OVERVIEW RESEARCH ON READING COMPREHENSION SKILLS IN TEACHING READING COMPREHENSION OF TEXTS IN HIGH SCHOOLS

La Nguyet Anh1 and Tran Thi Hanh Phuong2*

1Hanoi University of Education 2, No. 32 Nguyen Van Linh Street, Phuc Yen City, Vinh Phuc Province, Vietnam
2Hanoi University of Education 2, No. 32 Nguyen Van Linh Street, Phuc Yen City, Vinh Phuc Province, Vietnam

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ABSTRACT

In the current context of educational innovation, more and more studies emphasize the key role of reading comprehension and reading comprehension skills. However, there is not much general research in this field, especially using bibliometric methods. Therefore, this study was conducted to overview the main trends in the research field of reading comprehension and reading comprehension skills. A total of 1997 publications published from 2013 to 2023 were analyzed from the Scopus database. In particular, publishing trends, countries and institutions with the most research, and keywords used in the research field were explored and analyzed using bibliometric indices based on PRISMA and VOSviewer software version 1.6.16 to visualize and analyze citation networks. In addition, from a detailed review of the 47 cited publications, four prominent groups are generally studied: the impact and influence of factors on learners' reading comprehension skills; solutions and strategies to develop reading comprehension skills for learners; Teaching tools and forms used to build reading comprehension skills for learners and the importance and relationship of reading comprehension. Based on the findings, this study also proposes some new research directions for the future.

KEYWORDS: Reading comprehension, reading comprehension skills, text, teaching reading comprehension, teaching reading comprehension of text

1. INTRODUCTION

Reading comprehension skills have played an important role in recent years, especially in the context of educational innovation and digital transformation today. Researchers have confirmed that reading comprehension skills play a crucial role, having a direct impact on the learning process and future success of individuals. Compared to other skills such as writing, speaking, and listening, reading comprehension skills have outstanding advantages; including expanding knowledge and vocabulary, developing analytical thinking and reasoning, and accumulating knowledge and information. Reading activities are directly related to perception, thinking, learning and expanding the reader's knowledge.
and vision. Through reading, readers can discover, absorb, and expand knowledge, and apply that knowledge to work and real life to achieve personal goals and self-development. Reading comprehension is an important tool to help improve each person's communication and understanding abilities. With the development of information technology, reading comprehension skills have also changed. Today, reading is not limited to reading traditional books and articles but also includes reading and understanding online documents, scientific articles, and other information sources on the Internet. This requires readers to process large amounts of information and evaluate the reliability of information sources. Reading comprehension is also adapted to meet the demands of the digital age. Therefore, practicing reading comprehension skills is essential for success in learning and life. Reading comprehension skills, although they have many advantages, are also facing many challenges and difficulties. Issues such as difficulty and variety of reading texts (Kim and Petscher, 2021); readers' IQ and vocabulary (Ozuru, Dempsey, et al., 2009); as well as the imbalance between time and reading resources (Kulesz, Francis, et al., 2016) have become significant challenges. Although previous studies have attempted to address issues related to reading comprehension skills. Some studies have focused on identifying influencing factors, such as Kulesz, Francis, et al. (2016); and G. Georgiou et al. (2021). These studies have further investigated factors such as text difficulty and the influence of IQ and vocabulary on reading comprehension skills. In addition, some other studies seek solutions to overcome difficulties and develop reading comprehension skills for learners. Williams and Martinez (2019) along with Al Sultan (2023) have introduced new methods and technologies to improve individuals' reading comprehension skills. In the field of research on reading comprehension skills, current research mainly focuses on researching and solving specific problems related to separate subjects. However, there are no studies that have mentioned the overall analysis of research in this field. Therefore, the purpose of this study is to fill the scientific research gap by doing an overview of learners' text comprehension skills. We aim to provide a systematic overview of reading comprehension skills, propose new research ideas for the future, and make recommendations to improve learners' reading comprehension skills. The identified research questions (Q) of this study are as follows:

Q1: General research status on reading comprehension and text comprehension skills: Data from Scopus database, popular keywords, top journals, and geographical analysis of publication products by country family like?

Q2: What are the theoretical perspectives on reading comprehension skills and teaching reading comprehension?

Q3: What are the future research directions?

To address the questions, the study conducted a bibliographic review of published products related to reading comprehension and reading comprehension skills. A cluster content analysis of the data was performed to further refine the scope of the study and identify future research directions. The findings of this study have theoretical and practical significance, normalizing the bibliographic map of the
general status of the research problem as well as current research trends, and proposing future research trends. again.

