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The Intellectual Structure of Early Childhood Education Research: A Bibliometric Study Based on Scopus Database

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ABSTRACT

This study aims to map the intellectual structure of early childhood education research through a bibliometric analysis of publications indexed in the Scopus. The data were collected using relevant keywords such as "early childhood education," "preschool education," and "early learning," within a specified time frame. The bibliographic data were analyzed using VOSviewer to examine co-authorship networks, keyword co-occurrence patterns, citation structures, and the temporal evolution of research themes. The results reveal that early childhood education research is characterized by three major interconnected clusters: educational practices, child development and health, and epidemiological or longitudinal studies. The findings also indicate a clear shift in research focus over time, from health-oriented and developmental perspectives toward more education-centered themes such as teaching, preschool systems, and early learning environments. Density analysis further highlights core research areas alongside emerging topics, including mental health and gender, which remain relatively underexplored. This study contributes to the literature by providing a comprehensive and systematic overview of the knowledge structure and development of early childhood education research, offering valuable insights for researchers, educators, and policymakers in identifying research gaps and future directions.

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1. INTRODUCTION

Early Childhood Education (ECE) has increasingly been recognized as a critical foundation for lifelong learning and human development [1], [2]. The early years of life, typically defined as the period from birth to eight years old, represent a phase of rapid cognitive, emotional, social, and physical growth. During this stage, children develop fundamental skills that shape their future academic achievement, behavioral patterns, and overall well-being. As a result, the quality and accessibility of early childhood education have become central concerns for policymakers, educators, and researchers

worldwide [3]. Numerous studies have emphasized that investments in early education yield long-term benefits, including improved educational attainment, enhanced productivity, and reduced social inequality.

Over the past two decades, research in early childhood education has expanded significantly, reflecting growing global awareness of its importance. This expansion is not only quantitative but also qualitative, as the field has evolved to incorporate diverse theoretical perspectives and methodological approaches [4], [5]. Early childhood education research now spans multiple disciplines, including education, developmental psychology, neuroscience, sociology, and public policy. Scholars have explored a wide range of topics such as early literacy and numeracy, play-based learning, curriculum design, teacher competencies, parental involvement, and socio-emotional development. In addition, emerging issues such as digital learning environments, inclusive education, and the integration of technology into early childhood settings have further enriched the research landscape.

Despite this rapid growth, the body of literature in early childhood education remains highly fragmented. The diversity of research themes and interdisciplinary influences has made it challenging to identify the core intellectual structure of the field. Different studies often focus on specific subtopics or contexts, leading to a scattered understanding of how knowledge in early childhood education is organized and how it evolves over time. Traditional literature reviews, while valuable, are often limited by subjective selection processes and may not fully capture the complexity and breadth of the research domain. Consequently, there is a need for a more systematic and comprehensive approach to map the intellectual structure of early childhood education research.

Bibliometric analysis has emerged as a powerful methodological tool for addressing this challenge. By applying quantitative techniques to large datasets of academic publications, bibliometric methods enable researchers to uncover patterns, relationships, and trends within a specific field of study. This approach allows for the identification of influential authors, key journals, dominant research themes, and collaboration networks among scholars and institutions. Furthermore, bibliometric analysis facilitates the visualization of knowledge structures through network mapping, providing a clearer understanding of how different research areas are interconnected. Such insights are particularly valuable for fields like early childhood education, where interdisciplinary integration plays a significant role.

The use of bibliometric tools has become increasingly prevalent in educational research, particularly with the availability of comprehensive academic databases such as Scopus and advanced visualization software like VOSviewer. These tools enable researchers to analyze large volumes of publication data efficiently and systematically. Through techniques such as co-authorship analysis, keyword co-occurrence analysis, and citation analysis, it is possible to construct a detailed map of the intellectual landscape of a research field. In addition, overlay and density visualizations provide insights into the temporal evolution of research themes and the relative importance of different topics within the field.

Although bibliometric studies have been conducted in various areas of education, including digital learning, inclusive education, and teacher professional development, comprehensive analyses focusing specifically on early childhood education remain limited. Existing studies often concentrate on particular themes or geographical regions, thereby lacking a holistic perspective of the global research landscape. This gap highlights the need for a comprehensive bibliometric study that captures the full scope of early childhood education research and provides an integrated understanding of its intellectual structure.

