Exploring Research Trends of Online Learning for Developing English Reading Skills: A Bibliometric Analysis

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Abstract. Increasing research has demonstrated the importance of online reading for teaching and improving EFL students' reading abilities. However, there are few studies using bibliometrics to examine the literature and identify patterns in this field. This study aimed to identify significant trends within this field of research and to develop an intellectual overview of relevant scholarly work. Bibliographic data for 82 research publications published between 2008 and 2022 (February) were obtained from the Scopus database. Perish/publish, and the VOS viewer was used for data analysis. The publication trend was analyzed using bibliographic indicators, focusing on characteristics such as the most productive year, the top 10 most cited authors, document types, and prominent themes based on the frequently used keywords within the study area. The study's conclusions demonstrate that since 2017, the body of literature in this area has been continuously growing. However, during the COVID-19 epidemic in 2021, the number of research studies skyrocketed. Based on the findings of twenty studies, research was carried out on reading methods, the effects of online reading, and the distinctions between online and printed reading. In light of the aforementioned study, this paper concludes by attempting to outline some potential topics for further investigation.

Keywords: online reading, research trends, English reading skills, reading strategies

Introduction

Reading is such a receptive language skill that a learner needs to learn to understand both text and context comprehensively. There are no hard and fast rules for reading; reading allows readers to introspectively generate or reproduce their ideas. It is a method of semantic acquisition, communication, and information and thought distribution. The history of reading dates back to the fourth millennium BC, when the script first appeared (Shimray et al., 2015). Learners of English as a foreign language (EFL) usually depend on the traditional format of reading materials and techniques, commonly known as print reading.

Nevertheless, the twenty-first century begins with the boon of technology in all aspects of human life. Consequently, the IoT (Internet of Things) changes the lifestyle, taste, and habits of human behavior. The application of technology in the acquisition and instruction of reading abilities is unremarkable. This evolving paradigm significantly influenced the transformation of

learning and cognition, the volume and caliber of reading, and the advancement of online reading comprehension. For developing students' reading skills at all educational levels, online reading is becoming increasingly popular worldwide.

However, the COVID-19 pandemic forced teaching and learning in many countries to move online from March 2020 to the present (Beach et al., 2021). EFL learners are trying to cope with this online instructional system for developing reading and other language skills using various technologies, e.g., mobile phones, computers, and laptops. Thus, online reading comprehension intervention is becoming an inevitable part of teaching pedagogy (Washburn et al., 2021). That is why there is a need to investigate how and what perspectives past research on online reading learning has been conducted to identify new dimensions in the pedagogy of reading skills. For this purpose, this study has conducted a bibliometric analysis of published research on online reading in the reputable online database Scopus.

In this connection, a clear understanding of bibliometric analysis is required. Allen Richard first proposed the term "Bibliometrics" in 1969 to study the growth of literature on a particular topic (Liao et al., 2018). This scientific research field reveals the evolution of a particular research direction and has gained increasing attention from the scientific community in recent years (Wang et al., 2020). It supports researchers in investigating and understanding research trends of a particular topic. This quantitative analysis identifies trends and patterns within publications in a particular field by examining factors such as publisher productivity, journal impact, publication dates and locations, citation and reference patterns, among others, to evaluate the influence of publication venues, regions, research institutions, authors, and documents. It is especially advantageous for researchers, educators, students, librarians, and funding organizations (Zhang, 2019). Studies show a lack of evidence of bibliometric analysis in online reading for developing EFL learners' reading skills.

Therefore, a study is needed to survey the current practice of online reading research for developing students' reading skills. From this perspective, this study was conducted on the published articles in "Scopus," the largest abstract and citation database in the world (Meho, 2020), setting the following objectives:

a) What is the current trend in terms of distribution of publications, citations per year, document types, the top 10authors and sources?
b) What are the dominating themes in the published researches on online learning for developing reading skills?
c) What are the significant research objectives in the top 20-cited publications on reading skills through online learning?

