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Bibliometric Analysis of Early Literacy Trends in the Digital Era

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***Abstract*:** Early literacy refers to the basic skills and knowledge children need before they learn to read and write fluently. This is an early stage in literacy development, where children begin to develop an understanding of written language. This research aims to determine trends in writing literacy articles *(early literacy) and articles with* the highest number of citations, mapping and looking for trends in international scientific publications using the Scopus database. The research method used is bibliometric analysis. 200 articles form the population of this research. Of the 200 existing articles, 80 articles were selected as research samples. Data is saved in Microsoft Excel for data processing purposes and in RIS format for VOSviewer software to carry out publication trend mapping and analysis. In the period 2018-2023, the number of articles published decreased. A significant decline occurred in 2018-2019. The results of the mapping analysis using VOSViewer software have six themes, namely *"research," "text," "contribution," "connection," "validation," and "reader*." These themes can be used as references for further research.

Keywords: bibliometrics, literacy, early literacy, publish or publish, vosviewer

Introduction

There is great interest in the idea of providing age-appropriate interventions. However, there are some essential differences between these study categories concerning age; One significant exception is language intervention, which shows greater effectiveness in the early stages. If not, if comparisons based on age can be made, the impact will be prominent and significant across interventions obtained with groups of younger and older children. This means that most types of teaching that are effective in kindergarten are very similar to those that can be used in Preschool. Unfortunately, there has been no direct test of age differentiation in early literacy instruction in kindergarten and Preschool, and indeed, there is still too little research on preschool literacy instruction to provide comparative results that can be accepted with a high degree of certainty. Future research into this issue may shed greater light on what, to some observers, may seem a surprising finding [1].The literature that children commonly share or access may influence oral language development, including expanding their vocabulary. However, the role of parents in facilitating this process can be more beneficial for developing children's emergent literacy skills. Parents' approaches, including verbal interaction, reading with children, and providing support in understanding reading material, can help children develop broader and deeper literacy skills [2]. Advocate academic teaching, including literacy [3].Whereas reading is understanding a text (either by relating the text phonetically to speech or by gauging meaning by 'guessing' from the overall linguistic context), writing is more tied to the specific structure of a particular linguistic script. Anthropologists and psychologists have linked cognitive arguments to broader development patterns regarding the importance of literacy acquisition for the functioning and 'progress' of society and implied a 'technology' of literacy [4]. However, as recognized through the work of social psychologists Sylvia Scribner and Micheal Cole in the 70s, many assumptions about literacy in general tied to school-based writing lead to severe problems.

Weitzman and Greenberg say that families become supporters of children's early literacy development by making simple adjustments to how they talk to their children, such as including open-ended questions in conversations and offering additional information about what the child is saying [5]. Wells documented a strong relationship between experiences with early literacy development and educational attainment [6].

In the digital era, children, parents, and early childhood educators simultaneously learn about digital technology and new media. These devices are changing how we acquire knowledge and communicate with each other. For example, the cellphone, which at the beginning of its development only functioned as a communication tool, has now changed into an entertainment medium and medium.

In line with this, Ackerman found that reading difficulties at school entry increased the risk of behavior problems later in life [7]. However, the association between early literacy difficulties and behavior problems later in life was explained by characteristics present before the onset of literacy difficulties. The effects were still very weak even when literacy difficulties predicted later behavior problems. A rare study of middle school students with reading difficulties experimentally examined the role of reading difficulties in subsequent behavior problems. Ten to eleven-year-olds are provided with intensive response-based reading intervention for three years, and this directly improves reading achievement, which in turn (indirectly) influences attention [8].

Method

The research method used is bibliometric analysis related to literacy (*early literacy*). Bibliometric analysis is a useful quantitative research methodology for assessing scientific productivity and identifying trends in specific research fields [9]. According to Koseoglu [10], Bibliometrics is defined as an approach to evaluating and monitoring the progress of certain scientific disciplines by sorting data, including quotations, author affiliations, keywords, themes discussed, and methods used for published studies within the discipline via basic/advanced statistical techniques. Data was collected using the *Publish or Perish* (PoP) application on October 27 2023, using the Google Scholar *database.*