The structure of the article is as follows: Part 1: the introduction and identification of research questions; Part 2: presents an overview of the research problem; Part 3: describes data search and analysis methods; Part 4: presents the main findings and discusses the results, provides future research perspectives, and considers the limitations of the study; Part 5: conclusion.

2. LITERATURE REVIEW

In this study, we use the database on Scopus. The research's survey limits are related to the keywords "reading comprehension" and "reading comprehension skills" or "text", "teaching reading comprehension" and "teaching reading comprehension of text". The time frame is from 2013 to 2023 with publications being magazines, and the language used is English. We conducted the sample selection process for bibliometric and content analysis based on PRISMA software (Figure 1). Data such as the number of publications, countries, keywords appearing at the same time, number of citations, and impact factor (IF) will be analyzed and evaluated in the section discussing the method adopted in support of VOSviewer software, version 1.6.16. The use of bibliometric analysis offers the advantages of objectivity, quantification, and avoidance of subjective inferences.

The concept of Reading Comprehension has been discussed in many studies. Reading comprehension is defined as decoding and understanding text (Alisaari, J., et al., (2018), and interpreting mental images from a given text (Sun, Y., et al., 2021). The importance of reading comprehension skills, through analysis and assessment, shows that this is a global issue, of particular importance to many scientific disciplines, especially in the context of the expanding information highway. Reading comprehension texts are also very diverse: informational texts, multimodal texts (Januarty, R. and H. N. A. Nima., 2018), and explanatory texts (Bilgi, A. D. and E. R. Özmen, 2018).

In addition to text comprehension, there are studies interested in other levels of reading and comprehension such as measuring literacy through reading comprehension ability (Kargin, T., et al., 2023). Impacts and influences of factors on learners' reading comprehension skills such as near reading comprehension measures, and distant reading comprehension measures (Jiang, H., et al., 2019). The influence of cognitive reading strategies in improving skills understanding is also discussed (Fresneda, R. G., 2022). Provides preliminary evidence for the feasibility of text structure interventions and shows significant gains using standardized measures of reading comprehension skills (Al Otaiba, S., et al., 2018).

Solutions and strategies to grow and develop reading comprehension skills are also proposed and researched (Smith, R., et al., 2023). Using the THIEVES strategy as a schema activation for the reading comprehension ability of EFL learners (Khataee, E., 2019). The impact of POSSE strategy in developing reading comprehension (Al Sultan, A. A., 2023). Tests were also performed.
3. METHODS

a. Search documents and analyze results on Scopus

A bibliometric approach is used to build a collection of research articles on text comprehension skills in teaching reading comprehension through the use of extracted and screened data from the Scopus database. This is the most used database to perform bibliometric analysis. Our study chose Scopus because it is the largest multidisciplinary database of reviewed literature in social science research (Douthu et al., 2020). The research began with identifying search key phrases in the Scopus database (https://www.scopus.com). Key phrases are used in combination with searches in the Scopus database, specifically: reading comprehension, reading comprehension skills, text, teaching reading comprehension, and teaching reading comprehension of text. Search strings are connected by “and”, “or”. For example, reading comprehension and reading comprehension skills; reading comprehension skills or text comprehension skills; and text and teaching reading comprehension.

These keywords were chosen to search for articles for research in this academic field. The results showed 1997 publications from the Scopus core collection. This is a readily available, popular, comprehensive, and reliable database.

The process followed in selecting samples for bibliometric and content analysis was based on PRISMA (Figure 1). At this stage of screening, publications from the Scopus database were identified, considered optional and limited according to the indexes: open source index (All open access); Year of publication index (Year) in the past 10 years (from 2013 to 2023); Social Sciences and Psychology index; Document type index (Article) and keyword index (Keyword); Source type index is journals and publication language index (Language). Therefore, the final sample included 47 publications, including open-source access.
b. Visual network analysis and citations

We exported the full records and cited references of the search results in text files for visual analysis. This study applies a multi-method approach, including PRISMA and Vosviewer review methods. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) general research method is a quantitative, effective, and accurate research method to synthesize available research documents in a specific field, evaluate quantitative bibliometric data and qualitative content analysis (Moher et al., 2009). Once the results were available, the study continued according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA).

Additionally, our study used VOSviewer, version 1.6.16 to visualize and analyze the citation network. The VOSviewer tool allows visualization of keywords, countries, and organizations based on relationships between items. We created visualization maps by counting citations and occurrences by study authors, across terms, countries, and institutions. A map usually includes only one type of link. Furthermore, there cannot be more than one link between any pair of items. Each link has a strength,
represented by a positive numerical value. The higher this value, the stronger the link. Use VOSviewer to present representative results while covering a broad picture of research surrounding this topic.

