# Research Trends in the Use of Games in Early Childhood Education: A Bibliometric Study

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| Notes | ABSTRACT |
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| <br><br>**How to cite:** Ulkhatiata, I. T. (2023). Research Trends in the Use of Games in Early Childhood Education: A Bibliometric Study. Khizanah Al-Hikmah : Jurnal Ilmu Perpustakaan, Informasi, Dan Kearsipan, 11(2). https://doi.org/10.24252/kah.v11i2a10<br><br>DOI: 10.24252/kah.v11i2a10<br><br> | Games are a part of the learning media that might surely attract a child's interest, making the teaching and learning process more effective, efficient, and enjoyable. This study aims to present literature findings related to the use of games in early childhood education. The database was obtained using keywords such as 'game' and 'child education,' then stored in CSV format and analyzed using R-Bibliometrix (Biblioshiny) software. The included data type is journal articles. The study found that there was a fluctuation in the number of publications, with the highest production peak in 2022, totaling 192 articles. The authors who have contributed the most articles on the use of games in this field are Krustrup P and Larsen MN. The majority of scholarly works were still dominated by institutions from North America, particularly the United States, with the participation of 87 countries. The thematic map indicated a connection between the themes of game usage located in the lower right quadrant, suggesting opportunities for further exploration.<br><br>**Keywords:** Bibliometric; research trends; games; early childhood education |

## 1. INTRODUCTION

Early childhood education is a fundamental and strategic form of education in the development of human resources (Lailan, 2017). Following Article 28 of 2003 regarding the Indonesian National Education System, early childhood education has been placed on par with other forms of education (Widodo, 2021). This indicates that, from the formal legal standpoint of view, early childhood education is an integral part of the entire National education system (Yanto, 2020). Even though preschool education is not a mandatory requirement for entry into primary school (Elihami & Ekawati, 2020). According to Article No. 20 of 2003, the education system in Indonesia consists of early childhood education, basic education, secondary education, and higher education, all of which are systematically unified (Rakhmawati, 2019). Early childhood education is a fundamental level of education that can be implemented through formal, non-formal, and informal channels, and is divided into child care centers

*(Taman Penitipan Anak)*, playgroups *(Kelompok Bermain)*, as well as kindergartens *(Taman Kanak-Kanak)* or equivalent forms (Rizqiyyatunnisa & Mahdi, 2021). Early childhood education in the informal education pathway takes the form of family education or education organized by the community environment.

The Indonesian education system also states that early childhood education is an educational effort aimed at children from birth to six years old, carried out through the provision of educational stimulation to assist in physical and spiritual growth and development, so that children are prepared to enter further education (Ariyanti, 2016). The goal of early childhood education institutions can be considered as an effort to provide educational stimulation to assist in the physical and spiritual growth and development of children, enabling them to be prepared for further education. The provision of educational stimulation can take the form of learning methods and approaches that need to be tailored to the physical and cognitive needs and abilities of the child (Ita, 2018).

The learning methods employed should ideally adhere to the principles of optimal child learning, as, in reality, many formal and informal institutions have yet to implement or align with these principles in their educational activities. Therefore, every teacher is expected to conduct teaching activities effectively, efficiently, in an engaging, and enjoyable manner for their students. This approach aims to facilitate an active learning process, ultimately leading to maximal learning outcomes.

Learning that might capture the interest of early childhood involves using a play-based learning method. Through play, children not only become familiar with various aspects of life but also engage in learning. It fosters courage and builds confidence. Relying solely on monotonous methods, such as lectures and assignments, can lead to boredom and a lack of attention from the students, which is why incorporating interactive and play-based learning is crucial.

Games activities can be carried out with or without the use of toys. Toys are employed to convey understanding, provide information, offer enjoyment, and build and develop a child's imagination (Zarkasih Putro, 2016). Many fundamental concepts can be learned by children through games activities. During the preschool age, children need to master various basic concepts such as color, size, shape, direction, quantity, and so on. These basic concepts are more easily acquired by children through play activities (Kurnia, 2012).