This study aims to fill this gap by conducting a bibliometric analysis of early childhood education research based on data retrieved from the Scopus database. By

examining publication trends, keyword co-occurrence patterns, citation structures, and collaboration networks, this study seeks to map the intellectual structure of the field in a systematic and objective manner. The analysis not only identifies dominant research clusters but also reveals emerging themes and potential areas for future investigation. In doing so, the study contributes to a deeper understanding of how early childhood education research has developed over time and how it continues to evolve in response to changing educational needs and global challenges.

2. METHODS

This study adopts a bibliometric approach to systematically map the intellectual structure of early childhood education research. The data were retrieved from the Scopus database, which is widely recognized for its comprehensive coverage of high-quality peer-reviewed publications. A set of relevant keywords, including "early childhood education," "preschool education," and "early learning," was used to identify publications within a specified time frame (e.g., 2000–2025). The search results were refined by limiting the document type to journal articles and excluding non-relevant subject areas to ensure the relevance and consistency of the dataset. The bibliographic data were then exported in CSV format and analyzed using VOSviewer.

3. RESULT AND DISCUSSION

3.1 Result

a. Keyword Co-Occurrence

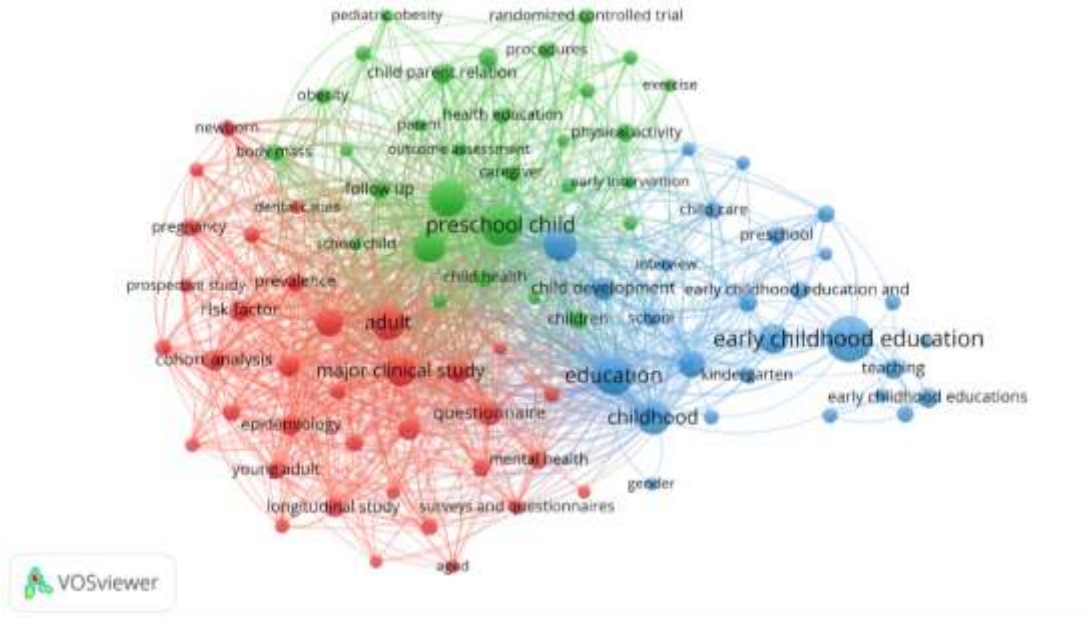

Figure 1. Network Visualization
Source: Data Analysis

Figure 1 reveals the intellectual structure of early childhood education research through the formation of three major thematic clusters, each represented by different colors. These clusters indicate how research topics are interconnected and how the field is structured around distinct yet overlapping domains. The size of the nodes reflects the frequency of keyword occurrences, while the proximity and link strength indicate the degree of association between topics. Overall, the map demonstrates a dense and highly interconnected research landscape, suggesting that early childhood education is a multidisciplinary field influenced by both educational and health-related perspectives.

The blue cluster represents the core educational dimension of the field, centered around keywords such as "early childhood education," "education," "preschool," "kindergarten," and "teaching." This cluster highlights the dominant focus on pedagogical practices, curriculum development, and institutional learning environments in early childhood settings. The presence of terms such as "childhood," "school," and "early childhood educations" further indicates that much of the research is concentrated on formal education systems and instructional strategies. This cluster can be interpreted as the foundational pillar of the field, emphasizing how structured educational interventions contribute to child development during the early years.