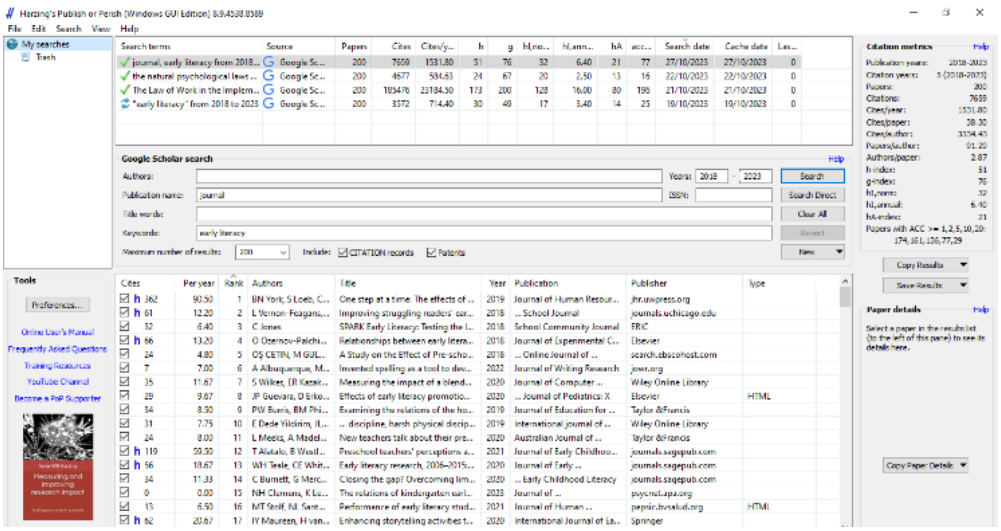

Figure 1. Google Scholar *database search* via PoP

The first image is the initial step in collecting the Google Scholar *database* via the PoP application with the keyword " *early literacy, "the publication name* is " *journal*, "and the year the article was published is 2018-2023. The data tracking results using PoP show that 200 articles make up the population of this research. Of the 200 existing articles, 80 were selected as research samples because they met the research criteria: articles published in journal form and related to *early literacy*. This data is then saved in *Microsoft Excel for data processing and in RIS format for use in VOSviewer* software. *VOSviewer* maps and identifies trends in international scientific publications in the Google Scholar database about *early literacy* based on keywords.

Results and Discussion

For Google Scholar it indexed articles via PoP related to early literacy for the period 2018 to 2023 experienced fluctuations as shown in the following image.

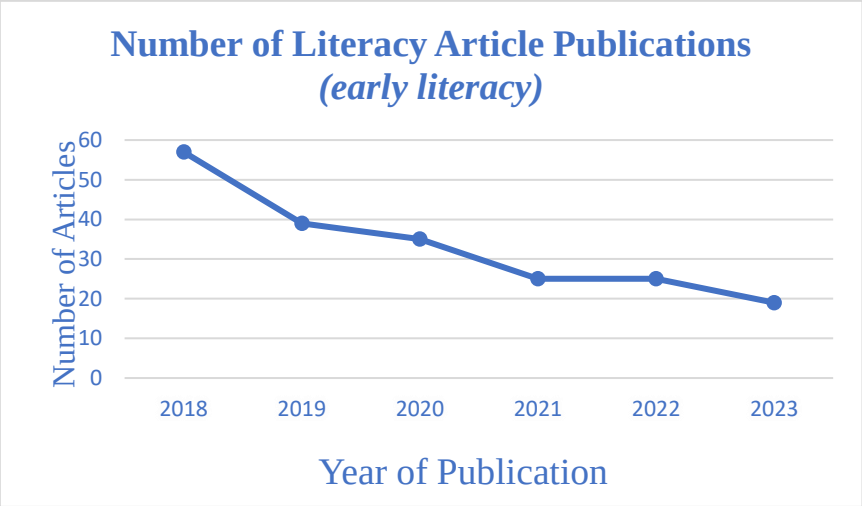

Figure 2. Number of *Early Literacy Article Publications*

Based on the data in Figure 2, the number of articles from 2018 to 2019 decreased significantly. In 2018, there were 57 articles published; in 2019, there was a decrease to 39 articles; in 2020, there was a decrease to 35; for 2021 and 2022, the number of articles was 25; and in 2023, there were 19 articles published.

Search results using PoP show 7,269 citations from 200 articles from 2018-2023. The articles with the highest number of citations are presented in Table 1.

