



Research Trends on Reading Comprehension Ability of Elementary School Students: Bibliometric Analysis

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ABSTRACT

Objective: This study aims to analyze trends, developments, and characteristics of global scientific publications regarding the reading comprehension of elementary school students during the eleven-year period (2014–2024) in order to overcome the limitations of systematic scientific mapping using a computational bibliometric approach in this field. **Methods:** This study used a quantitative bibliometric design, collecting metadata from 1,000 scientific articles related to reading comprehension in elementary schools from the Google Scholar database indexed through Harzing's Publish or Perish application. Statistical data processing was carried out using Microsoft Excel to analyze annual metrics and citations, followed by computational mapping and analysis of network visualizations, density, and overlays using the VOSviewer application to test the relationship between keyword co-occurrence. **Findings:** The analysis revealed that there were 1,000 publications with a fluctuating trend that tended to decline gradually, peaking at 171 articles in 2014 with an average of 91 publications per year. The VOSviewer mapping identifies 5 interconnected keyword clusters where the terms "program", "model", "achievement", "classroom", "comprehension ability", and "vocabulary" form the core with the highest density. Meanwhile, topics that emerged as an overlay trend have shifted from basic literacy (kindergarten, spelling) to the effectiveness of learning models (model, effectiveness) for elementary school students. **Research Implications:** These findings provide a comprehensive reference for educators and researchers to determine future research directions, particularly highlighting the urgency of developing interactive pedagogical models in literacy, and offer a foundation for basic education policymakers to integrate technology-based learning strategies to improve students' reading comprehension. **Originality:** This research contributes to presenting a unique eleven-year computational mapping of the publication of elementary school students' reading comprehension skills, as well as successfully uncovering research gaps (density gaps) that are still rarely touched, such as the integration of digital technology, teacher education, and student achievement in this discipline.



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INTRODUCTION

Reading comprehension abilities are one of the most fundamental skills in primary education, serving as an important gateway for elementary school students to master a wide range of academic disciplines. Reading comprehension determines whether students can process texts, understand complex meanings, and integrate new information with existing knowledge (Pearson & Duke, 2002). A strong foundation in reading comprehension helps educators and researchers ensure long-term academic success for elementary school students (Snow, 2002). In primary education, reading comprehension is related to several important aspects of cognitive development and literacy, including vocabulary acquisition, critical thinking skills, and contextual text engagement (Shanahan & Lonigan, 2010).

Many previous studies have focused on reading comprehension in primary education, including an exploration of pedagogical strategies to improve reading skills (National Reading Panel (US) et al., 2000), a discussion of metacognitive strategies in reading (Boulware-Gooden et al., 2007), an analysis of technology-assisted reading interventions (Cheung & Slavin, 2012), research on the impact of early literacy skills on reading comprehension

(Elleman et al., 2009) and research on the role of socio-economic factors in the literacy development of elementary school students (Sirin, 2005).

Based on several previous studies on reading comprehension in primary education, there has been no study that comprehensively analyzes research trends regarding the reading comprehension ability of elementary school students using a bibliometric analysis approach assisted by mapping visualization. More recently, the use of bibliometric analysis has often been used by many previous studies in determining research trends (Al Husaeni et al., 2023a; Niknejad et al., 2021; Ragadhita & Nandiyanto, 2022; Suprpto et al., 2021). Therefore, this study aims to analyze research trends related to reading comprehension skills among elementary school students using bibliometric analysis methods assisted by mapping analysis. This study also analyzes the development of the growth of research publications and the dynamics of citations related to reading comprehension in elementary education. We used visualization mapping to determine the key thematic clusters and keyword trends that emerged in reading comprehension research in primary schools.

METHOD

Bibliometric analysis is carried out as a research method. There are several stages of bibliometric analysis, including: Collecting article data is the first step in conducting literature research using bibliometric analysis. At this stage, published research documents related to the topic "Reading comprehension in elementary school students" are collected. The article data used is article data indexed by Google Scholar from 2014 - 2024. Article data is collected through the Publish or Perish application. The results of article data collection using Publish or Perish resulted in 1000 articles to be analyzed. The collected research article data is stored in a format (.csv) to be analyzed using Microsoft Excel software, and a format (.ris) to be analyzed and visualized using the VOSviewer application. After data collection, the article data is filtered to see the completeness of the components (such as year). Next, the article data is analyzed using Ms. Excel and visualized using VOSviewer. More detailed stages regarding the steps of the analysis were described in our previous study (Al Husaeni et al., 2023).

