Review

Use of Mobile Applications in Developing Reading Comprehension in Second Language Acquisition —A Review Study

Blanka Klimova [1,*] **and Katarina Zamborova** [2]

[1]   Department of Applied Linguistics, Faculty of Informatics and Management, University of Hradec Kralove, Rokitanskeho 62, 500 03 Hradec Králové, Czech Republic

[2]   Department of English Language, Faculty of Applied Languages, University of Economics in Bratislava, Dolnozemská cesta 1, 852 35 Bratislava, Slovakia; katarina.zamborova@euba.sk

*   Correspondence: blanka.klimova@uhk.cz

check for updates

Abstract: Reading is a fundamental skill for academic success because university students need to comprehend an extensive amount of information in a short time to achieve their academic goals. However, the influx of new technologies into education has challenged the teaching of reading skills in a foreign language. The purpose of this study was to explore the effect of emerging technologies, especially mobile applications, on second language reading comprehension in the period between 1 January and 30 September 2020. Therefore, the authors of this article conducted a search of available studies on the topic, i.e., the use of mobile applications in developing reading comprehension in second language acquisition, in two databases: Web of Science and Scopus. Despite the methodological differences, the findings of all of the identified studies showed that there was an improvement in reading comprehension after the treatment with mobile applications. In addition, a positive attitude and enhanced learner motivation when using mobile apps was found in several studies. Overall, there is potential for developing research on MALL and reading comprehension for randomized control studies with larger populations and longer intervention periods.

Keywords: smartphones; mobile applications; reading skills; English; students

1. Introduction

1.1. Theoretical Background

Reading skills in one's mother tongue are generally developed in the early stages of childhood. However, learning to read in a foreign language brings new challenges and requires different insights, so reading as a skill in English as Foreign Language (EFL) is still being researched [1–6]. Traditionally, reading together and listening are considered receptive skills, rather than being connected to speaking and writing as productive skills, but more recent research has studied the relationship of reading to different skills, most importantly the correlation between reading and writing [7,8].

Reading becomes an important aspect in people's lives when they want to grow and keep up with the abundance of information everywhere. It becomes an inevitable part of our leisure time, study assignments, or work duties. It is especially important for university students, as they are suddenly exposed to too many reading materials they have to handle for their studies. They can choose from two forms—print or digital—in which the writers' main goal is to keep the readers' attention and promote retention of the material. Text is often accompanied by videos or pictures to make it more vivid and unforgettable, so readers now have a wide range of possibilities of texts and formats to choose from, as almost everyone can become an author of a text.

The importance of developing reading skills lies in the fact that it is the most complex and interactive process based on an individual's perception of a text [1]. It oscillates between bottom-up processes, such as word recognition, decoding, and automaticity, and top-down processes, such as schema or background knowledge use [2]. When referring to reading in a foreign language, the process becomes even trickier, as each reader interacts with a text based on his/her individual experience and cognitive capacities. Research suggests starting with a holistic approach to text processing in terms of using effective metacognitive awareness strategies, as well as techniques in terms of the macro-level characteristics of a text to facilitate students' reading comprehension [9,10]. Overall, reading at the relevant level is one of the best ways for learners to obtain comprehensible input, i.e., language that they can understand. The more comprehensible output they receive, the better their English becomes [11].

Furthermore, one of the current challenges is how the development of technological advancements impacts the process by which students read [12]. Students are faced with hypertexts, informal texts accompanied by a video or pictures, and/or formats like e-books and audiobooks; therefore, teachers need to help students apply different reading strategies to be well-equipped for twenty-first century technological changes in reading [4,13,14]. Consequently, EFL classrooms are experiencing the implementation of mobile/smartphone apps into lessons whose effectiveness is already being evaluated [15,16] under the umbrella of Mobile Assisted Language Learning (MALL) or m-learning [17–19], derived from Computer Assisted Language Learning (CALL) [20]. The first comprehensive study of MALL brought up a selected annotated bibliography of implementation studies of MALL from 1994 to 2012 [21].

Nowadays, there has been a tendency to investigate MALL mainly in the area of vocabulary [22,23], but most recently, it has extended to listening and the implementation of podcasts [24,25]. However, when it comes to reading, research is limited, as identified by very few research studies for the years of 2012–2017 [5]. Electronic tools, such as SMS, tablets, electronic textbooks, Kindle devices, WhatsApp, or other apps, were explored. The findings confirmed the effectiveness of these tools in teaching and learning reading comprehension, as well as positive attitudes toward MALL. Furthermore, the review of MALL studies revealed that research in this field between 2007 and 2012 was based on small-scale and short intervention experimental studies [26].

Thus, the purpose of this study was to explore the effect of emerging technologies, especially mobile applications (apps), on second language reading comprehension in the period between 1 January and 30 September 2020.