4. RESULTS AND DISCUSSION

a. The general state of research on reading comprehension and text comprehension skills

To address research question #1 regarding the general state of research on reading comprehension and text comprehension skills, a quantitative descriptive analysis was conducted that revealed the number of publications by year, magazines, and the most effective organizations and countries. In addition, other methods are conducted based on bases such as co-authorship analysis based on the geographical location of the author providing the cooperation network of countries; through co-occurrence analysis, keywords on the topic were taken to map research trends. All of these analyses are supported by VOSviewer software, version 1.6.16.

As shown in Figure 2, the number of publications on this topic increases and decreases unevenly over time (from 2013 to 2023), reflecting that research interest in reading comprehension skills sometimes increases, and sometimes decreases with a significant number of publications. For example, from 2013 to 2019, the number of publications increased sharply from 03 publications (in 2013) to 17 publications (in 2019, and 2020); In 2021, it continues to decrease to 14 publications; By 2022, it will decrease to 10 publications and by 2023, it will continue to decrease to only 6 publications.

Bibliometric analysis shows that publications are distributed across many journals. Table 1: List of top 04 journals, with number of publications, citations, and impact factor (IF). The most effective journal was determined to be Reading And Writing magazine with 11 publications 90 citations (in 2015), and 61 citations (in 2014). The Journal of Education ranked second with 08 publications and citations of 108 (2014), 117 citations (2015), and 70 citations (2020); followed by the Journal of Learning Disabilities (04 publications and 75 citations in 2018); Journal of Speech Language And Hearing Research (04 publications).
Figure 2: Publications on reading comprehension skills (2013 – 2023)

Table 1: Top 4 journals based on number of publications

<table>
<thead>
<tr>
<th>Journal</th>
<th>Year</th>
<th>Publications</th>
</tr>
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<tbody>
<tr>
<td>Reading And Writing</td>
<td>2015</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>61</td>
</tr>
<tr>
<td>Journal of Education</td>
<td>2014</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>70</td>
</tr>
<tr>
<td>Journal of Learning Disabilities</td>
<td>2018</td>
<td>04</td>
</tr>
<tr>
<td>Journal of Speech Language And</td>
<td>2015</td>
<td>04</td>
</tr>
<tr>
<td>Hearing Research</td>
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</tbody>
</table>
Figure 3 also shows that Lancaster University is the most effective joint research organization in this field. Lancaster University organization leads with 08 publications; Next is Harvard University with 7 publications. Ranked third are Ohio State University and Florida State University with 6 publications. Ranked 4th with 5 publications is Vanderbilt University; University of California, Irvine Department of Psychology Lancaster University; …

Figure 3: The most effective affiliated organizations in reading comprehension skills (2013 – 2023)

Regarding the countries most productive in research on this topic, the United States leads with 48 publications; followed by the United Kingdom with 28 publications; Spain with 17 publications; and Canada with 08 publications. Finally Germany with 06 publications.

Observing the evolution of the research situation over time shows that: research goes deeply into solving the problem of reading comprehension and text comprehension skills. The methods that the studies use are mainly quantitative methods based on surveys or experiments. Although some publications use action research and content analysis. For example, from 2013 to 2019, related research focused on the effects of linguistic factors (phonetics, vocabulary, grammar, etc.) on the reading comprehension process or reading comprehension skills. From 2020 to 2023, research will mainly focus on the topic of finding specific measures and strategies to improve and support learners’ reading comprehension skills; which emphasizes the ability to expand reading comprehension of various types of texts; forms of online reading, and some types of tools used in the digital technology era.
Popular keywords on this topic were identified through concurrent analysis. Analyzing based on keywords that were excluded by frequency less than three and others that were meaningless, 23 common keywords emerged (Figure 4). From the analysis, five keyword phrases emerged and developed. The largest label and circle is for the keyword phrase “reading comprehension”, which proves that this keyword has the largest number of occurrences in the Scopus database. The second keyphrase has the second largest font, representing “read.” The third cluster represents “understanding” which is linked to “vocabulary”. Next is “memorization ability” and finally “reading strategy”.

Furthermore, the gap between “reading comprehension” and “memorization ability” is shorter than the gap between “reading comprehension” and “understanding”. This reflects that the relationship between the two variables "reading comprehension" and "memorization ability" is the strongest. The relationship between “reading comprehension” and “reading strategy” is the weakest because these two terms are the furthest apart.