RESULTS

Based on the results of searching data through the Harzing's Publish or Perish application from the Google Scholar database, as many as 1,000 articles were obtained that met the research criteria regarding the reading comprehension ability of elementary school students in the range of 2014 to 2024. The data obtained is in the form of article metadata consisting of the author's name, title, year of publication, journal name, publisher, number of citations, and article links. Overall, the 1,000 articles analyzed in this study had a very significant academic impact with a total accumulation of 806,085 citations, an average of 67,173.75 citations per year, and 806.09 citations per article. The average number of authors per article reached 2.61 authors. This series of documents also recorded a very high h-index value of 482 and a g-index of 892. The citation metric metric is briefly presented in Figure 1.

Citation metrics	Help
Publication years:	2014-2024
Citation years:	12 (2014-2026)
Papers:	1000
Citations:	806085
Cites/year:	67173.75
Cites/paper:	806.09
Cites/author:	442506.97
Papers/author:	515.71
Authors/paper:	2.61
h-index:	482
g-index:	892
hI,norm:	329
hI,annual:	27.42
hA-index:	150
Papers with ACC >= 1,2,5,10,20:	997,994,985,960,884

Figure 1. Citation Metrics from Publish or Perish

A. Development of Publications on Reading Comprehension Ability of Elementary School Students (2014–2024)

Analysis of the dynamics of scientific publications is an important step in bibliometric studies to map the growth, level of interest, and productivity of research in certain fields of science over time. In this context, the mapping of publication trends in primary school students' reading comprehension skills provides a comprehensive picture of the focus of global academics over the past decade (2014–2024). Based on the results of data extraction from *Google Scholar* through the *Publish or Perish* application, as many as 1,000 relevant scientific article documents were obtained. The temporal distribution shows a fluctuating dynamic with a tendency to gradually decrease the volume of publications, as presented in [Table 2](#) and [Figure 2](#) below.

Table 2. Publication development per year (2014–2024).

Year	Number of Publications	Percentage (%)
2014	171	17,1
2015	135	13,5
2016	128	12,8
2017	130	13
2018	101	10,1
2019	74	7,4
2020	89	8,9
2021	50	5
2022	35	3,5
2023	60	6
2024	27	2,7
Total	1000	100
Mean	91	9,1

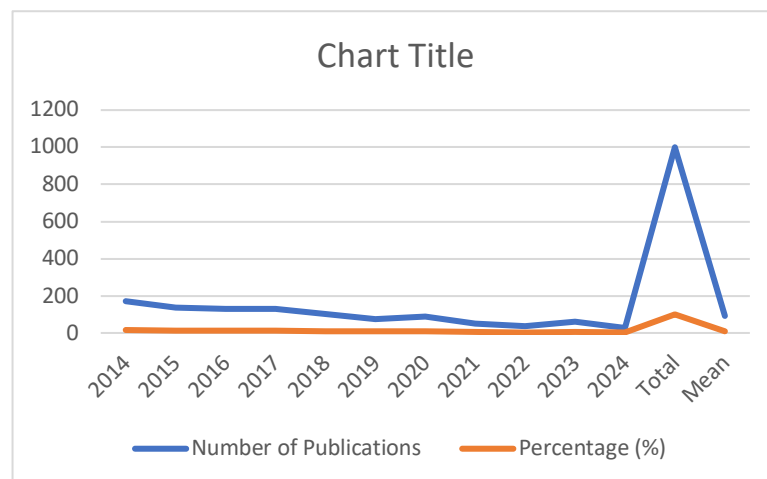


Figure 2. Reading Comprehension Research Development Chart
 Source: primary data, processed on Excell (2026)

As shown in [Table 2](#), the highest volume of publications occurred in 2014 with 171 documents (17.1%), followed by 2015 with 135 documents (13.5%), 2017 with 130 documents (13.0%), and 2016 with 128 documents (12.8%). Between 2014 and 2017, publication output remained consistently high, averaging more than 130 articles per year.

However, starting in 2018, the number of published articles gradually decreased to 101 documents (10.1%) and reached 74 documents (7.4%) in 2019. In 2020, there was a slight increase to 89 documents (8.9%), which may be due to increased research attention to distance literacy learning during the COVID-19 pandemic. Furthermore, the volume of publications decreased to 50 documents (5.0%) in 2021 and reached a full-year low of 35 documents (3.5%) in 2022. A small recovery was observed in 2023 with 60 documents (6.0%), while 2024 recorded 27 documents (2.7%) during the data collection period.