The emergence of modern games has also impacted traditional games, causing them to decline and struggle to compete with the evolving modern games of today (Agustina et al., 2023). Traditional games have declined in recent decades, influenced by the evolving mindset of a progressively advanced society. This shift has led people to abandon conventional practices in favor of modern conveniences that are easy and instant (Nur & Asdana, 2020).

Traditional games are not widely utilized as educational tools for early childhood, despite their potential to enhance various skills in children. Traditional games have the potential to contribute significantly to the development of children's abilities (Afrianti, 2018). This is due to a lack of awareness regarding the positive impact of traditional games. Some may believe that aligning educational methods with contemporary trends is more likely to yield successful outcomes, overlooking the potential benefits of incorporating traditional games into the learning process (Kurniati, 2006). But if learning can be done, it can be provided in a blended manner so that children also do not forget things related to traditional aspects (Oktaviani, 2022).

Games used in the learning process can be categorized into two types: traditional and modern. Modern games are typically characterized by advanced technological systems and are often machine-based or produced using machines. These modern games evolve in accordance with the current era's development, explaining the constant changes in their forms and types, making them increasingly appealing (Gian Prantoro, 2015).

The database related to research on the use of games in early childhood education has been quite extensive. Hence, it needs to process the data for various purposes, such as identifying further research that is still under explored. Bibliometric analysis is one method to collect, process, and analyze metadata of research articles from various databases such as Google Scholar, Scopus, and Web of Science to provide information about the overall structure of articles. Through bibliometric studies, one can understand the hierarchy of knowledge, research developments on specific themes, research gaps, and the qualitative and quantitative number of references from one article to another.

Therefore, bibliometric research related to the use of games in early childhood education is claimed to be still relatively rare. Consequently, this study aims to understand the trend in the development of use of games articles, utilizing the Scopus database from 2018 to 2023. The analysis encompasses; key information (document timeframe analyzed each year, the number of scientific publications based on sources, average citations per year, and authors); yearly article increase; most relevant authors; most relevant institutional affiliations; countries participating in scientific journal publications on Montessori learning methods, Co-word network visualization of keywords; and thematic map analysis.

The purpose of this research is to serve as a literature source and reference material that can be used in mapping the writing of scientific articles. This will address various challenges at the national and international levels. Furthermore, this research can serve as a guide for future researchers to contribute collaboratively with authors from various affiliated institutions and countries, aiming to foster the further development of the use of games.

## 2. METHODS

This quantitative study employed a bibliometric approach. According to Alan Pritchard, bibliometrics involves the application of statistical methods as one of the options to convey the results of a review of articles on information retrieval and categorization through a literature review of a publication (Rahayu et al., 2022). The researchers utilized bibliometric maps to gain a better understanding of trends in digital learning based on international publications sourced from the Scopus database (www.scopus.com).

The Scopus database was then analyzed using the R-studio program, which is part of the bibliometric software R-package. The data analyzed were obtained from the Scopus database with the document type being journal articles. The document data, in the form of BibTeX file extensions, were analyzed using the web Biblioshiny interface.

The five stages conducted in this research are keyword determination, data search, article selection, data validation, and data analysis. The determination of keywords is aligned with the research objective, which is the use of games in early childhood education. Therefore, the keywords are as follows.
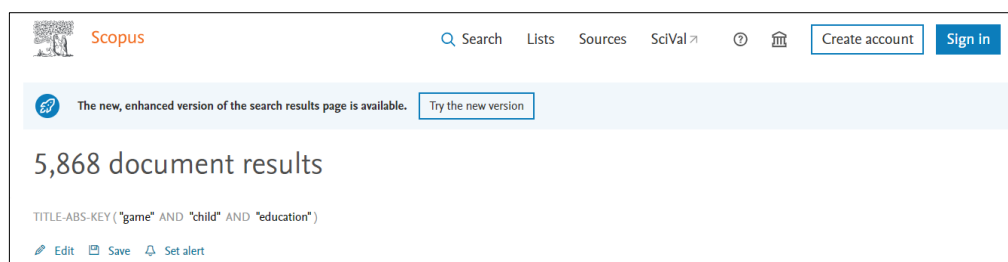