Material and Method

In this study, the published researches in Scopus database up to February 18, 2022 were considered. The Scopus is widely recognized for its prominence and meticulous standards (Meho, 2020). For its comprehensive coverage of high-quality journals across various disciplines (Mongeon & Paul-Hus, 2016), it is frequently utilized for performing bibliometric analyses of scholarly publications (Chen & Wang, 2018; Sanguankaew & Ractham, 2019; Shakil et al., 2020; Talan, 2021). The initial inquiry employed keywords such as "online learning" and "reading skills." Nonetheless, there were some results not relevant to this study were excluded. Following several reiterations, the enquiry thread of TITLE-ABS-KEY ("Online learning" AND "reading skills") was ultimately utilized to comportment the literature search. For searching and selecting literature, this study followed the guidelines of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Moher et al., 2010), as depicted in Figure 1 were implemented. Initially, the search found a total of 441 document results, regardless of type, year, or published materials.
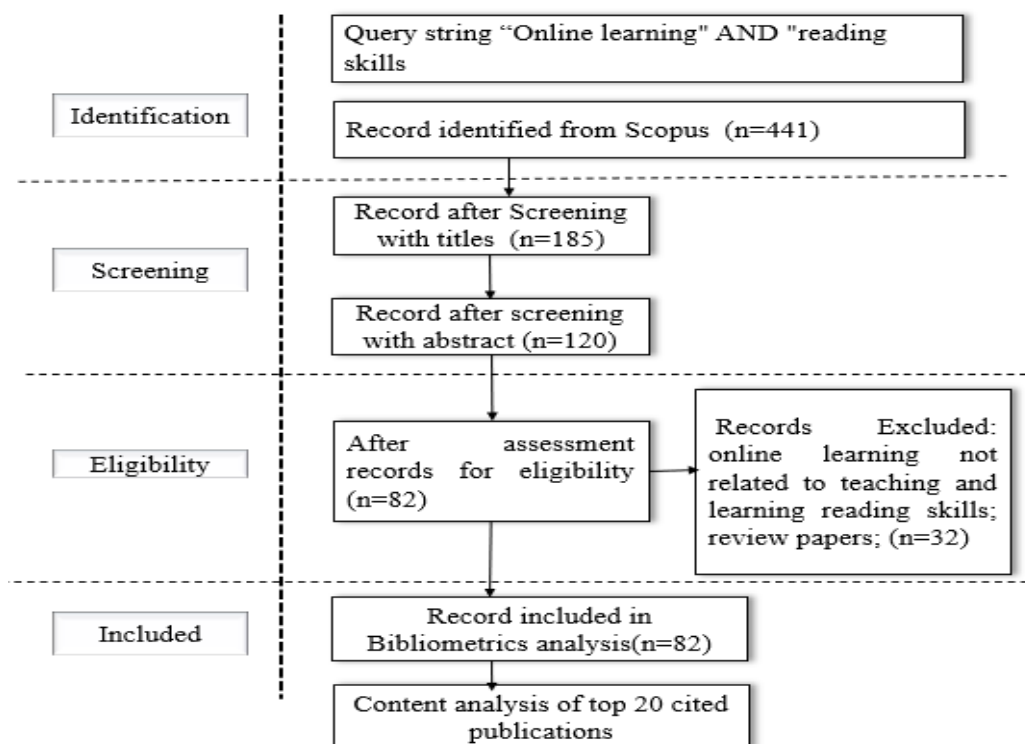
Figure 1.
PRISMA model

As this study focuses on publications on online learning to enhance reading skills, the final screening involved reviewing abstracts and full texts, resulting in a database of 82 articles selected from a total of 441 for the bibliometric analysis. Keyword and phrase co-occurrence studies were performed utilizing VOSviewer, a software designed for the creation, visualization, and exploration of bibliometric science maps (Jan & Ludo, 2010). Harzing's Publish or Perish software was implemented for producing citation metrics. Microsoft Excel was employed to calculate the frequencies of the released items and to create the corresponding graphs and charts (Baneyx, 2008). Finally, 20 top-cited researches were synthesized for eliciting dominating themes and different aspects of developing reading skills through online learning.