B. Analysis of Citation Metrics and Most Popular Articles

In addition to looking at the development of the number of annual publications, bibliometric analysis also evaluates the level of impact and academic influence of the published literature. One of the reasons for this impact is measured by the number of citations obtained by an article. Based on data extraction from 1,000 documents, Table 3 presents an example of an article with the highest number of citations (*top-cited articles*) that is the main reference in the research on reading comprehension and thinking skills. An article by Sawyer and Henriksen (2024) entitled "*Explaining creativity: The science of human innovation*" became one of the most influential publications with a total of 5,036 citations. This shows that the theoretical foundation of the creative thinking process and innovation has a very significant contribution in supporting the development of literacy and student understanding.

Table 3. Publication Data of Articles with the Highest Citations / *Top-Cited Articles Data.*

Nu.	Author	Title	Year	Citation	Reference
1	B Joyce, E Calhoun	Models of teaching	2024	13230	(Joyce & Calhoun, 2024)
2	G Mills, GE	Action research: A guide for the teacher researcher	2024	7115	(Mills & Mills, 2024)
3	E Bodrova, D Leong	Tools of the mind: The Vygotskian approach to early childhood education	2024	4170	(Bodrova & Leong, 2024)
4	CA Mertler	Action research: Improving schools and empowering educators	2024	3012	(Mertler, 2024a)
5	CA Mertler	Introduction to educational research	2024	2683	(Mertler, 2024b)
6	S Vaughn, A Boardman, JK Klingner	Teaching reading comprehension to students with learning difficulties	2024	1627	(Vaughn et al., 2024)
7	DH Tracey, LM Morrow	Lenses on reading	2024	1516	(Tracey & Morrow, 2024)
8	G Theoharis	The school leaders our children deserve: Seven keys to equity, social justice, and school reform	2024	916	(Theoharis, 2024)
9	J Ahn, R Verma, R Lou, D Liu, R Zhang...	Large language models for mathematical reasoning: Progresses and challenges	2024	700	(Ahn et al., 2024)
10	L Law	Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review	2024	687	(Law, 2024)
11	H Crompton, A Edmett, N Ichaporia...	AI and English language teaching: Affordances and challenges	2024	599	(Crompton et al., 2024)
12	J Kim	Leading teachers' perspective on teacher-AI collaboration in education	2024	597	(Kim, 2024)
13	MA Lachat, S Smith	Practices that support data use in urban high schools	2024	533	(Lachat & Smith, 2024)
14	S Cottrell	The study skills handbook	2024	386	(Cottrell, 2024)
15	J Echevarria, ME Vogt, DJ Short	Making content comprehensible for elementary English learners: The SIOP model	2024	265	(Echevarria et al., 2024)
16	S Gökçearslan, C Tosun, ZG Erdemir	Benefits, challenges, and methods of artificial intelligence (AI) chatbots in education: A systematic literature review.	2024	253	(Gökçearslan et al., 2024)
17	S Herrera, SG Herrera, KG Murry, RM Cabral	Assessment of culturally and linguistically diverse students	2024	230	(Herrera et al., 2024)

Nu.	Author	Title	Year	Citation	Reference
18	B Otto, BW Otto	Language development in early childhood education	2024	169	(Otto & Otto, 2024)
19	X Zhai, M Nyaaba, W Ma	Can generative AI and ChatGPT outperform humans on cognitive-demanding problem-solving tasks in science?	2024	162	(Zhai et al., 2024)
20	DJ Woo, D Wang, K Guo, H Susanto	Teaching EFL students to write with ChatGPT: Students' motivation to learn, cognitive load, and satisfaction with the learning process	2024	143	(Woo et al., 2024)
21	G Almgren Bäck, E Lindeblad, C Elmqvist...	Dyslexic students' experiences in using assistive technology to support written language skills: a five-year follow-up	2024	101	(Bäck et al., 2024)