**Figure 1.** The final search results in the Scopus database

The search conducted by entering the keywords on the website platform, namely 'game' and 'child education,' yielded a total of 5,868 related articles. Due to the vastness of the obtained articles, the author had to limit the articles to those published from 2018 to 2023. Additionally, the researcher selected articles with the document type 'article' and restricted the language to 'English.' Here are the results of the articles obtained by applying these keyword limitations:

TITLE-ABS-KEY ( "game" AND "child" AND "education" ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( OA , "all" ) ) AND ( LIMIT-TO ( PUBYEAR , 2023 ) OR LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) )
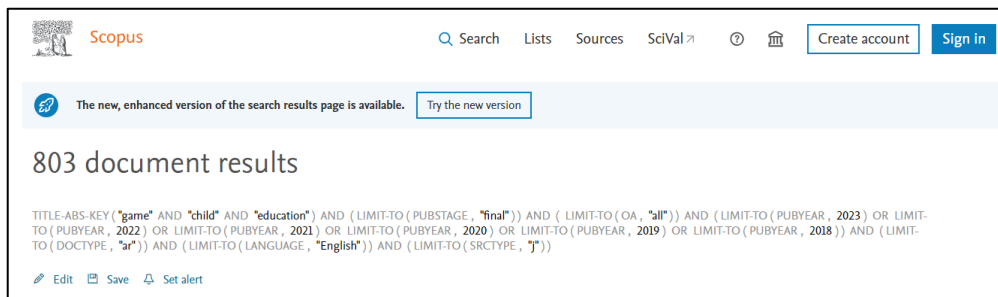


**Figure 2.** The final search results in the Scopus database

The analysis results obtained by the researcher through these keywords in the Scopus database indicate that there are 803 collected articles as of March 31, 2023, and they are stored in CSV format.


## 3. RESULTS AND DISCUSSION

### Main Information

In Table 1, the author presents data on the development of scholarly publications on the use of games in early childhood education globally during the period 2018-2023. The main information obtained includes the document timeframe analyzed by year, the number of publications according to subject, document type, authors, and document content. The document type used to display the data is journals, with a total of 425. The average publications per year are 24.34%, with a total of 3,497 authors. The bibliometric analysis yielded the following data on publications in general.


**Table 1.** The Bibliometric analysis results based on main information on the use of games in early childhood education from 2018 to 2023

| Description<br>Main Information About Data | Results |
| --- | --- |
| Timespan | 2018-2023 |
| Sources (Journals, Books, etc) | 425 |
| Documents | 803 |
| Annual Growth Rate (%) | 24.34 |
| Document Average Age | 2.64 |
| Average citations per doc | 6.554 |
| References | 37169 |
| **DOCUMENT CONTENTS** | |
| Keywords Plus (ID) | 2929 |

| | |
|---|---|
| Author's Keywords (DE) | 2410 |
| **AUTHORS** | |
| Authors | 3497 |
| Authors of single-authored docs | 64 |
| **AUTHORS COLLABORATION** | |
| Single-authored docs | 65 |
| Co-Authors per Doc | 4.77 |
| International co-authorships % | 25.53 |
| **DOCUMENT TYPES** | |
| Article | 803 |

## Annual Scientific Production

Table 2 figured out that the scholarly publications on the use of games in early childhood education from 2018 to 2023 had the highest number of Scopus-documented articles in the year 2022, with a total of 192 articles. Furthermore, it can be seen that the lowest number of journals was found in the year 2023, totaling 30 articles, as the data collected extends only until March 31, 2023. The analysis of the development of Scopus-indexed scholarly article publications from 2018 to 2023 yielded fluctuating results. Therefore, it can be concluded that the number of scholarly articles on the use of games in early childhood education indexed in Scopus from 2018 to 2023 has been continuously increasing, but there was a decline in 2023, especially as of March.