The green cluster reflects a strong emphasis on child development and health-related aspects within early childhood research. Key terms such as "preschool child," "child development," "physical activity," "health education," "caregiver," and "early intervention" suggest that this cluster focuses on the holistic development of children, including physical, cognitive, and socio-emotional well-being. The inclusion of terms like "randomized controlled trial," "procedures," and "outcome assessment" also indicates the use of rigorous empirical and experimental approaches in studying child development. This cluster highlights the integration of health sciences and developmental psychology into early childhood education research, reinforcing the interdisciplinary nature of the field.

The red cluster represents the epidemiological and behavioral research dimension, characterized by keywords such as "adult," "prevalence," "risk factor," "cohort analysis," "questionnaire," and "mental health." This cluster suggests that a significant portion of the literature examines early childhood from a longitudinal and population-based perspective, often linking early experiences to later life outcomes. The presence of terms like "pregnancy," "newborn," and "young adult" indicates that research in this cluster extends beyond early childhood itself, exploring developmental trajectories across the lifespan. This reflects an increasing interest in understanding how early childhood conditions influence long-term health, behavior, and social outcomes.

Importantly, the connections between these three clusters demonstrate a high level of integration across different research domains. For instance, keywords such as "child development," "education," and "childhood" appear as bridging nodes that connect educational, developmental, and epidemiological perspectives. This suggests that early childhood education research is not confined to a single discipline but rather operates at the intersection of multiple fields. The dense network structure indicates that contemporary research increasingly adopts a holistic approach, combining pedagogical, developmental, and health-related insights.

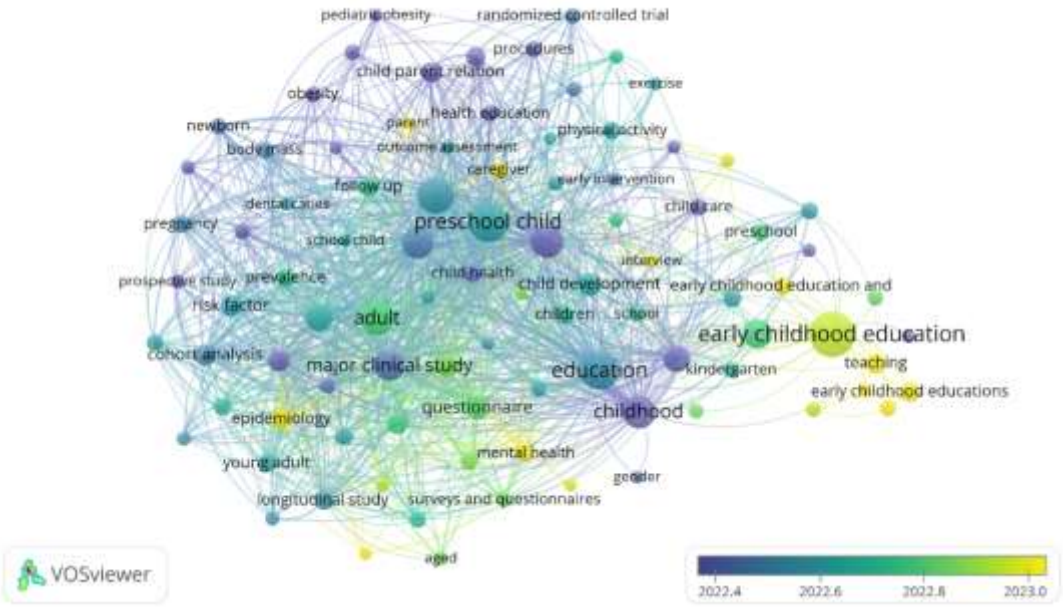

Figure 2. Overlay Visualization
Source: Data Analysis

Figure 2 provides insight into the temporal evolution of early childhood education research by illustrating how topics have developed over time. The color gradient, ranging from blue (earlier years) to yellow (more recent years), indicates the average publication year of each keyword. Overall, the map shows a clear transition from foundational and health-related research themes toward more education-centered and pedagogical topics in recent years. This suggests that the field has evolved from a predominantly developmental and epidemiological focus into a more integrated educational domain.

In the earlier phase (represented by blue and dark green nodes), research was largely concentrated on health, clinical, and developmental aspects of early childhood. Keywords such as "cohort analysis," "epidemiology," "risk factor," "pregnancy," "newborn," and "major clinical study" dominate this period, indicating that early research heavily emphasized medical and longitudinal perspectives. Additionally, terms like "child health," "physical activity," and "caregiver" suggest a strong focus on understanding the biological and environmental determinants of child development. This reflects the historical roots of early childhood research, which were closely linked to public health and developmental psychology.