Figure 4. Keyword network based on co-occurrence

In the current context of educational innovation, approaches to digital techniques such as virtual exchanges, blended learning, flipped classrooms, etc. have been used in previously analyzed studies to Improve the quality of teaching, form, and develop reading comprehension skills for learners. In addition to pedagogical methods and forms of teaching organization, factors that affect learners' text comprehension skills such as language, cognitive level, psychological factors, context, etc. also have positive impacts on this process. Therefore, it is necessary to have specific pedagogical impacts...
combined with many rich and diverse forms of learning, especially the application of science and technology to promote learners' abilities.

b. **Theoretical perspectives on reading comprehension, reading comprehension skills, and teaching reading comprehension**

To understand the theoretical perspectives in research question 2, a content analysis of 47 publications was conducted using co-citation analysis. Publications are selected according to link strength in VOSviewer software, version 1.6.16

The study set up software to identify the 47 most important publications for content analysis through a bibliographic linkage technique. Bibliographic coupling uses the number of divided references as a measure of the degree of similarity between them. The more the bibliographies of two publications overlap, the stronger the connection between them (Zupic & Cater, 2015). The software identified 47 publications with the greatest total link strength. This means that publications with more links will stand out more than other publications. After reading the abstracts, 47 publications were selected for in-depth content analysis (Elo & Kyngäs, 2008). Other publications do not cover the topic of reading comprehension skills in depth. The study then grouped these 47 publications into four groups according to their degree of similarity. This is the primary source for the other publications discussed.

Group 1, studies focus on the impact and influence of factors on learners' reading comprehension skills. For example, the influence of the learning or family environment (G. Georgiou et al., 2021); age influence (Wang, Xu et al., 2022); influences linguistic elements such as vocabulary, grammar, etc. (Kulesz, Francis, et al., 2016); (Kim, 2020); (Kirschmann, Lenhard, et al., 2021). Besides, text elements and text characteristics also impact learners' reading comprehension skills (Yasuhiro Ozuru, Kyle Dempsey, et al., 2009).

Group 2, studies discuss solutions and strategies to develop reading comprehension skills for learners. For example, the strategy is POSSE (Al Sultan, 2023); metacognitive reading strategies (Razkane, Sayeh et al., 2023); THIEVES strategy (Khataee, 2019); the MMCSI-modified multicomponent cognitive reading strategy (Bilgi and Özmen, 2018); ... In addition, studies also discuss language interventions and improvements (Jiang, Logan, et al., 2019, Toste, Capin et al., 2019); text structure (Al Otaiba, Connor et al., 2018); or increase the use of different types of texts in the classroom such as multimodal texts, digital texts (Murray, Stevens et al., 2022); (Alisaari, Turunen et al., 2018); (Januarty and Nima 2018). In addition, research also provides specific instructions on how to read vocabulary (Williams and Martinez, 2019); multisyllabic word reading (Toste, Capin et al., 2019), and reading phonics and spelling activities (Bear, 2022); (Diprossimo, Ushakova et al., 2023). Or forms of discussion reading (Rydland and Grøver, 2019), directed reading, approach-based reading (Schwanenflugel, Kuhn et al., 2009), and critical reading (Hromova, Kryvych et al., 2022).

Group 3, research on teaching tools and forms used to develop reading comprehension skills for learners. In the current period, when the achievements of information technology are applied to
education more and more widely, teaching forms and methods are also applied, changed, and
developed rapidly, bringing about Optimal effectiveness for the process of forming, training, and
developing reading comprehension skills for learners. Besides direct verbal instructions (Yaghmour
and Obaidat, 2022); Teachers can apply many forms of combining online teaching and flipped
classroom models (Setyosari, Kuswandi et al., 2022). Not only using familiar tools such as question
tools (Cerdán, Pérez et al., 2019) but also mentioning graphic organizers (Januarty and Nima, 2018);
text-to-speech tools (Wood, Moxley et al., 2018); Color translation tools (Echauri Galván and García
Hernández, 2020) effectively supports reading comprehension activities and checks the level of
learners' achievement when performing reading comprehension activities in high school.

Group 4, studies focusing on concepts of reading comprehension (Smith, Snow et al., 2023); determine
the role and relationship of cognitive reading with learners' understanding (Fresneda, 2022); the close
relationship between reading and reading comprehension (Sun, Wang et al., 2021). Research also
confirms the importance of metacognitive reading (Mohammad Reza Ahmadi et al., 2013) and the role
of early literacy in developing learners' reading comprehension skills (Kargin, Güldenoğlu et al.,
2023).

c. **Future research directions**

To understand possible research directions for other future studies on text comprehension skills in
teaching reading comprehension, an analysis of the co-occurrence of keywords in publications from
2013 - 2023 was made; along with the content analysis discussed in the previous subsections. The
density visualization for co-occurring keywords is shown in Figure 5.
After excluding keywords with a frequency of less than two and meaningless keywords, 23 popular keywords appeared. The items highlighted in yellow in Figure 6 are hot topics in the literature because they have been the most focused on by recent research. For example, strategies and solutions to develop learners' reading comprehension skills.