**Table 2.** The bibliometric analysis results based on annual scientific production

| Year | Articles |
|------|----------|
| 2018 | 121 |
| 2019 | 125 |
| 2020 | 149 |
| 2021 | 186 |
| 2022 | 192 |
| 2023 | 30 |

## Most Relevant Authors

The analysis of the most relevant authors can be seen in Figure 3. These authors have published works indexed by Scopus. The author with the greatest influence is highlighted in dark blue in the bar diagram. The bar graph data indicates that the author with the maximum influence is Krustrup P and Larsen MN, followed by three other authors with a relatively good impact, marked with a slightly lighter blue than the previous two authors. Meanwhile, authors with the lowest impact are five authors marked with a light blue, each contributing four articles.
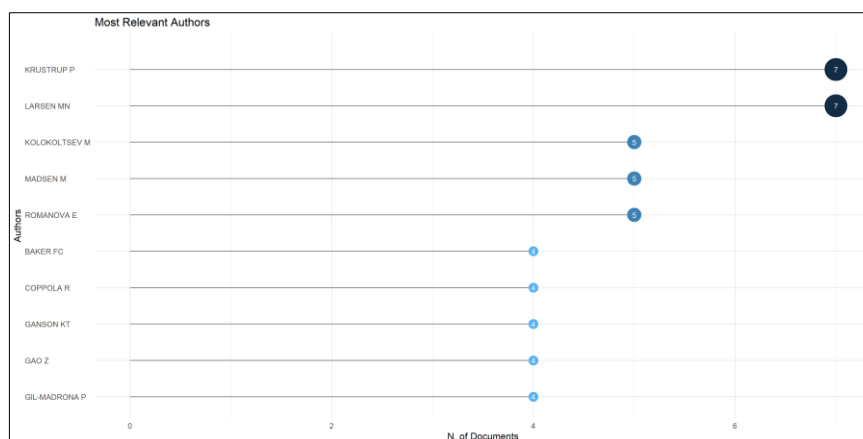


**Figure 3.** The Bibliometric analysis results based on most relevant authors

## Most Relevant Affiliation

Figure 4 showed that the most actively publishing affiliation in scientific articles as of March 2023 is the University of Hong Kong with 31 articles, followed by University College London with 26 articles. The purpose of the analysis of author affiliations is to identify institutions that produce a significant number of scientific publications on the use of games in early childhood education, serving as a reference source for future researchers, collaboration references between authors, target institutions for journal publications, and more.
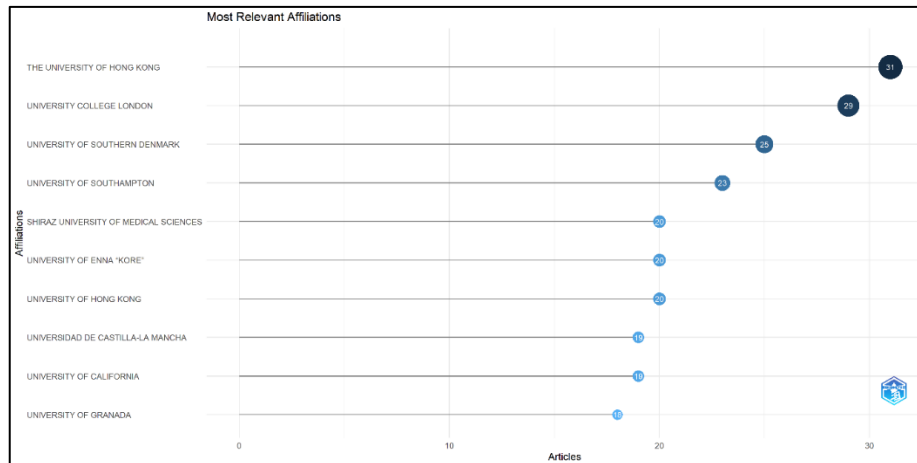