Results and Discussion
Results
The results of co-occurrence analyses, citation metrics analyses, frequency analyses of the published materials, and critical highlights on the significant themes and issues raised are given below under four gross sub-headings: publication trends, top 10 cited authors, document types, and popular themes.
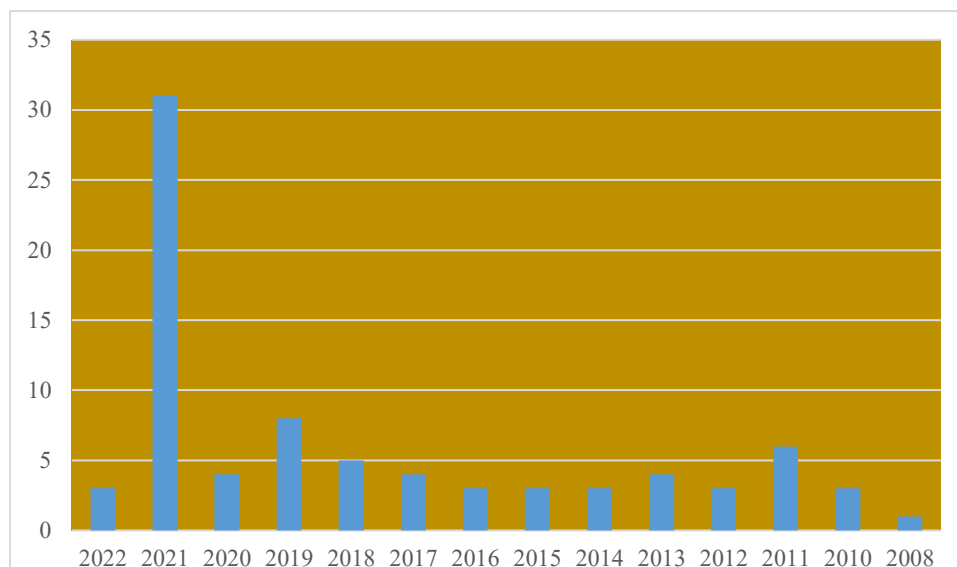
Publication trends
Table 1 summarizes the studies on online learning for developing reading skills up to February 18, 2022. The first publication was found in 2008. In this bibliometrics analysis, the researchers found a tenure of 14 years of publications on this issue from 2008 to 2022. During this time, total publications were n=82, and total citations were 875. The citation per year was 62.50, and per paper was 10.67. At the same time, the number of authors per paper was 2.73. The score for the h-index was 12, and for the g-index was 28. Figure 2 shows the distribution of online learning and reading skills articles from the beginning of 2008 (the first recorded existence) through February 18, 2022, and yielded 82 publications. The highest number of

publications was 31 in 2021, accounting for 37.8% of total production. No publications were reported in 2009. Overall, the data retrieved up to 2022 demonstrates a favorable drift in publishing outlines over time, indicating scholars' growing interest in online learning and reading skills research. Nevertheless, the early development of publications on online learning and reading skills was stated to be very steady until 2017, except in 2011, when the publications in recent years have increased (Figure 2).

Table 1.
Summary of the studies

Publication year	2008-2022(14)
Total papers	82
Total citation	875
Citation/year	62.50
Citations/paper	10.67
Authors/paper	2.73
h-index	12
g-index	28

Figure 1.
Distribution of publications per year

Top 10 cited authors

The section demonstrates the top-cited ten authors' names, year, and type of publications, sources, and the number of cites per author to portray a comparative scenario of online-reading publications.

Table 2.
Top 10 cited authors

SL No.	Authors	Year	Source	Cites	Type	Cites/ Year	Cites/ Author
1	(Rockinson-Szapkiw et al., 2013)	2013	Computers and Education	196	Article	4	9
2	(Julie Coiro, 2011)	2011	Journal of Literacy Research	144	Article	1	11
3	(Leu et al., 2015)	2015	Reading Research	144	Article	6	7

			Quarterly				
4	(S. Zhang & Duke, 2008)	2008	Journal of Literacy Research	47	Article	2	14
5	(Liang & Huang, 2014)	2013	Educational Technology and Society	39	Article	2	9
6	(Salmerón et al., 2018)	2018	Learning and Individual Differences	29	Article	3	4
7	(Hsu & Wang, 2011)	2011	Literacy Research and Instruction	27	Article	2	11
8	(Murphy, 2010)	2010	ReCALL	25	Article	1	12
9	(Ciampa, 2012)	2012	Journal of Research on Technology in Education	17	Article	1	10
10	(Wu & Peng, 2017)	2017	Interactive Learning Environments	17	Article	2	5
	Total citation			541			

Table 2 presents a summary of the top 10 cited publications on online reading for developing reading skills since their first publication in 2008. All top 10 publications were journal articles. The total number of citations of all top articles was 541, which is 61.82% of the total citations. The topmost cited publication was conducted by Rockinson-Szapkiw et al. (2013), published in the journal of "Computers and Education", and its citation was 196. The second topmost articles were written by (Coiro, 2011) and (Leu et al., 2015), published in the "Journal of Literacy Research" and "Reading Research Quarterly", and equally cited with the number 144. The other publications were cited with a number below 50. The lowest citation of the topmost publication was found in 2012 (Ciampa, 2012) and 2017 (Wu & Peng, 2017). It is assumed and found that more research articles on the development of online reading skills were published in 2021, after the COVID-19 pandemic outbreak (Ibna Seraj et al., 2020).