The research question is then as follows: What is the use of mobile applications in developing reading comprehension in second language acquisition?

1.2. Literature Review

Recent academic scholarship has focused on the connection of reading comprehension and technology [27–29] because technological advances are affecting how foreign language learners acquire language skills, especially reading. The studies range from investigating using e-books versus printed books, where less attention (concentration) was found to be needed for reading from paper in comparison to any size or type of a screen [30]. While printed books were preferred mostly for pleasure reading, the participants expressed greater intention to use e-books in the future [31]. Importantly, research showed higher learning outcomes of students in rural schools using e-books versus printed books [32]. Other areas of research included the impact of iPads on reading [33–35], as well as the use of mobile/smartphones for reading comprehension [5,21].

Research shows that learners struggle with reading materials for various reasons, such as lack of engagement, weak decoding and fluency skills, inadequate vocabulary and background knowledge, and/or ineffective strategies for setting a purpose for reading, monitoring one's understanding, and resolving problems [36]. Therefore, a few principles need to be followed when implementing technology in the class, such as knowing your students and their technical literacy, choosing purposeful and contextualized materials (the Internet provides an abundant amount of authentic texts), and supporting language use through networked collaborative interactions (emails, bulletin boards, chatrooms). Activities for developing literacy, especially reading skills in connection with writing through technology, might be done through sharing Whiteboards (a writing process web-based e-tool), Wikis, or WebQuests (pre-designed activities for learners to use to answer questions about a specific topic) [37]. Technology, especially computers, is particularly well-suited to the tasks of individualized instruction, repetitive practice, and immediate feedback [38]. The same applies to using mobile/smartphones in education due to their ubiquity—being suited to the needs of digital native students [39].

The selected studies on MALL and reading comprehension in L2 between 2012 and 2017 show a lack of publications in this area and definitely a need for extensive research. The 17 articles were chosen from the Web of Science and Scopus databases [5]. They include a 16-week study on SMS vocabulary learning and its impact on reading for Iranian freshmen, aged 18–21, studying 320 words from the Academic Word List via SMS in comparison to a control group using a dictionary. Both groups' upper-intermediate proficiency improved regardless of the medium of learning; however, the experimental group outperformed the control group with positive feedback on a questionnaire about using SMS [40]. Later investigation moved from using SMS as a learning tool to WhatsApp. The outcomes of the studies using WhatsApp show a correlation between the outcomes and students' mostly positive attitude toward using it [41,42]. The latter study included 30 Saudi Arabian males, aged 18–20, enrolled in their Preparatory Year. Data were collected through self-reflection journals and semi-structured interviews. They used Freebody and Luke's four resources model based on code breaking (using alphabets, spellings, structural conventions, and patterns), text participation (the ability to understand and compose meaningful written, visual, spoken, digital, and multimodal texts), text use (the ability to functionally use those texts inside and outside the classroom settings), and text analysis (the ability to analyze those texts critically in terms of particular representations and views) to meet the requirements of literacy in the digital world. It was found that a 14-week treatment including online and offline dictionaries, mobile cameras, online resources used in and outside the classroom, memos, and WhatsApp improved the participants' code breaking practices. Additionally, their text use and text analysis practices were slightly improved. The participants shared images, photos of summaries, and mind maps through the tools to look for new vocabulary, pronunciation, and parts of speech [42]. Another study in Iran with 40 high school students, aged 13–19, showed a positive impact on their reading skills after introducing reading materials through mobile phones for a month and seeing improvements after the semester. However, the participants expressed some concerns about the negative impact of the extensive use of the mobile phones (more than two hours daily), citing concerns such as addiction, interruption, and less physical activity [43].

Even though there has been positive light shed on the research of implementing technology and its impact on reading, one needs to be careful about its abundance so as not to arouse a negative effect on students so they will not completely lose connections with the real world around them, as they, as digital natives, are surrounded and immersed with technological devices daily.

2. Methods

The authors conducted a literature search of available sources found on the topic, i.e., use of mobile applications in developing reading comprehension in second language acquisition. They reviewed articles in two databases: Web of Science (WoS) and Scopus, which complement each other, since some of the WoS peer-reviewed journal articles do not appear in Scopus and vice versa. In addition, these databases are widely acknowledged for university research. The search period was performed for the studies published between 1 January 2018 and 30 September 2020, since a detailed review on this research topic had been published in the earlier studies [5]. The search collocated keywords were as follows: mobile applications AND reading comprehension, mobile technologies AND reading comprehension, mobile applications AND reading skills in English, mobile technologies AND reading skills in English, mobile technologies AND L2 reading. The keywords were combined and integrated into database and journal searches. The terms used were searched using AND to combine the keywords listed and using OR to remove search duplication where possible. A backward search was also conducted, i.e., references of retrieved articles were assessed for relevant articles that the authors' searches may have missed.