Table 1. Articles with the Highest Number of Citations

No	Writer's name	Article Title	Year	Journal Name	Number of Quotes
1.	BN York, S Loeb, C Doss	*One step at a time: The effects of an early literacy text-messaging program for parents of preschoolers*	2019	*Journal of Human Resources*	362
2.	AR Napoli, DJ Purpura	*The Home Literacy and numeracy environment in Preschool: Cross-domain Relations of parent-child practices and Child Outcomes*	2018	*Journal of Experimental Child Psychology*	190
3.	MJ Haslip, DF Gullo	*The changing landscape of early childhood education: Implications for policy and practice*	2018	*Early Childhood Education Journal*	166

The data in Table 1 shows that the article with the title *One Step at a Time: The Effects of an Early Literacy text-messaging Program for Parents of Preschoolers* has the most citations, namely 362 quotes [11]. Next in second place is a journal titled *Preschool: Cross-domain Relations of Parent-child Practices and Child Outcomes*, with a total of 190 citations [12]. Then, in third place, there is a journal titled *The Changing Landscape of Early*

Childhood Education: Implications for Policy and Practice (MJ Haslip, DF Gullo, 2018) with 166 citations. This can be a reference source for further *early literacy* research [13].

Data from the PoP application is stored in RIS form, which is then used in VOSviewer software to obtain bibliometric analysis results. After the RIS data was entered into the VOSviewer software, 1386 terms were obtained, with 125 terms being the closest. By choosing the minimum number of occurrences of repeated words to be 3 terms, a display like Figure 3 is obtained.

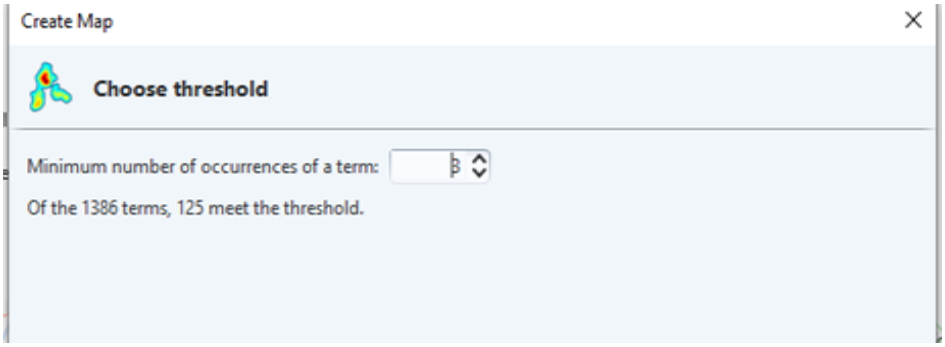

Figure 3. Visualization of Terms Obtained in VOSviewer Software

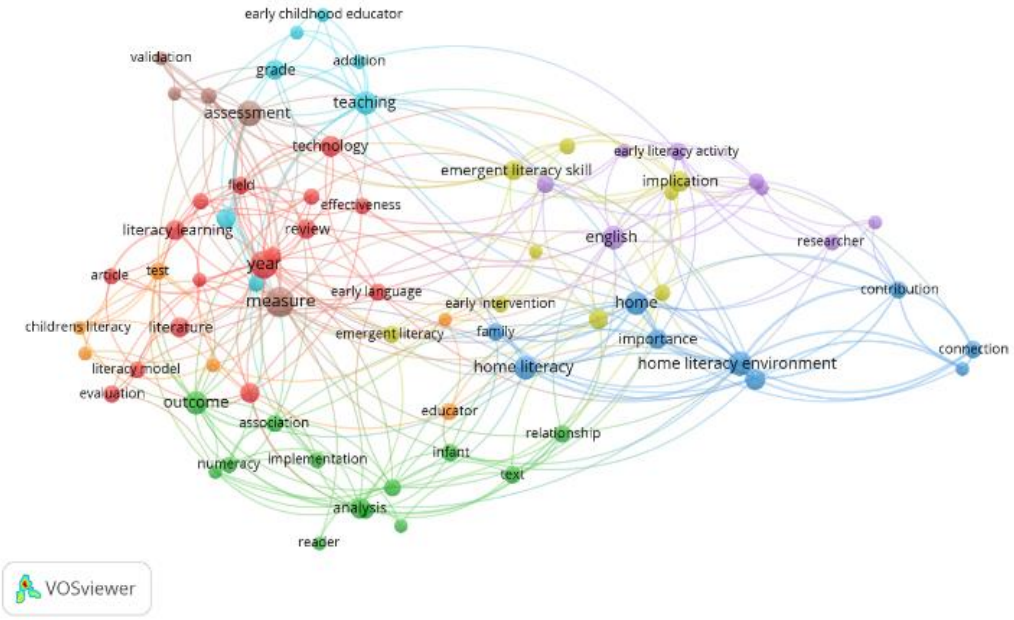

Figure 4. *Circles Network Visualization*

The results of *the Circles Network Visualization VOSviewer software* in the figure above show that there are 8 clusters consisting of 73 themes related to *early literacy* in the digital era. that is:

1. Cluster 1 (in red) consists of 16 themes: *article, early education, early literacy practice, early language, effectiveness, evaluation, field, literacy learning, literacy model, literature, need, resource, review, systematic review, and technology.*
2. Cluster 2 (green) consists of 13 themes: *analysis, association, book, first year, health literacy, implementation, infant, month, numeracy, outcome, reader, relationship, and text.*
3. Cluster 3 (dark blue) consists of 9 themes, namely: *attitude, connection, contribution, family, home, home literacy, home literacy environment, importance, literacy experience.*

4. Cluster 4 (yellow) consists of 9 themes: *early intervention, early literacy learning, early literacy outcome, emergent literacy, emergent literacy skills, focus, implications, national early literacy panel, and phonological awareness.*
5. Cluster 5 (purple) consists of 8 themes: *aloud, book reading, dual language learner, early literacy activity, early literacy instruction, English, form, and researcher.*
6. Cluster 6 (blue) consists of seven themes: *addition, challenge, early childhood educator, first grade, grade, mathematics, and teaching.*
7. Cluster 7 (orange) consists of 6 themes: *children's literacy, digital literacy, educator, present study, storytelling activity, and test.*
8. Cluster 8 (brown) consists of five themes: *assessment, children's early literacy skills, measure, tablet, and validation.*