Document types

Three different document types were found in these 82 publications on online learning for developing reading skills. The most common document type is the article (70), accounting for 86% of total publications. The other document type formats are conference papers and book chapters, 7% and 6% of the total publications. The other formats, e.g., editorial material, meeting abstract, and book review, were not found. The numbers and proportions of various document types are shown in Figure 3. All the documents were searched and downloaded on February 18, 2022.
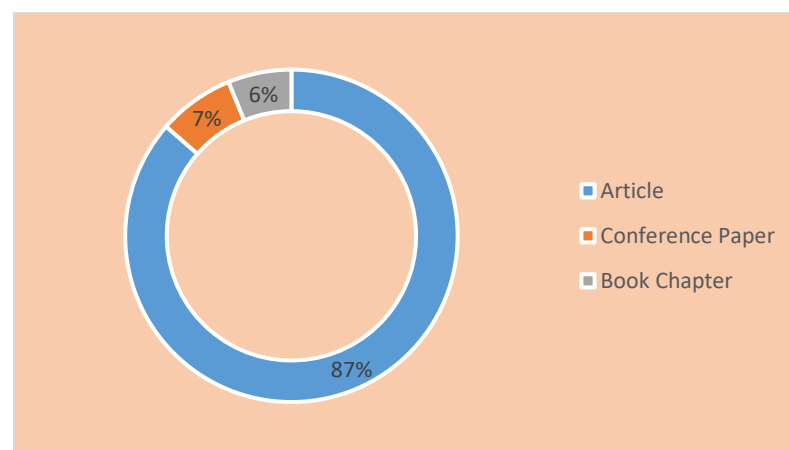

Figure 2.

Document types

Popular themes

To deduce the popular themes highlighted in the publications, author keyword analyses, keyword co-occurrence, term co-occurrence, research objectives, effects of online reading, comparisons between online and paper reading, and reading strategies were considered.

Author keyword analyses

Figure 3 presents the total strength of co-occurrence links between these 14 and other keywords. To identify common themes in these 82 studies, the author keywords were analyzed using VOSviewer software. Figure 3 presents a word cloud with the most common words that appeared 3 times among all author keywords. Of the 262 author keywords, 14 appeared most frequently. The most frequent keywords are blended learning (7 times) and reading comprehension (7 times).

Apart from the theme, there were several keywords extracted such as digital reading, online reading, reading strategies, reading, comprehension (4 times each), call, interaction, technology, e-learning, motivation, and self-efficacy (3 times each). These keywords can be a valuable mention for scholars to frame search strings for forthcoming bibliometric or systematic online reading studies aimed at enhancing reading skills.
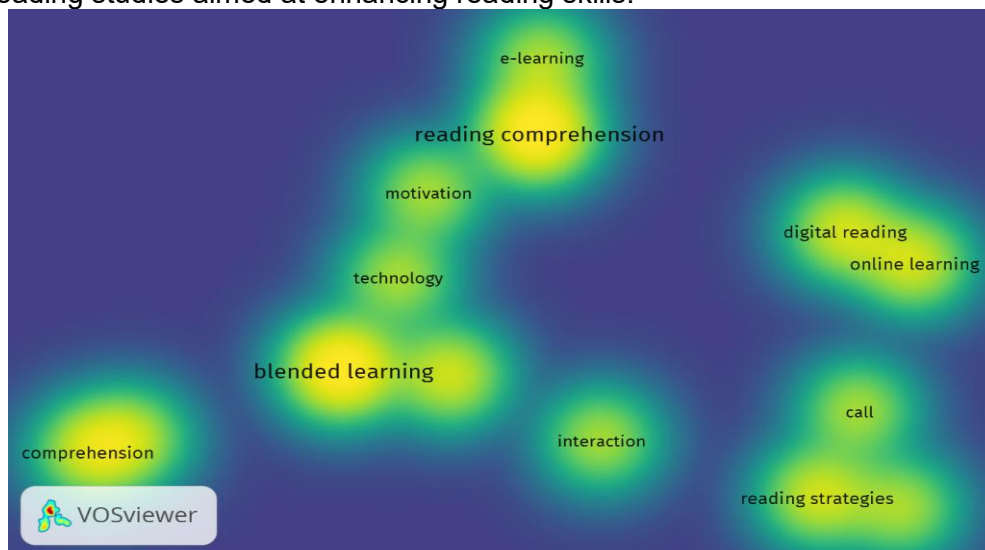