On the basis of the keywords and abstracts, 125 articles were detected in the two databases. In the Web of Science, the authors identified 90 articles, and 35 were found in Scopus. In addition, six articles were detected from other sources, usually references of the already detected articles. The authors also conducted a more specific search for only peer-reviewed original journal articles, thus excluding conference articles and review articles. Eventually, the search included 131 articles. After removing duplicates and titles/abstracts unrelated to the research topic, 64 English-written studies remained. Of these, only 21 articles were relevant for the topic. These studies were investigated in full and were considered against the following inclusion and exclusion criteria. The inclusion criteria were as follows:

- Only studies published between 1 January 2018 and 30 September 2020 were included.
- Peer-reviewed journal studies written in English were involved.
- Only experimental/quasi-experimental studies were included.
- The primary outcome concentrated on the use of mobile applications in developing reading comprehension in second language acquisition.

The exclusion criteria were as follows:

- The studies that did not explore English as a second language, e.g., [6].
- The conference papers, e.g., [4,44], review studies, e.g., [5,45], and original papers not focusing on the topic, e.g., [25,46,47], or survey studies, e.g., [3], were excluded.

Based on these criteria, nine articles were eventually included in the final analysis. Figure 1 below illustrates the selection procedure.
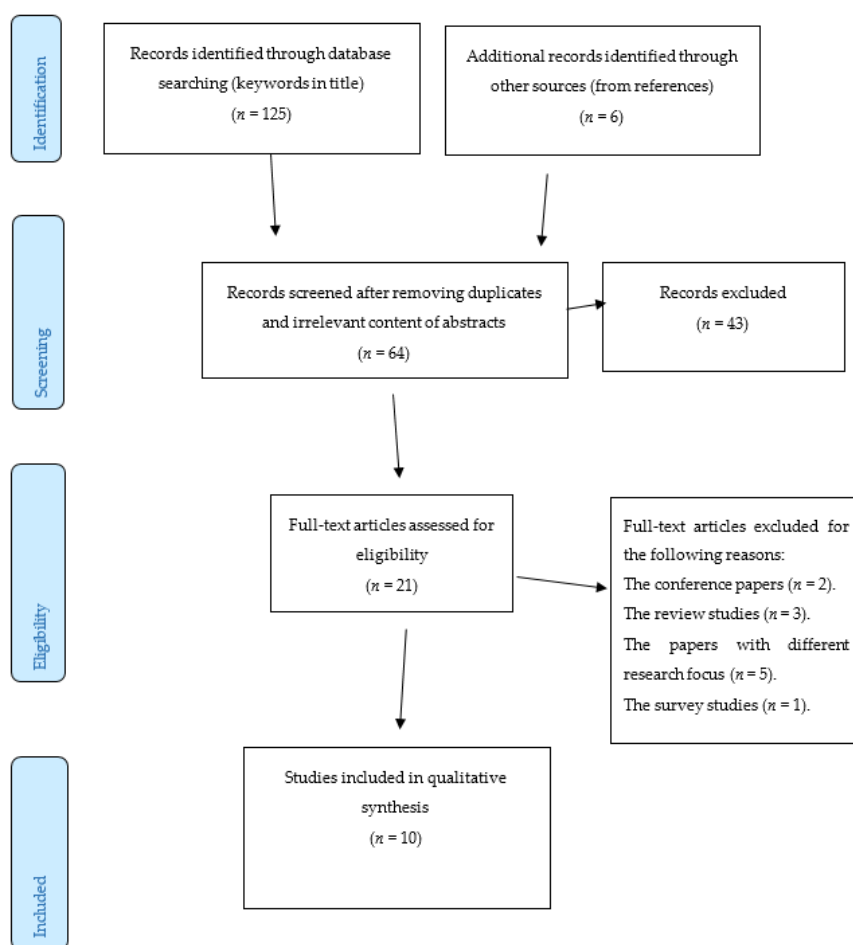
Figure 1. An overview of the selection procedure.

3. Results

Altogether, ten articles were eventually included in the final analysis [48–57]. Three of them originated in Indonesia [53–55], two in Saudi Arabia [50,51], and one in India [48], Jordan [49], Iran [52], Russia [56], and China [57]. Most of them used different mobile apps and platforms. However, in two studies [48,50], WhatsApp was applied and in another two studies [49,56], the authors used the Quizlet learning platform. Although the authors of the selected studies explored the effect of mobile apps, only six studies [49,51–55] might be considered in this sense, since they had both an experimental and a control group and conducted pre- and post-tests. Furthermore, there were huge differences in the detected studies in terms of the subject samples and the length of the intervention period. For instance, the number of participants in the selected studies ranged from 20 [48] to 290 [56] individuals. Most of these participants were people aged 14 to 21 years old. The intervention period ranged from 1.5 h up to 17 weeks. In addition, different outcome measures were used in these studies, e.g., pre- and post-reading comprehension tests, questionnaires, interviews, or observations. The findings of the majority of studies confirmed that mobile apps, respectively mobile learning, enhanced student reading comprehension.