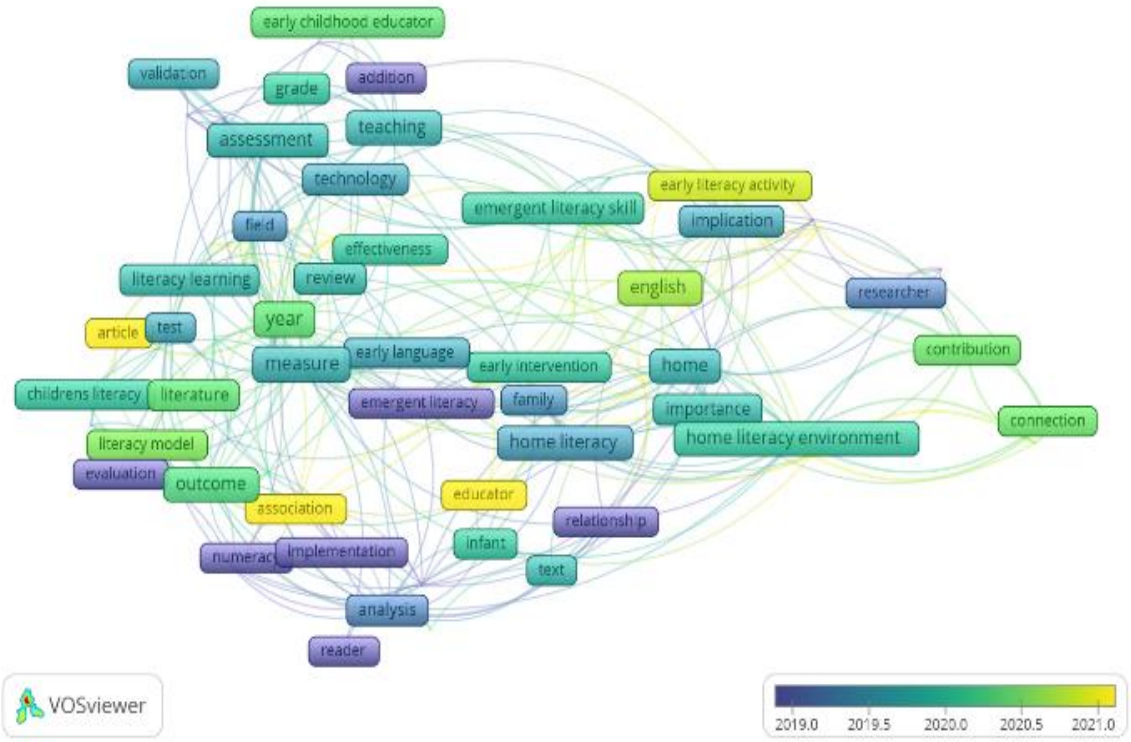

Figure 5. Frames Overlay Visualization

The results of *the Frames Overlay Visualization of the VOSviewer software show an overview of the trend of article writing themes in journals indexed in Scopus based on year, shown through network visualization in the VOSviewer* software. This visualization makes it possible to see how these themes develop over time in the scientific literature indexed in Scopus. Trends in the theme of writing articles related to literacy *(early literacy)* in the digital era, starting from the oldest year to the newest year, are marked by various colors such as purple, blue, turquoise, dark green, light green and yellow in the *VOSviewer network visualization.* These colors distinguish different clusters or groups of themes in the research trend analysis. Each color represents a particular group of themes, which can help understand changes and developments in research themes in scientific literature. This can be interpreted as the words *"Early literacy instruction, "English," "present study," "attitude"* in light green and *"literacy experience," "association," "educator," "article," "early literacy practice", "need," "early literacy outcome," "dual language learner," "aloud"* in yellow are the latest themes related to *early literacy* in the digital era. The themes identified in the analysis of article writing trends can be a valuable reference for future research.

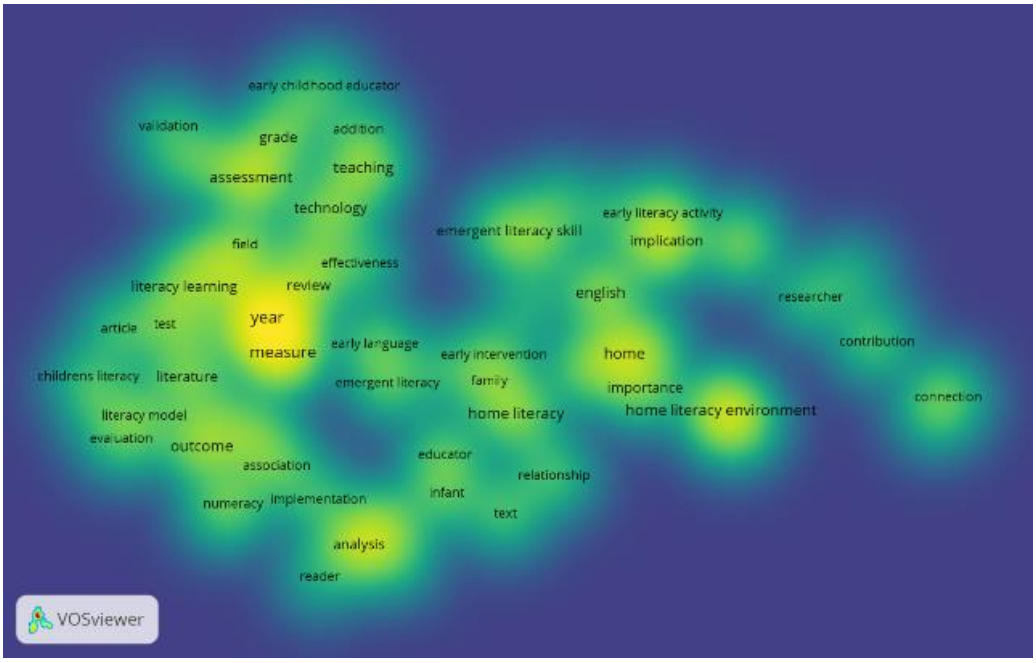

Figure 6. ***Density Visualization***

The Density Visualization results of the VOSviewer software in the image above show the density. In network visualization using *VOSviewer*, the density or level of research of a research theme can be shown by color intensity. If the color of a theme is bright yellow, it indicates that it has been the subject of much research, with many articles published on the topic. On the other hand, if the color of the theme is fainter, it indicates that the theme is still rarely researched, with few articles on the topic. Color intensity can indicate popularity and research focus in a particular field. Themes in dim colors such as *"research," "text," "contribution," "connection," "validation," and "reader"* are themes that can be used as references for further research.

Conclusion

The trend of writing articles in Scopus-indexed journals about literacy (early literacy) in the period 2018-2023, the number of articles published has decreased. A significant decline occurred in 2018-2019. One Step at a Time: The Effects of an Early Literacy text-messaging Program for Parents of Preschoolers is an article about early literacy with the highest number of citations, namely 362 citations. The results of the mapping analysis using VOSViewer software have six themes, namely "research," "text," "contribution," "connection," "validation," and "reader." These themes can be used as references for further research.

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