**Figure 4.** The Bibliometric analysis results based on most relevant affiliation

## Productive Countries

The bibliometric analysis results presented in Figure 5 can be observed from the 87 countries contributing to international scholarly journals on the use of games. These countries come from various continents. Based on the analysis, it is evident that the USA is the country that produces the most scientific publications, followed by the UK, Spain, Brazil, China, Indonesia, and many other countries from various continents contributing to international scholarly journals.
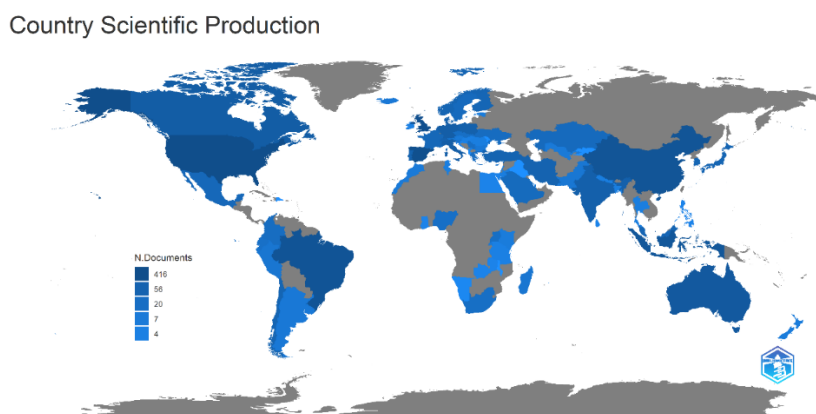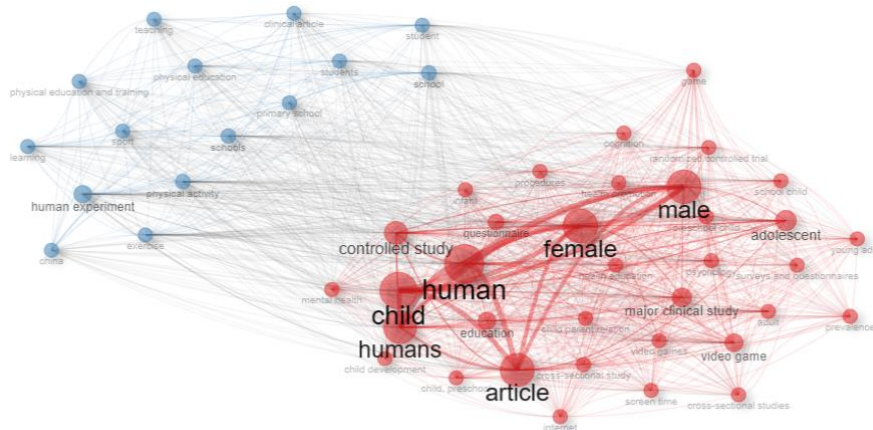


**Figure 5.** The Bibliometric analysis results based on country scientific production

## Co-Occurance Netwrok by Titled

The first analysis conducted in the bibliometric study is Co-Words analysis, aiming to understand the content of information in scholarly publications and design knowledge systems. Co-Words

analysis, as part of the bibliometric method, is used to identify concepts, structures, research, and trends within a discipline through keywords, titles, and abstracts. To present Co-Words analysis data, researchers can use approaches such as Co-Occurrence Network, Trend Topics, and Factorial Analysis by examining word frequencies.

Figure 6 showed the visualization of the keyword title network, where color, circle size, font size, and line thickness indicate the strength of the relationships between keywords. In this network, there are red and blue clusters that are interconnected. The relationships between the red and blue clusters complement each other, with continuous connections between these relationship networks.