Figure 3.
Word cloud on author keywords

Keyword co-occurrence

Figure 5 presents a word cloud of the 20 most frequent words that appeared 3 times each among all keywords (381). Keywords in a publication might disclose significant insights regarding a study issue (Tian et al., 2018) and are consequently utilized to investigate focal points within a certain research domain (Huang et al., 2020). This study analyzed the co-occurrences of all terms from the publications using VOS viewer (Figure 5). Keyword co-occurrence analysis examines the closeness of analogous keywords within publications on the same study topic. Out of the 964 keywords, 48 were identified as meeting the minimal criterion of 5 occurrences. The top two keywords were students and reading comprehension (9 times each). The keywords e-learning and blended learning were the second most common, which appeared 7 times each. The other keywords in the context of online learning for developing reading skills were digital reading (6 times), reading skills, teaching, online learning (4 times each), and online reading, interaction, and technology (3 times each).
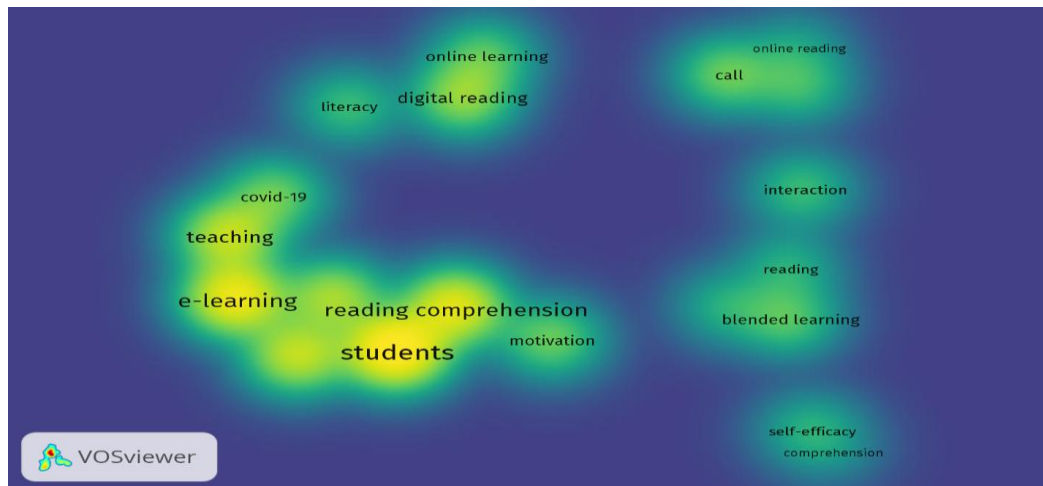
Figure 4.
The most frequent 20 words in all keywords