Based on the researchers' findings and considering factors affecting reading comprehension skills, the study proposes some future research directions (Table 2).

**Table 2. Research agenda for future studies on reading comprehension skills in high schools**

<table>
<thead>
<tr>
<th>Research</th>
<th>Future research questions</th>
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<tbody>
<tr>
<td><strong>Language</strong></td>
<td></td>
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<tr>
<td></td>
<td>What is natural language?</td>
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<tr>
<td></td>
<td>How to build advanced natural language development models in reading comprehension?</td>
</tr>
<tr>
<td></td>
<td>How to build models and methods for processing multilingual text information?</td>
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<tr>
<td><strong>Artificial intelligence</strong></td>
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<tr>
<td></td>
<td>What is the system of smart software that supports the reading</td>
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</table>
How does developing interfaces improve the reading comprehension and information processing capabilities of computer systems?

Context of reading comprehension

- What is the relationship of social, cultural, and historical context to the intelligent reading comprehension system?
- How to develop machine learning models to model and use contextual information in reading comprehension?

Table 2 proposes research directions and future research questions, specifically:

First of all, the research direction can solve the difficulties of linguistic factors in reading and understanding text. For example, researching and developing methods and models to classify and understand the grammatical structure of words and sentences in text; semantic processing, and semantic relationships between linguistic components of text (words, phrases, sentences); … Research directions in this field improve automatic reading comprehension, applications in the fields of natural language processing, information extraction, machine translation and many other applications related to language and text.

Regarding innovation and the contemporary context, future research can apply the achievements of information technology and digital transformation in education. Diprossimo and colleagues (2023) emphasize the need to use vocabulary scaffolding features that not only support multimodal pronunciation but also support vocabulary development in digital reading environments (Diprossimo, Ushakova et al., 2023). A potential future research direction to address technological approaches to support the teaching and educational process. For example, research to develop advanced machine learning models; combine reading comprehension of multimodal text (image text); multilingual reading comprehension; multi-document or research intelligent natural language interactions such as chatbots, virtual assistants, etc. With the rapid development of this field, there are many favorable opportunities to explore and make certain contributions to improving reading comprehension in the future.

The third direction for future research concerns the context of reading comprehension. With this research direction, it is possible to focus on understanding and using contextual information to improve the reading comprehension ability of computer systems. In other words, developing smart reading comprehension technologies and their applications in many different fields. For example, methods to identify and understand social factors in texts (culture, gender, geography, sociology, etc.); Analyze events, locate time, identify cycles (time context); or multi-context; interactions with humans based on intelligent system contexts. These research directions all aim to improve reading comprehension and create diverse and accurate reading comprehension results.
5. CONCLUSION
The present study provides a comprehensive view of reading comprehension skills between 2013 and 2023. This study contributes to general knowledge by presenting the results of a network survey. Academic networks and global research trends in reading comprehension skills. 1997 important and highly relevant publications on the topic were retrieved from the Scopus database. To answer the research questions, the bibliometric analysis method is applied, which uses PRISMA and VOSviewer software version 1.6.16. Using data analytics software, we provide insights related to publication results, journals, keywords, countries, and organizations. The findings of this study can become an important foundation to promote further research on other factors that affect bibliometric analysis methods and suggest promising future research directions in this field.

This study also has some limitations related to the systematic review method and analysis methods used. Although we have used the Scopus database to collect publications, we have not mentioned publications published in other databases such as Google Scholar, Web of Science, and ScienceDirect and also have not considered languages other than English such as Arabic, German, and many others. This may create a limitation in the scope and representativeness of the study. Furthermore, limiting the time from 2013 to 2023 for reviewing publications and the number of publications to only the articles reviewed is also a limitation. There may be important and relevant publications published before or after this period that we have overlooked. In addition, during the bibliometric analysis, we have not used some other visualization tools such as HistCite that can provide a more in-depth view of the academic network. Failure to use these tools may reduce the integrity and diversity of our analysis. Notwithstanding this, we conducted analyses to obtain useful information about the group of topics found in the publications considered in the systematic review. We also propose some future research directions to continue to supplement and expand aspects of research and exploration in this field.

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