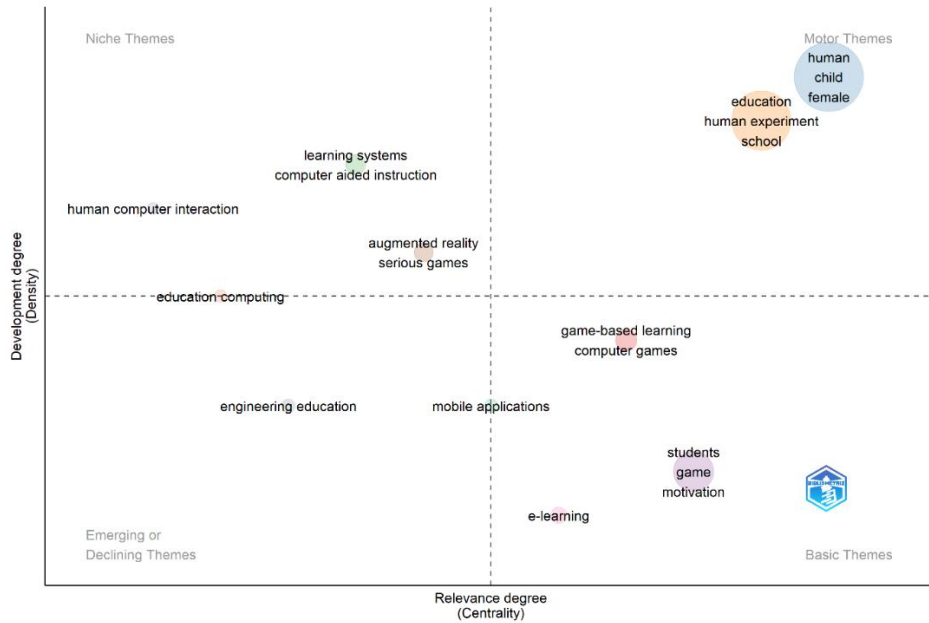**Figure 6.** The Bibliometric analysis results based on co-occurance network

**Thematic Maps or Research Theme Opportunities**

Thematic maps are conducted to analyze specific theme groups based on density and centrality. It can be understood that as density increases upwards, it indicates more research (trend issues and many documents related to the topic). Meanwhile, centrality is related to how relevant the theme is to the broader topic studied. The further to the right, the theme is considered more relevant and influential (Nusantara, 2021). Thematic maps are highly intuitive and can be analyzed based on quadrants where the themes are positioned.

Figure 7 presented the results of the thematic map analysis consisting of four quadrants based on density and centrality: First, themes in the upper-right quadrant are interpreted as relevant and extensively researched. As they are located on the right (centrality) and upper part (density), these themes should be further developed and studied. Second, themes in the lower-right quadrant are centrally positioned but have low density, indicating that themes in this quadrant can still be considered as research topics. Third, themes in the upper-left quadrant, or highly specialized themes, are specific, rare, dense, but not highly central themes. Fourth, there are two possibilities if a theme is in this quadrant: either the theme is starting to decline or it is beginning to rise. However, if the theme is on the rise, it can be a good opportunity for researchers to explore it. The procedure to determine whether a theme is rising or falling can be done by reviewing articles.

Thematic maps in Figure 7 showed the relationship between education, human experiment, and school located in the upper-right quadrant, indicating a need for further examination. Topics such as student issues, games, and motivation are in the lower-right quadrant because they are the most popular but haven't been extensively discussed. Therefore, from this analysis, it is evident that research on the use of games, especially in early childhood education, needs to be explored further.

**Figure 7.** The Bibliometric analysis results based on thematic maps

## Discussion

Bibliometrics is a method used to measure the impact and outcomes of research through the use of quantitative indicators (Budianto & Dewi, 2023). These indicators complement qualitative indicators such as funding received, the number of patents granted, awards received, and peer reviews. Both qualitative and quantitative indicators work together to assess the quality and impact of a research (Andini, 2013). Bibliometric analysis is used to evaluate the use of collections, understand the development of research in specific topics, and assist in analyzing curriculum needs for teaching programs in library science studies (Arlina et al., 2022). This method is also used to evaluate the alignment of researchers' publication contributions with the university's vision, mission, and prominent research topics. It is employed to assess the performance of individual researchers and the overall research performance of the university (Afifandasari et al., 2023). Bibliometrics is the activity used to measure and analyze books or other scientific information sources using mathematical and statistical methods (Diodato, 1994).

This study utilizes data from 2018 to 2023, with the highest Scopus index occurring in 2022, reaching up to 192. In this bibliometric analysis, searches are conducted using the keywords "game" and "child education" in Scopus. Subsequently, the data is retrieved and analyzed using Bibliometric and Biblioshiny applications to obtain the desired information. From 2018 to 2023, among the top 10 authors who meet the criteria each year are Krustrup P and Larsen MN. During this period, the affiliation in the research coordination program falls within the top 10 categories from 2018 to 2023, specifically the University of Hong Kong. Each result obtained in this writing is adapted to bibliometrics and then analyzed. This analysis aims to scrutinize the content data within the trend patterns of themes discussed each year. The data is collected from various documents and, simultaneously, in the articles that have been examined. In the data found in the scholarly publications that form the trending topics, they are divided into various plots that differ from 2018 to 2023.