Term co-occurrences

An analysis of term co-occurrences in the titles and abstracts of publications on online reading for skill development was conducted to investigate the dominant themes and trending subjects in the area. Among the 2155 terms utilized in titles and abstracts, 57 terms were identified with at least 10 occurrences employing the full counting method. A network map of the term nodes was created with a threshold of at least 10 occurrences utilizing VOSviewer (Figure 6). The network map facilitates the examination of the co-occurrence of various phrases within these articles (Van Eck & Waltman, 2010). The most frequent terms relevant to the study of online reading for developing reading skills were student (219 times), study (115), reading (99), skill (77), comprehension (72), teacher (65), text (42), and technology (34). Depending on the density map, the results present that certain key research subfields, such as reading strategy, the effect of online learning, the significant difference between traditional and online learning, students' and teachers' perception, and motivation for online learning, have gained a certain level of development in the field. Besides, the extracted keywords having less density such as digital text and e-book indicate that further research can be explored in this field.
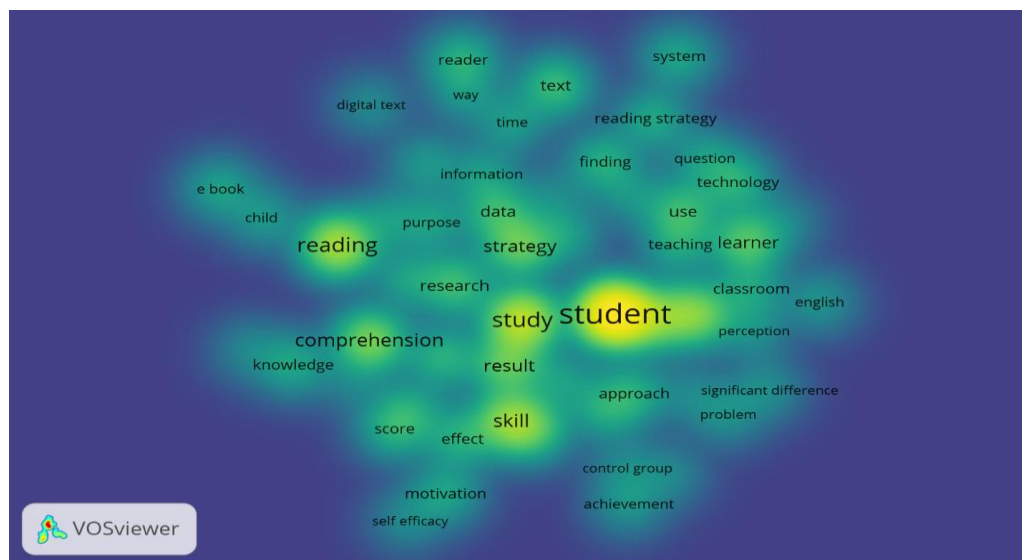

Figure 5.
Term occurrence

Significant research objectives in the top-cited 20 publications

To identify research objectives, only the top-cited 20 publications were reviewed with the study's guidelines (Lam & Habil, 2021). For alignment of the research results mentioned above, the findings of this research question would assist in tracking the themes and trends of the previous studies. Three key research objectives were elicited from the review of the twenty (20) top-cited publications on online reading for developing EFL learners' reading skills in teaching and learning: (1) effects of using online reading, (2) differences between digital and paper reading, and (3) online reading strategies. Figure 7 presents the hierarchy of those research objectives. Most of the studies (n=11) dealt with the effect of online reading along with the other two. The hierarchy chart shows the major research trends in this field.

Figure 6.
Hierarchy chart of research objectives of the top-cited 20 publications

Discussion

Effect of online reading

The majority of studies (n=11) focused on the effect of online reading on developing students' reading skills. These studies showed extensive research had been done on print reading, whereas few studies have been done on online reading. Salmerón et al. (2018) found that online reading significantly affected students' navigation skills at higher grade levels. Online reading habits positively affected the engagement of students in reading activities (Wu & Peng, 2017). Ciampa (2012) reported that students' reading comprehension scores improved from pre-test to post-test following the use of the online e-book reading program (Hsu & Wang, 2011; Kazakoff et al., 2018), expressed enjoyment of the e-book reading experience (Hwang et al., 2019), and regularly engaged in reading online e-books at home during their leisure time. The study demonstrated that there were variations in students' performance even in controlling offline reading comprehension (Julie Coiro, 2011). Delgado and Salmerón (2021) examined the influence of reading media and reading duration on readers' sustained attention, metacognitive calibration, and reading comprehension.

Moreover, online reading had a positive effect on collaborative reading comprehension exercises outside school (Murphy, 2010). Mohd Noor et al. (2011) reported that online reading strategies positively affected the development of learners' reading skills and their overall evaluation. Nevertheless, the study also pointed out that digital reading materials did not affect developing students' reading skills (Nielen et al., 2018).