Based on the extraction of metadata from the 1,000 documents analyzed, Table 1 presents the top 21 *articles* that have the most significant impact. [Joyce & Calhoun's \(2024\)](#) work entitled "*Models of teaching*" ranked the most with 13,230 citations, followed by [Mills & Mills \(2024\)](#) on action *research* with 7,115 citations, and [Bodrova & Leong \(2024\)](#) on Vygotsky's approach to early childhood education with 4,170 citations. Thematically, these high-citation articles cover several key focuses. Pedagogical Models & Methodologies: An in-depth discussion of learning models, *action research*, and developmental psychology approaches ([Joyce & Calhoun, 2024](#); [Mills & Mills, 2024](#); [Bodrova & Leong, 2024](#)). Literacy & Reading Comprehension Strategies: A special focus on reading interventions for students with learning difficulties as well as basic literacy strategies ([Vaughn et al., 2024](#); [Tracey & Morrow, 2024](#); [Echevarria et al., 2024](#)). Integration of Artificial Intelligence (AI) & Educational Technology: Recent trends that show high citations on the use of *Generative AI*, *ChatGPT*, and *assistive technology* in language learning and reasoning ([Ahn et al., 2024](#); [Law, 2024](#); [Crompton et al., 2024](#); [Bäck et al., 2024](#)).

C. Visualisasi Data Penelitian Pemetaan Membaca Pemahaman

Data yang dipetakan menggunakan *software* VOSviewer menghasilkan tiga bentuk visualisasi utama, yaitu *network visualization* (Gambar 2), *overlay visualization* (Gambar 3), dan *density visualization* (Gambar 4). Hasil analisis *network visualization* menunjukkan bahwa istilah-istilah (*terms*) yang diekstrak dari judul dan abstrak artikel yang sesuai dengan fokus pemetaan terbagi ke dalam beberapa kluster utama. Setiap kata/item memiliki nilai *link*, *total link strength*, dan frekuensi kemunculan (*occurrences*) yang bervariasi. Secara keseluruhan, berdasarkan *network visualization*, diperoleh *total link strength* sebesar 549 dengan jumlah keterhubungan (*total links*) sebanyak 809. Penjelasan lebih rinci mengenai pembagian kluster adalah sebagai berikut:

- Kluster 1 (ditandai dengan warna merah): Terdiri dari 13 item yang mencerminkan fokus pada kurikulum, pendidik, dan hambatan belajar, yaitu: *addition, curriculum, difficulty, disability, educator, goal, implication, need, participant, program, project, teacher education*, dan *text comprehension*.
- Kluster 2 (ditandai dengan warna hijau): Terdiri dari 11 item yang berfokus pada intervensi dan strategi pembelajaran, meliputi: Cluster 2 (11 items), 21st century skill, Context, example, higher education, information, literature, meaning, model, paper, question, students ability.
- Kluster 3 (ditandai dengan warna biru): Terdiri dari 11 item yang berfokus pada aspek kognitif dan kosa kata siswa, meliputi *achievement, Class, classroom, effectiveness, elementary school student, evidence, primary school, school student, student achievement, technology*
- Kluster 4 (ditandai dengan warna kuning): Terdiri dari 11 item yang berkaitan dengan evaluasi dan pengujian hasil belajar, meliputi *academic achievement, academic performance, age, capability, executive function, high school student, intervention, meta analysis, middle school student, relation, self*.
- Kluster 5 (ditandai dengan warna kuning): Terdiri dari 11 item yang berkaitan dengan evaluasi dan pengujian hasil belajar, meliputi *case, comprehension ability, comprehension skill, dyslexia, influence, kindergarten, literacy skill, reader, spelling, word, word reading*.