However, as it has been indicated, the main weakness of these studies was their methodological design. On the other hand, all studies attempted either quantitatively, qualitatively, or both to enhance student reading comprehension by using mobile learning.

Table 1 provides an overview of the findings from these selected studies on the use of mobile applications for developing reading comprehension in second language acquisition. The studies are ordered alphabetically according to the surname of the first author.

Table 1. An overview of the findings from the selected studies on the use of mobile applications in developing reading comprehension in second language acquisition.

Study	Objective	Characteristics of the Subject Group and Groups	Intervention Tool and Length of Intervention	Main Outcome Measures	Findings	Limitations
Ahmed [48] India	To explore the effect of WhatsApp on developing EFL students' reading and writing skills.	20 male EFL undergraduate students; only an experimental group.	WhatsApp (sharing articles on latest news and stories, commenting and discussing on students part) in a two month period.	Researcher's observation and a questionnaire.	WhatsApp was very effective in developing learners' reading and writing skills, and progress was especially seen in developing vocabulary, grammar, reading comprehension, and writing skills.	Not mentioned. However, there was no control group, a small subject sample, and a short intervention period.
Assaf et al. [49] Jordan	To examine the effect of an electronic collocation-based instructional program on enhancing Jordanian EFL tenth grade students' reading comprehension.	50 male students, aged 15; 25 students in each experimental and control group.	Quizlet—a flashcard mobile app (learning lexical collocations to enhance their reading skills) vs. traditional learning, nine weeks.	Reading comprehension post-test.	The experimental group outperformed the control group in each part of the test: literal and inferential comprehension, with a significance level = 0.000 at ($\alpha \leq 0.05$).	Only lexical collocations included, a small subject sample, and short intervention period.
Hazaea and Alzubi [50] Saudi Arabia	To explore the role of mobile technology in improving learner autonomy (LA) in the EFL reading context.	30 male students aged 18–20; only an experimental group.	Internet search engines and WhatsApp groups for 14 weeks.	Student portfolios and semi-structured interviews.	The participants' LA was enhanced through the use of selected mobile applications in terms of taking responsibility for and making decisions about reading materials and the time and place of reading.	A homogeneous small size sample; slight violation of the rules of using the WhatsApp group beyond the stipulated conditions of the group; lack of a control group.
Keezhatta and Omar [51] Saudi Arabia	To investigate whether struggling students' language performance is accelerated by using MALL with teacher instruction versus conventional instruction alone.	120 participants in grade 10; 60 in the experimental group and 60 in the control group.	A hybrid use of language learning and MALL based on The Irves and Barron (2014) model of DDD-E: Decide, Design, Develop, and Evaluate vs. traditional class.	Pre-test and post-test of reading skills.	A significant difference between MALL users and nonusers in favor of the experimental group ($p < 0.05$). MALL materials and systems improve reading comprehension skill among the experimental group students.	The study was confined to the Saudi secondary schools and the number of participants was relatively small.
Naderi and Akrami [52] Iran	To explore the effect of instruction using telegrams on students' reading comprehension.	103 university students; 55 in the experimental group and 48 in the control group.	Social network—telegram vs. traditional class, 14 sessions (2.5 h a week).	Pre-test and post-test of reading skills, placement test.	The experimental group significantly outperformed the control group. The effect size was 0.34. In addition, there was no difference between females and males as far as reading comprehension was concerned.	Not mentioned.
Nugrahini [53] Indonesia	To examine the effect of MALL on EFL learners' reading comprehension.	60 intermediate female EFL students (16–17 years old); 30 in the experimental group and 30 in the control group.	16 meetings and eight reading comprehension texts; mobile phones.	Reading comprehension test (TOEIC test)—pre-test/post-test.	Both groups (experimental and control) improved in terms of the target language reading comprehension, but the findings supported the superiority of MALL.	Not mentioned. However, there was no control group and a small subject sample.
Priyanti et al. [54] Indonesia	To evaluate the effect of Quizizz on eleventh grade students' English studies.	73 students in eleventh grade, with 37 in the experimental group and 36 in the control group.	Quizizz platform vs. traditional instruction; the length of the intervention—not mentioned.	Validated multiple choice reading comprehension test—multiple choice test.	Mean score of the experimental group was higher than the control group (83.08 > 80.77), which means their reading comprehension results were better.	Not mentioned.