This research has at least two limitations. First, the study is based on a limited number of keywords and is potentially constrained by the database used to collect articles. Second,

although the research employs formal analysis tools like Biblioshiny, VOSviewer, and Mendeley, the assessments made by the authors still have the potential for identification errors.

It is recommended for future researchers to improve upon this study by expanding the sample size and the number of keywords in the database. Additionally, for more accurate analysis results, it is advisable to compare the findings using different bibliometric analysis software such as BibExcel and HistCite.

## 4. CONCLUSION

Through bibliometric analysis, this study aims to examine publication papers from the period 2018-2023 related to the use of games for early childhood education. The review results indicate a significant increase in the number of published journals during the period 2018-2022. Several countries such as the USA, UK, Spain, Brazil, China, and Indonesia are highly dominant in terms of document numbers. Two authors are considered to have a more significant influence in this field. The data mapping display shows that relevant previous research can be classified based on the type of game, game genre, study subjects, learning approaches, types of learning, subjects involved in the research, and several topics that have the potential for further development, integration with other topics to achieve novelty. The findings of this review report can provide mapping and identify research trends, particularly on the topic of using games in early childhood education, serving as an alternative reference for future research. This study is limited to the early childhood level and only utilizes the Scopus database. For future researchers, journals could be created to explore other types of games using a combination of prestigious databases such as Scopus and Web of Science.

## REFERENCES

Afifandasari, T., Suluri, S., & Ramadhan, S. (2023). Perkembangan Kajian Pendidikan Karakter Religius: Analisis Jurnal Bilbiometrik pada Database Scopus. *Manazhim*, *5*(1), 517–535. https://doi.org/10.36088/manazhim.v5i1.3038

Afrianti, N. (2018). Permainan Tradisional, Alternatif Media Pengembangan Kompetensi Sosial-Emosi Anak Usia Dini. *Cakrawala Dini: Jurnal Pendidikan Anak Usia Dini*, *5*(1), 1–12. https://doi.org/10.17509/cd.v5i1.10405

Agustina, D. N., Supriatna, M., & Peniasiani, D. (2023). Nilai Kerjasama dalam Permainan Tadisional Galah Asin di Kelurahan Munjul Jaya Purwakarta. *Jurnal Pendidikan Indonesia*, *12*(1), 282–291. https://id.m.wikipedia.org/wiki/Berkas:Permainan_galasin.jpg

Andini, N. (2013). *Pengorganisasian Komunitas dalam Pengembangan Agrowisata di Desa Wisata Studi Kasus: Desa Wisata Kembangarum, Kabupaten Sleman*. *24*(July), 1–23.

Ariyanti, T. (2016). Pentingnya Pendidikan Anak Usia Dini Bagi Tumbuh Kembang Anak/The Importance of Childhood Education For Child Development. *Jurnal Dinamika Pendidiikan Dasar*, *8*(1), 50–58.

Arlina, R., Sudiar, N., & H, R. (2022). Tren Topik Penulisan Artikel Ilmiah Bidang Ilmu Perpustakaan dan Informasi Tahun 2017-2021 Menggunakan Co-Occurance. *Al-Kuttab : Jurnal Kajian Perpustakaan, Informasi Dan Kearsipan*, *4*(1), 62–78. http://jurnal.iain-padangsidimpuan.ac.id/index.php/Kuttab/article/view/5406

Budianto, E. W. H., & Dewi, N. D. T. (2023). Pemetaan Penelitian Rasio Net Operating Margin (NOM) pada Perbankan Syariah: Studi Bibliometrik VOSviewer dan Literature Review. *Ecobankers: Journal of Economy and Banking*, *4*(2), 84–94. https://journal.bungabangsacirebon.ac.id/index.php/EcoBankers/article/view/872

Diodato, V., (1994), Dictionary of bibliometrics. New York : The Haworth Press

Elihami & Ekawati. (2020). Persepsi Revolusi Mental Orang Tua Terhadap Pendidikan Anak Usia

Dini. *Jurnal Edukasi Nonformal*, *1*(2), 16. https://ummaspul.e-journal.id/JENFOL/article/view/379

Gian Prantoro. (2015). Pengaruh Penggunaan Permainan Tradisional Bakiak dan Engklek terhadap Keterampilan Sosial Anak Usia Dini. *Jurnal Teknologi Pendidikan*, *4*(3), 49–58.