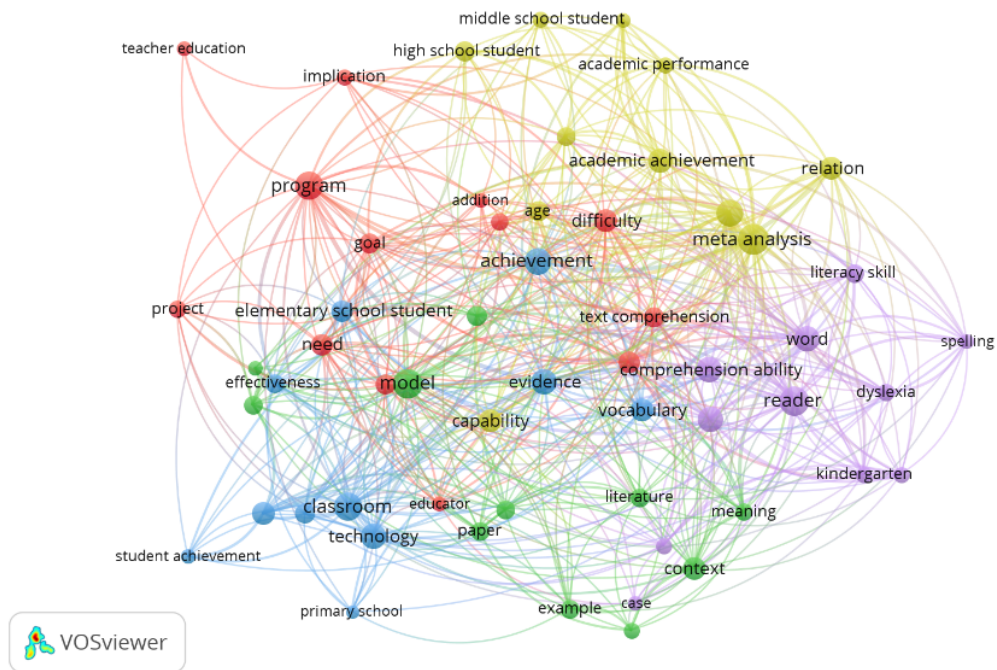


Figure 3. Network Visualization of Reading Comprehension Topics

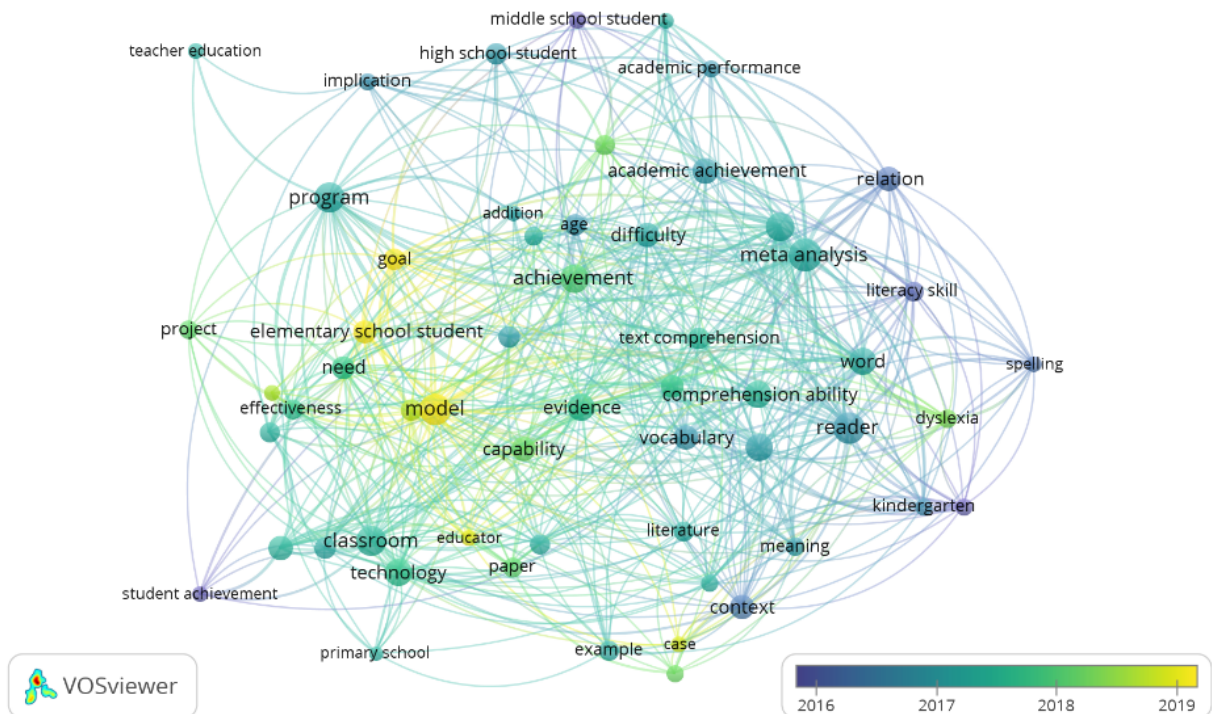


Figure 4. Overlay Visualization of Reading Comprehension Topics

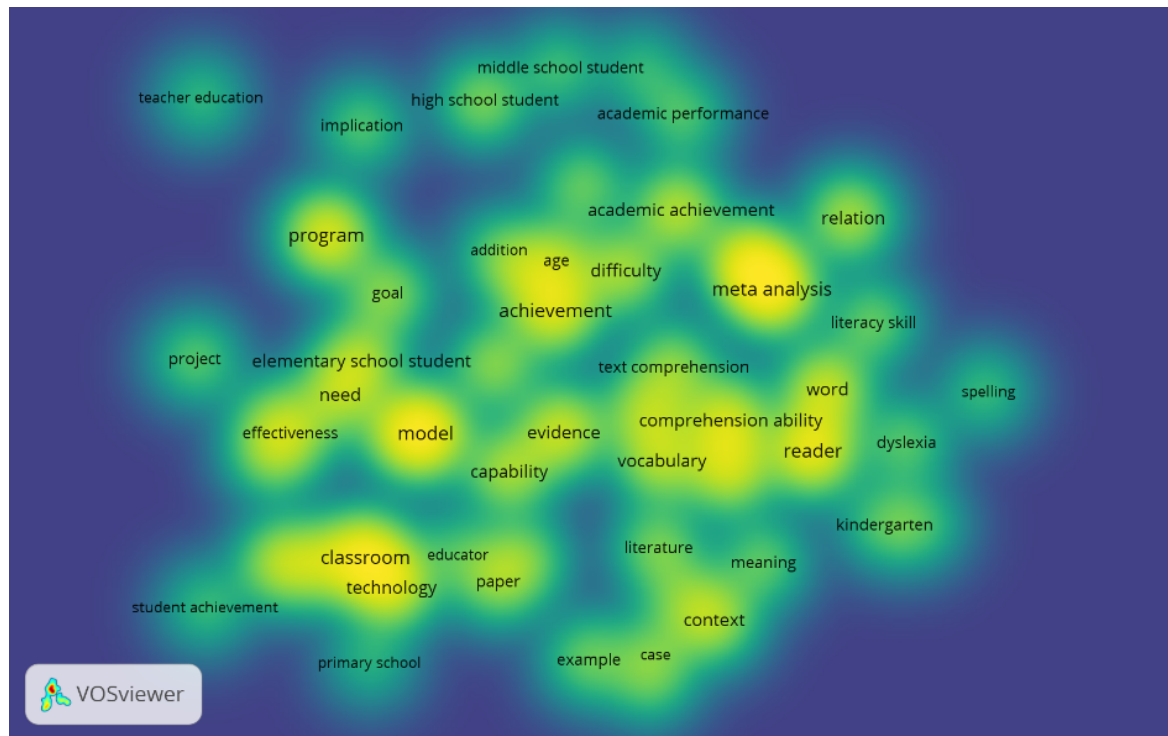


Figure 5. Density Visualization of Reading Comprehension Topics

In addition, based on *the network visualization analysis* in [Figure 3](#), some of the terms that have the most significant contribution and influence in the formation of the keyword network are prominent in each cluster. For example, in Cluster 1, the keyword "program" became one of the most frequently used terms. Meanwhile, in Cluster 2, the keyword "model" has a very high frequency of *occurrences* and *total link strength* values, which closely links it to the terms "elementary school student" and "effectiveness". Similarly, in Cluster 3 and Cluster 5, terms such as "achievement", "comprehension ability" and "vocabulary" recorded the number of *occurrences* and *total link strength* which were dominant in *Figure 3*. The high value of metrics in these terms confirms that the main focus of elementary school literacy research in the last decade has relied heavily on the development of models and strategies to improve students' reading, comprehension, and vocabulary.

CONCLUSION

The number of scientific publications on *reading comprehension in elementary school students* during the last decade (2014–2024) was recorded as many as 1,000 documents. In general, the development of research on this topic shows a fluctuating trend with a downward trend. 2014 was the period with the highest volume of publications, which was 171 articles (17.1%). The number gradually decreased until 2019, namely 135 articles (2015), 128 articles (2016), 130 articles (2017), 101 articles (2018), and 74 articles (2019). In 2020, the number of publications had increased to 89 documents. However, this increase did not last long because in the following years it decreased again, namely 50 documents (2021), 35 documents (2022), had experienced a slight recovery to 60 documents (2023), and recorded 27 documents in 2024 during the data collection period. In addition, term mapping extracted from titles and abstracts using the VOSviewer application results in 5 main clusters marked with different colors. The terms that are most frequently used and have the most dominant connection in this research include the keywords *program*, *model*, *achievement*, *classroom*, *technology*, *comprehension ability*, and *vocabulary*. Based on *the overlay visualization analysis*, the focus of research has shifted where the initial topics (around 2016) are dominated by basic *literacy* (*literacy skills*, *spelling*, *kindergarten*), while the latest trends and novelties of research are rapidly developing interventions to develop effective learning models (*effectiveness*) for elementary school students (*elementary school student*). These results provide a direction for future researchers to explore variables that still have a low *density gap* such as *technology integration*, *teacher education*, and *student achievement* in reading comprehension learning.

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