Table 1. *Cont.*

Study	Objective	Characteristics of the Subject Group and Groups	Intervention Tool and Length of Intervention	Main Outcome Measures	Findings	Limitations
Sofiana and Mubarok [55] Indonesia	To examine the effect of an English game-based mobile application (EBMA) on the reading achievement and learning motivation of the students.	119 students from eighth grade in a junior high school; 58 in the experimental group and 61 in the control group.	English game-based mobile application (EBMA) vs. traditional instruction, three times.	Reading test and a questionnaire.	The students who used EBMA as a medium of learning had better achievement in reading than those who did not (71.12 > 65.52).	Not mentioned. However, there was a short intervention period.
Pavlova et al. [56] Russia	To investigate mobile learning of English for specific purposes by ecology students with the help of the Quizlet learning platform.	290 students; 138 in the experimental group and 152 in the control group.	Quizlet vs. traditional instruction for 17 weeks.	Monitoring of mobile devices, direct observation, questioning of the students, and evaluating their impressions.	Mobile learning has increased the effectiveness of teaching ESP. In addition, it has increased the levels of students' satisfaction and motivation.	Not mentioned.
Yang [57] China	To examine whether attention cueing benefits learners studying ancient Egyptian culture using mobile-assisted instruments.	50 EFL learners aged 19; only an experimental group.	A self-regulatory, mobile phone based set of visualizations depicting ancient Egyptian culture; 1.5 h.	Comprehension test, cognitive load questionnaire, and attitude questionnaire.	The results stress the importance of presenting attention-capturing arrows in external representation, as it can result in better learning efficiency. A Pearson correlation revealed a statistically significant negative correlation between the test scores and cognitive loads—$p = 0.043$.	Not mentioned. However, there was no control group and a small subject sample.

4. Discussion

Despite the methodological differences, the findings of all of the identified studies [48–57] showed an improvement in reading comprehension after the treatment with MALL and that the use of MALL, respectively mobile applications, is on the rise in second language acquisition. Moreover, in several studies, a positive attitude and enhanced motivation of learners when using mobile apps was found [48,50,55–57]. In fact, research also revealed that students' motivation could especially be raised via game-based mobile apps, which seem to be more interactive, simulate real-life situations [55], and make learning more autonomous in terms of taking responsibility for and making decisions about reading materials and the time and place of reading [50]. Game-based mobile apps, such as an English game-based mobile application [55], enhanced students' attention, creativity, and community relationships, and thus contributed to collaborative and exploratory learning [58], which in turn raised the students' motivation for learning.

The findings are in alliance with a previous review research study [5], where experimental groups outperformed control groups in all of the studies performed. In addition, when participants were interviewed or questioned, the results were very positive in expressing satisfaction and motivation due to the usefulness and easiness of using innovative approaches/methods in developing reading through mobile devices. Thanks to their portability and accessibility, students used a variety of metacognitive and cognitive reading strategies and agreed on effective use of technology.

In addition, the current findings illustrated that the presence of highlighted cues, such as attention-capturing arrows, guided learners to identify corresponding text, which enabled learners to organize and retrieve information in their working memory, as well as resulted in a better transfer of test results [57].

The results also indicated that mobile apps for the development of reading comprehension should be mainly used outside of traditional classes, since more space can then be devoted to the development of productive speaking skills [5,50,51]. However, one should not underestimate the importance of reading, since reading is a fundamental skill for academic success, because university students need to comprehend an extensive number of texts in a short time to meet their academic goals [59]. Therefore, teachers should integrate the development of reading comprehension into class instruction by using shorter texts [52] or WhatsApp or Quizlet, for example, to develop pre-reading skills, such as vocabulary or grammar [48,49,56], or post-reading skills, such as writing [48]. As Pavlova et al. [56] point out, Quizlet is especially suitable for developing English for Specific Purposes (ESP), in which students have to master specialized sets of vocabulary infrequently occurring in general English texts. However, by using Quizlet, teachers can create a set of vocabulary on any topic, and students can practice these specialized terms as much as they want, thus developing their reading comprehension more easily, having learned the key collocations of their texts.

When it comes to pedagogical implications, the previous research suggested considering some issues for further investigation, such as if skills and knowledge from reading on devices are perceived from short-term memory into the long-termed memory, what reading skills and strategies are being developed under these circumstances, and if it applies to other languages aside from English [5]. The results of this current review encourage applying the apps to develop reading comprehension as a part of blended learning [60]. Moreover, there is a need for appropriate training for teachers [5], because there is a constant emergence of new technologies to attract learners' attention, such as Instagram or Snapchat. As Al Fadda Hind [45] claims, Instagram appears to be a very effective social media platform for engaging and learning English, particularly for vocabulary learning.