Online vs. paper reading

The second most frequent research objective in these studies was to demonstrate differences between online and paper reading for developing students' reading skills (n=9). This deviation is found based on terms and effects. This review study found several synonyms

for the terms online and paper reading; for online reading, electronic book (e-book) reading (Korat & Segal-Drori, 2016; Rockinson- Szapkiw et al., 2013), internet-based reading (Leu et al., 2015), digital textbook (Goodwin et al., 2020), screen reading (Delgado & Salmerón, 2021) and for paper reading, printed book reading (Korat & Segal-Drori, 2016; Wu & Peng, 2017), traditional, offline reading (Leu et al., 2015), textbook format (Rockinson-Szapkiw et al., 2013), and paper reading (Goodwin et al., 2020). In terms of comparing the effects on students' performance, students who received an online intervention performed better than those who read on paper (Korat & Segal-Drori, 2016; Leu et al., 2015). Besides higher scores, students who engaged in online reading reported higher perceived affective and psychomotor learning (Rockinson-Szapkiw et al., 2013). The study also noted that students highlighted and annotated text while online reading than paper reading (Goodwin et al., 2020), but exhibited better reading literacy in the print environment (Wu & Peng, 2017).

Nevertheless, the study focused on no difference in students' metacognitive calibration of both online and paper reading processes (Delgado & Salmerón, 2021). Leu et al. (2015) examined the achievement difference in online reading proficiency in relation to income inequality and also considered whether this gap is distinct from the achievement disparity observed in traditional, offline reading. The findings indicate a substantial achievement disparity in each instance, supporting the existence of a distinct and independent achievement gap for online reading. Rockinson-Szapkiw et al. (2013) investigated the relationship between the format of e-textbooks, specifically digital textbooks versus printed textbooks, and university students' academic performance and perceived learning outcomes. Since no disparity in cognitive learning and academic performance was observed between the two groups, it indicates that the electronic textbook is equally effective for learning as the traditional textbook. Coiro (2011) examined the extent to which new reading comprehension skills are necessary when adolescents engage in reading for information on the Internet. The findings revealed that performance on a single online reading comprehension metric accounted for a significant portion of the unique variance in scores on a second online reading comprehension metric, exceeding the variance explained by offline reading comprehension and prior knowledge. Hwang et al. (2019) identified positive correlations among reading comprehension, self-efficacy, and both intrinsic and extrinsic motivation. Goodwin et al. (2020) concluded that digital highlighting and text review are more conducive to reading comprehension than paper highlighting, which often occurs in non-essential portions of the text.

Reading strategies

This study found that reading strategies were one of the research objectives in online reading for students' reading skills development. Different studies focused on different platforms, e.g., i-ELLS (interactive English Language Literacy System) (Mohd Noor et al., 2011), Internet reading strategies (S. Zhang & Duke, 2008), Web-based collaborative reading (Murphy, 2010), blog based reading (Hsu & Wang, 2011) for carrying intervention on online reading for students' reading skills development. Besides using different platforms for online reading, some studies focused on blended learning strategies (Kazakoff et al., 2018), metacognitive online reading strategies (Ramli et al., 2011), and navigation learning strategies (Turner et al., 2020). All the strategies using different learning platforms significantly affected the students' reading performance. Ramli et al. (2011) examined the metacognitive online reading strategies employed by adult learners in an ESL course and discovered that the learners predominantly employed global reading strategies, followed by problem-solving strategies and support reading strategies. However, they do not effectively utilize the online learning tools and features available within the LMS. Kazakoff et al. (2018) examined how a blended learning approach as a reading strategy can facilitate reading development in both ELs and non-ELs over the span of one or two school years. Noor et al. (2011) examined how technological features such as discussion tools, real-time audio-visual communication, and personal knowledge construction and annotation tools are developed to serve as strategies for online reading.

Conclusion

An overview of the research trends in the body of literature on online learning for improving the reading abilities of EFL students is given by this bibliometric study. The following results are presented by this study. According to the study, the body of research in this area has been growing consistently since 2017, but during the COVID epidemic in 2021, the number of papers skyrocketed. Second, in the context of online reading research, this study included keywords such reading comprehension, e-learning, blended learning, digital reading, online learning, etc. Thirdly, the expansion of literature addressed reading tactics, the impact of online reading, and the differences between online and print reading. Additionally, this study suggests many concerns, like group online reading (Mohd Noor et al., 2011). online reading behavior utilizing eye-movement data or screen capture (Wu & Peng, 2017), and strategies for encouraging students to read online (Turner et al., 2020). For more study in this area, it is necessary to design efficient and optimal digital guidance (Nielen et al., 2018), create a favorable online learning environment (Ramli et al., 2011), and address technological issues such webpage loading speed (Ciampa, 2012). In summary, further investigation is required to examine the efficacy of online reading in language instruction. In order to frame a better online reading pedagogy, the results of this study will help future scholars by offering keywords for searching streams and themes for doing empirical research.

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