Ita, E. (2018). Manajemen Pembelajaran Pendidikan Anak Usia Dini Di Tk Rutosoro Kecamatan Golewa Kabupaten Ngada Flores Nusa Tenggara Timur. *Jurnal Dimensi Pendidikan Dan Pembelajaran*, *6*(1), 45–52. https://doi.org/10.24269/dpp.v6i1.889

Kurnia, R. (2012). Konsepsi Bermain dalam menumbuhkan Kreativitas Pada Anak Usia Dini. *Educhild*, *1*(1), 77–86.

Kurniati, E. (2006). Program Bimbingan Untuk Mengembangkan Keterampilan Sosial Anak Melalui Permainan Tradisional. *Bandung: Tidak Diterbitkan*, 1–18. http://file.upi.edu/Direktori/FIP/JUR._PGTK/197706112001122-EUIS_KURNIATI/pedagogia.pdf

Lailan, A. (2017). Alfina Lailan , Model Pembelajaran … *An-Nahdhah*, *10*(20), 191–202.

Nur, H., & Asdana, M. F. (2020). Pergeseran Permainan Tradisional Di Kota Makassar. *Phinisi Integration Review*, *3*(1), 17–29.

Nusantara, M. A. (2021). Development Planning for Prosperity Sebuah Kajian Pustaka Terstruktur (Systematic Literature Review). *Kybernan: Jurnal Studi Kepemerintahan*, *4*(2), 206–225. http://www.jurnal-umbuton.ac.id/index.php/Kybernan/article/view/1219

Oktaviani, D. (2022). *Dampak Permainan Modern vs Tradisional dalam Pembentukan Karakter Anak Masa Kini (Penelitian studi kasus dengan metode deskriptif kualitatif kepada siswa kelas 2 di Sekolah Dasar Negeri Cipagalo 1)*.

Rahayu, N. S., Liddini, U. H., & Maarif, S. (2022). Berpikir Kreatif Matematis: Sebuah Pemetaan Literatur dengan Analisis Bibliometri Menggunakan Vos Viewer. *Mosharafa: Jurnal Pendidikan Matematika*, *11*(2), 179–190. https://doi.org/10.31980/mosharafa.v11i2.1232

Rakhmawati, I. (2019). Mengembangkan Kecerdasan Anak melalui Pendidikan Usia Dini. *ThufuLA: Jurnal Inovasi Pendidikan Guru Raudhatul Athfal*, *3*(1), 40. https://doi.org/10.21043/thufula.v3i1.4729

Rizqiyyatunnisa, & Mahdi, N. I. (2021). Penyelenggaraan PAUD Formal, Non Formal dan Informal di Kb. Tk. Ik Keluarga Ceria. *Buhuts Al-Athfal: Jurnal Pendidikan Dan Anak Usia Din*, *1*(1), 59–73.

Widodo, H. (2021). *Dinamika Pendidikan Anak Usia Dini* (Y. Winarti (ed.)). ALPRIN.

Yanto, M. (2020). Manajemen Mutu Pendidikan Anak Usia Dini Wijaya Kusuma Rejang Lebong. *Zuriah : Jurnal Pendidikan Anak Usia Dini*, *1*(2), 97. https://doi.org/10.29240/zuriah.v1i2.2020

Zarkasih Putro, K. (2016). APLIKASIA: Jurnal Aplikasi Ilmu-ilmu Agama Mengembangkan Kreativitas Anak Melalui Bermain. *Ejournal.Uin-Suka.Ac.Id*, *16*(1), 19–27. http://ejournal.uin-suka.ac.id/pusat/aplikasia/article/view/1170