The main limitations of this review study consisted of the methodological varieties of the selected studies, as well as the different types of mobile applications used. Furthermore, bias might also be in the selection of the studies by using only two databases.

5. Conclusions

The use of mobile applications in developing reading comprehension in second language acquisition is on the rise. Students seem to enjoy using these mobile apps, both inside and outside the educational settings, especially if the content is interactive and simulates real-life situations.

Generally, there is a potential for developing research on MALL and reading comprehension, but it should be randomized and controlled, with larger populations and longer intervention periods. The given research encourages further studies in the use of specific reading apps. There are some on the market; however, they are not intentionally developed for L2 readers. In addition, when working with a certain app, it should be taken into consideration that the research plan needs to be well thought out and strategic to be applicable in the new context and in a more general sense. Thus, the issues of whether the effect of acquired reading skills will prevail in the long term, or what type of strategies of reading comprehension students develop L2 by using mobile apps still need to be answered.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Namjoo, A.; Marzban, A. A New Look at Comprehension in EFL/ESL Reading Classes. *Procedia-Soc. Behav. Sci.* **2014**, *116*, 3749–3753. [CrossRef]
2. Al-Mahrooqi, R.; Roscoe, A. *Focusing on EFL Reading*; Cambridge Scholars Publishing: Newcastle, UK, 2014.
3. Amelia, L.C.H.; Abidin, M.J.Z. Young ESL learners' perception on the effects of using digital storytelling application in English language learning. *Pertanika J. Soc. Sci. Humanit.* **2018**, *26*, 179–198.
4. Arifani, Y. The effectiveness of Pamanpintermu e-reading program on EFL learners' reading performances. In Proceedings of the 3rd International Conference on Education, Sports, Arts and Management Engineering (ICESAME 2018), Quezon City, Philippines, 19–20 July 2018; Atlantis Press: Amsterdam, The Netherlands, 2018.
5. Gutierrez-Colon, M.; Frumuselu, A.D.; Curell, H. Mobile-assisted Language learning to enhance L2 reading comprehension: A selection of implementation studies between 2012–2017. *Interact. Learn. Environ.* **2020**, 1–9. [CrossRef]
6. Xu, Y.; Yau, J.C.; Reich, S.M. Press, swipe and read: Do interactive features facilitate engagement and learning with e-Books? *J. Comput. Assist. Learn.* **2020**. [CrossRef]
7. Choi, J.; Moon, Y.; Paek, J.K.; Kang, Y. Examining the Relationship between Reading and Writing of Advanced Korean EFL Learners. *Korean J. Appl. Linguist.* **2018**, *34*, 91–116. [CrossRef]
8. Alqouran, A.A.; Smadi, O.M. The Effect of Reading-Writing Integration on Jordanian Undergraduate Students' Writing Performance. *Arab. World Engl. J.* **2016**, *7*, 177–189. [CrossRef]
9. Zarrati, Z.; Nambiar, R.M.K.; Maasum, T.N.R.T.M. The Importance of Text Structure Awareness in Promoting Strategic Reading Among EFL Readers. *Procedia-Soc. Behav. Sci.* **2014**, *118*, 537–544. [CrossRef]
10. Al-Qahtani, A.A. Investigating Metacognitive Think-Aloud Strategy in Improving Saudi EFL Learners' Reading Comprehension and Attitudes. *Engl. Lang. Teach.* **2020**, *13*, 50–62. [CrossRef]
11. Harmer, J. *Essential Teacher Knowledge*; Pearson Education Limited: London, UK, 2012.
12. Shen, L.-B. Computer Technology and College Students' Reading Habits. *Chia-Nan Annu. Bull.* **2006**, *32*, 559–572.
13. Budiharso, T. Reading Strategies in EFL Classroom: A Theoretical Review. *Cendekia* **2014**, *8*, 189–204. [CrossRef]
14. Munzur, Z. Impacts of Technology Enhanced EFL Reading Classroom on Student Learning and Achievement. *J. Educ. Future* **2017**, *12*, 49–66.

15. Kim, H. Exploring Smartphone Applications for Effective Mobile-Assisted Language Learning. *Multimedia-Assist. Lang. Learn.* **2012**, *15*, 31–57. [CrossRef]

16. Rosell-Aguilar, F. State of the App: A Taxonomy and Framework for Evaluating Language Learning Mobile Applications. *CALICO J.* **2016**. [CrossRef]

17. Godwin-Jones, R. Emerging Technologies. Mobile Apps for Language Learning. *Lang. Learn. Technol.* **2011**, *15*, 2–11.

