rudell, Ruddell, and Singer, eds. (1994). *Theoretical models and processes of reading*, (4th Ed.). International Reading Association, Newark, Delaware USA.496–513.
- Urquhart, A.H., Weir, C.J. (1998). *Reading in a second language: process, product, and practice*. Longman, New York.
- Usluel, Y. K. (2016). Social network usage. In Social networking and education, pp. 213–222. *Springer International Publishing*.
- Villanueva de Debat, E. (2006). Applying Current Approaches to the Teaching of Reading. *English Teaching Forum*, 44 (1), pp.8-15.
- Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, 34(1), 179-225. <http://dx.doi.org/10.3102/0091732X09349791>
- Yazdanpanah, K. (2007). The effect of background knowledge and reading comprehension test items on male and female performance. *The Reading Matrix*, 7(2) 64-80.
- Ziefle, M. (1998). Effects of display resolution on visual performance. *Human Factors*, 40, 554–568.