18. Miangah, T.M.; Nezarat, A. Mobile Assisted Language Learning. *Int. J. Distrib. Parallel Syst.* **2012**, *3*, 309–319. [CrossRef]

19. Yang, J. Mobile Assisted Language Learning: Review of the Recent Applications of Emerging Mobile Technologies. *Engl. Lang. Teach.* **2013**, *6*. [CrossRef]

20. Jarvis, H.; Achilleous, M. From Computer Assisted Language Learning (CALL) to Mobile Assisted Language Use. *TESL-EJ* **2013**, *16*, 1–18.

21. Burston, J. Mobile-Assisted Language Learning: A Selected Annotated Bibliography of Implementation Studies 1994–2012. *Lang. Learn. Technol.* **2013**, *17*, 157–225.

22. Lin, J.; Lin, H. Mobile-Assisted ESL/EFL Vocabulary Learning: A Systematic Review and Meta-Analysis. *Comput. Assist. Lang. Learn.* **2019**, *32*, 878–919. [CrossRef]

23. Kohnke, L.; Zhang, R.; Zou, D. Using Mobile Vocabulary Learning Apps as Aids to Knowledge Retention: Business Vocabulary Aquisition. *J. Asia TEFL* **2019**, *16*, 683–690. [CrossRef]

24. Stefancik, R.; Stradiotová, E. Using web 2.0 tool podcast in teaching foreign languages. *Adv. Educ.* **2020**, *7*, 46–55. [CrossRef]

25. Artyushina, G.; Sheypak, O.A. Mobile phones help develop listening skills. *Informatics* **2018**, *5*, 32. [CrossRef]

26. Viberg, O.; Grönlund, Å. Mobile Assisted Language Learning: A Literature Review. In Proceedings of the 11th World Conference on Mobile and Contextual Learning, mLearn 2012, Helsinki, Finland, 16–18 October 2012; Volume 1, pp. 9–16.

27. Lysenko, L.V.; Abrami, P.C. Promoting reading comprehension with the use of technology. *Comput. Educ.* **2014**, *75*, 162–172. [CrossRef]

28. Dreyer, C.; Nel, C. Teaching reading strategies and reading comprehension within a technology-enhanced learning environment. *System* **2003**, *31*, 349–365. [CrossRef]

29. Huang, Y.N.; Hong, Z.R. The effects of a flipped English classroom intervention on students' information and communication technology and English reading comprehension. *Educ. Technol. Res. Dev.* **2015**, *64*, 175–193. [CrossRef]

30. Zambarbieri, D.; Carniglia, E. Eye movement analysis of reading from computer displays, eReaders and printed books. *Ophthalmic Physiol. Opt.* **2012**, *32*, 390–396. [CrossRef]

31. Piramanayagam, S.; Seal, P.P. The choice between ebooks and printed books: A study among hospitality and turism educators and learners. *Libr. Philosphy Pract.* **2020**, *3921*, 11. Available online: https://digitalcommons.unl.edu/libphilprac/3921 (accessed on 11 December 2020).

32. Santoso, T.N.B.; Siswandari, S.; Sawiji, H. The Effectiveness of eBook versus printed books in the rural schools in Indonesia at the modern learning era. *Int. J. Educ. Res. Rev.* **2018**, *3*, 77–84. [CrossRef]

33. Sheppard, D. Reading with iPads–The difference makes a difference. *Educ. Today* **2011**, *3*, 12–15.

34. Simpson, A.; Walsh, M.; Rowsell, J. The digital reading path: Researching modes and multidirectionality with iPads. *Literacy* **2013**, *47*, 123–130. [CrossRef]

35. Moon, A.L.; Francom, G.M.; Wold, C.M. Learning from versus learning with technology: Supporting costructionist reading comprehension learning with iPad applications. *TechTrends* **2020**, 1–11. [CrossRef]

36. Dalton, B.; Proctor, C.P. Reading as thinking: Integrating strategy instruction in a universally designed digital literacy environment. In *Reading Comprehension Strategies*; McNamara, D.S., Ed.; Taylor & Francis: New York, NY, USA, 2006; pp. 421–440.

37. Erben, T.; Ban, R.; Castañeda, M. *Teaching English Language Learners through Technology*, 1st ed.; Routledge: New York, NY, USA, 2008. [CrossRef]

38. Johnson-Glenberg, M.C. Web-based reading comprehension instruction: Three studies of 3D Readers. In *Reading Comprehension Strategies*; McNamara, D.S., Ed.; Taylor & Francis: New York, NY, USA, 2006; pp. 293–324.

39. Zeng, S. *English Learning in the Digital Age: Agency, Technology and Context*; Springer: Singapore, 2018.

40. Alemi, M.; Lari, Z. SMS vocabulary learning: A tool to promote reading comprehension in L2. *Int. J. Linguist.* **2012**, *4*. [CrossRef]

41. Gutierrez-Colon Plana, M.; Gimeno, A.; Appel, C.; Hopkins, J.E. Improving learners' reading skills through instant short messages: A sample study using WhatsApp. In *World Call Sustainability and Computer-Assisted Language Learning*; Gimeno, A., Levy, M., Barr, D., Eds.; Bloomsbury Academic: London, UK, 2016; pp. 266–281.

42. Hazaea, A.N.; Alzubi, A.A. The effectiveness of using mobile on EFL learners' reading practices in Najran University. *Engl. Lang. Teach.* **2016**, *9*, 8. [CrossRef]

43. Gheytasi, M.; Azzizifar, A.; Gowhary, H. The effect of smartphone on the reading comprehension proficiency of Iranian EFL learners. *Procedia-Soc. Behav. Sci.* **2015**, *199*, 225–230. [CrossRef]

44. Davila, J.M.; Santisteban, M.; Sarmiento, A.M.; Fortes, J.C.; Grande, J.A. Use of APPs as tools for acquiring language skills. In Proceedings of the 14th Annual International Technology, Education and Development Conference (INTED 2020), Valencia, Spain, 2–4 March 2020; pp. 541–547.

45. Al Fadda Hind, A. Determining how social media affects learning English: An investigation of mobile applications Instagram and snap chat in TESOL classroom. *Arab. World Engl. J.* **2020**, *11*, 3–11. [CrossRef]

46. Nahar, L.; Jaafar, A.; Sulaiman, R. Usability evaluation of a mobile phone-based braille learning application "MBRAILLE". *Malays. J. Comput. Sci.* **2019**, 108–117. [CrossRef]

47. Fucekova, M.; Metruk, R. Developing English skills by means of mobile applications. *Inf. Technol. Learn. Tools* **2018**, *66*, 173–185. [CrossRef]

48. Ahmed, S.S. WhatsApp and learn English: A study of the effectiveness of WhatsApp in developing reading and writing skills in English. *ELS J. Interdiscip. Stud. Humanit.* **2019**, *2*, 148–156. [CrossRef]

49. Assaf, M.M.; Al-Jamal, D.A.; Rababeh, E.Q. The effect of an electronic collocation-based instructional program on enhancing Jordanian EFL tenth grade students' reading comprehension. *IUG J. Educ. Psychol. Sci.* **2020**, *28*, 869–888.

50. Hazaea, A.; Alzubi, A. Impact of mobile assisted language learning on learner autonomy in EFL reading context. *J. Lang. Educ.* **2018**, *4*, 48–58. [CrossRef]

51. Keezhatta, M.S.; Omar, A. Enhancing reading skills for Saudi secondary school students through Mobile Assisted Language Learning (MALL): An experimental study. *Int. J. Engl. Linguist.* **2019**, *9*, 437. [CrossRef]

52. Naderi, S.; Akrami, A. Learners' reading comprehension development through MALL: Telegram groups in focus. *Int. J. Instr.* **2018**, *11*, 339–350. [CrossRef]

53. Nugrahini, Y. The influence of Mall (Mobile Assisted Language Learning) on English as foreign language students' reading comprehension. *J. Engl. Lang. Teach. Learn. Lit.* **2019**, *2*, 51–57.

54. Priyanti, N.W.I.; Santosa, M.H.; Dewi, K.S. Effect of Quizizz towards the eleventh-grade English students' reading comprehension in mobile learning context. *Lang. Educ. J. Undiksha* **2019**, *2*, 71–80. [CrossRef]

55. Sofiana, N.; Mubarok, H. The impact of English game-based mobile application on students' reading achievement and learning motivation. *Int. J. Instr.* **2020**, *13*, 247–258. [CrossRef]

56. Pavlova, E.; Valeeva, N.; Zakirova, Y. M-learning in teaching ESP: Case study of ecology students. *Eur. J. Contemp. Educ.* **2019**, *8*, 920–930. [CrossRef]

57. Yang, H. The effects of attention cueing on English reading on mobile phones. *Front. Educ. China* **2018**, *13*, 315–345. [CrossRef]

58. Wu, T.T.; Huang, Y.M. A mobile game-based English vocabulary practice system based on portfolio analysis. *Educ. Technol. Soc.* **2017**, *20*, 265–277.

59. Taj, I.H.; Fatimah, A.; Muhammad, S.; Waqar, A. Effect of technology enhanced language learning on EFL reading comprehension at tertiary level. *Arab. World Engl. J.* **2020**, *8*, 108–129. [CrossRef]

60. Kacetl, J.; Klímová, B. Use of Smartphone Applications in English Language Learning—A Challenge for Foreign Language Education. *Educ. Sci.* **2019**, *9*, 179. [CrossRef]