In contrast, more recent research trends (indicated by yellow nodes) show a shift toward educational practices and learning environments. Keywords such as "early childhood education," "teaching," "preschool," and "kindergarten" appear prominently in the newer spectrum, highlighting increased attention to instructional strategies, curriculum design, and formal early learning systems. The emergence of these terms suggests that contemporary research is increasingly oriented toward optimizing educational outcomes and improving teaching effectiveness in early childhood settings. This shift also indicates a growing recognition of the importance of structured

education and policy interventions in shaping early development, signaling future research directions that are likely to integrate pedagogy, technology, and inclusive education practices.

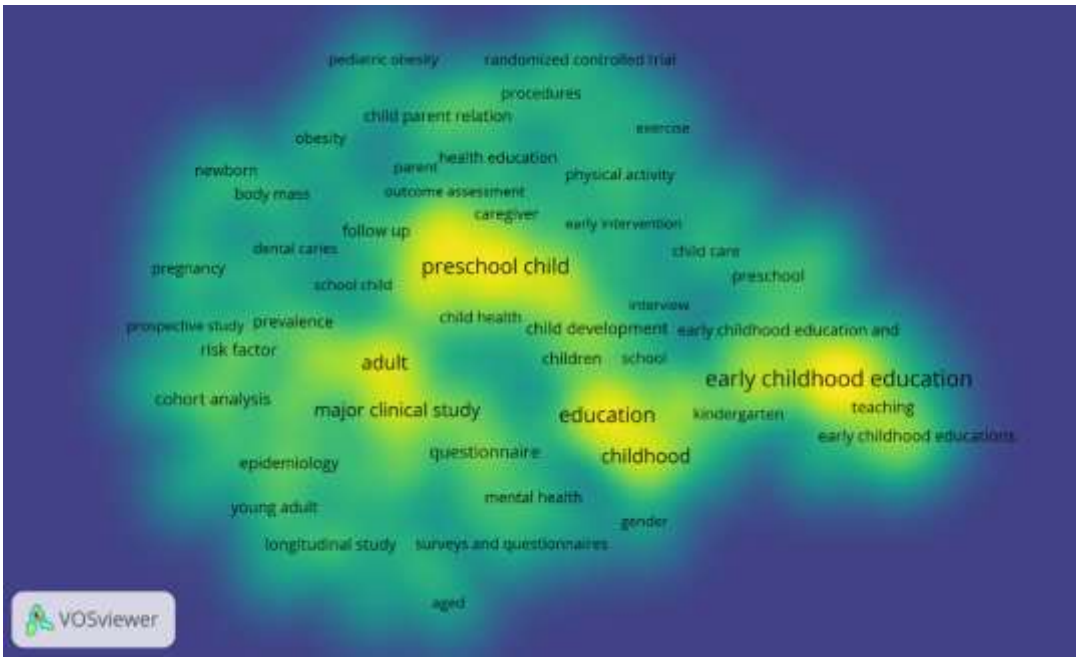

Figure 3. Density Visualization
Source: Data Analysis

Figure 3 highlights the concentration of research topics within early childhood education by using color intensity, where yellow indicates high-density (frequently occurring and strongly connected keywords) and blue indicates low-density areas. The map shows that the most prominent and intensively studied themes are centered around keywords such as "early childhood education," "preschool child," "education," and "childhood." These areas form the core of the research field, reflecting a strong and sustained scholarly focus on educational practices, child development, and early learning environments. The high-density concentration in these nodes suggests that they serve as the central pillars of the intellectual structure, linking various subtopics across the field.

In contrast, areas with lower density—represented by green to blue shades—indicate less explored or more specialized research topics, such as "mental health," "gender," "longitudinal study," and certain clinical or epidemiological aspects. While these topics are still connected to the core network, their relatively lower density suggests opportunities for further research and development. Additionally, the spread of density across both educational and health-related terms confirms the interdisciplinary nature of early childhood education research. This pattern indicates that while the field is strongly anchored in education and child development, there remains significant potential to expand research into emerging or underrepresented areas, particularly those integrating psychological, social, and long-term developmental perspectives.

b. Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
696	[6]	Myopia
693	[7]	Mental Health Surveillance Among Children - United States, 2013-2019
590	[8]	Causal Inference: The Mixtape
564	[9]	Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda
556	[10]	Race and economic opportunity in the United States: An intergenerational perspective
528	[11]	A systematic literature review on obesity: Understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity
516	[12]	Promoting optimal development: Identifying infants and young children with developmental disorders through developmental surveillance and screening
507	[13]	Young children's online learning during COVID-19 pandemic: Chinese parentsâ€™ beliefs and attitudes
475	[14]	Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: Global perspective
389	[15]	Translanguaging and Literacies

Source: Scopus, 2026

3.2 Discussion

The findings of this bibliometric study reveal that early childhood education research has developed into a highly interconnected and multidisciplinary field. The co-occurrence network demonstrates the presence of three major thematic clusters—education, child development and health, and epidemiological or longitudinal research—indicating that the field is not confined to a single disciplinary perspective. This aligns with the growing recognition that early childhood education cannot be understood solely through pedagogical approaches, but must also incorporate insights from developmental psychology, public health, and social sciences. The strong interlinkages among clusters suggest that contemporary research increasingly adopts a holistic perspective, where learning, health, and developmental outcomes are viewed as mutually reinforcing components.

From a structural standpoint, the dominance of the education cluster highlights that pedagogical practices, curriculum design, and early learning environments remain the central focus of the field. Keywords such as “early childhood education,” “teaching,” “preschool,” and “kindergarten” occupy a prominent position, indicating that formal educational settings are the primary context for scholarly investigation. However, the simultaneous presence of development-related terms such as “child development,” “caregiver,” and “early intervention” suggests that educational research is increasingly informed by developmental considerations. This integration reflects a paradigm shift from traditional instruction-focused approaches toward more child-centered and developmentally

appropriate practices in early childhood education.

The temporal analysis further reveals a clear evolution in research priorities over time. Earlier studies were predominantly oriented toward health-related and epidemiological themes, including "risk factors," "cohort analysis," and "pregnancy," reflecting a foundational concern with understanding the biological and environmental determinants of early development. In contrast, more recent research has shifted toward educational themes, particularly those related to teaching practices, early learning systems, and institutional settings. This transition indicates a maturation of the field, where initial efforts to understand developmental conditions have gradually evolved into a stronger emphasis on optimizing educational interventions and learning outcomes. Moreover, the emergence of newer educational keywords suggests that the field is responding to contemporary challenges, including the need for quality early education and improved school readiness.

The density visualization reinforces these findings by identifying core and peripheral research areas within the field. High-density regions centered on "early childhood education," "preschool child," and "education" confirm that these topics represent the intellectual core of the discipline. At the same time, lower-density areas such as "mental health," "gender," and longitudinal developmental studies highlight underexplored or emerging domains. These findings suggest that while the field has established strong foundations in education and development, there is still considerable room for expansion into more specialized and integrative topics. In particular, issues related to mental health, socio-emotional development, and long-term outcomes present promising avenues for future research.

4. CONCLUSION

This study provides a comprehensive bibliometric mapping of early childhood education research, revealing a dynamic and multidisciplinary intellectual structure shaped by the integration of educational, developmental, and health-related perspectives. The findings indicate that while the field is strongly anchored in core themes such as early childhood education, preschool learning, and child development, it has evolved over time from a predominantly health-oriented focus toward a more education-centered paradigm. The analysis also highlights the existence of emerging and underexplored areas, including mental health, gender, and long-term developmental outcomes, which present valuable opportunities for future research. This study contributes to a deeper understanding of the evolution and organization of early childhood education research, offering insights that can guide scholars, educators, and policymakers in advancing more holistic, inclusive, and evidence-based early learning practices.

REFERENCES

[1] Y. Ydo, "Building stronger foundations for learning: The key for effective curriculum implementation and lifelong learning," *Prospects*, vol. 52, no. 1, pp. 1–5, 2022.

[2] C. T. Ramey and S. L. Ramey, "Early childhood education that promotes lifelong learning, health, and social well-being: The Abecedarian Project and its replications," 2023.

[3] M. R. Jalongo, "The effects of COVID-19 on early childhood education and care: Research and resources for children, families, teachers, and teacher educators," *Early Child. Educ. J.*, vol. 49, no. 5, pp. 763–774, 2021.

[4] Y. Liu, "Paradigmatic compatibility matters: A critical review of qualitative-quantitative debate in mixed methods research," *Sage Open*, vol. 12, no. 1, p. 21582440221079920, 2022.

[5] M. M. H. Emon, "Research approach: A comparative analysis of quantitative and qualitative methodologies in social

science research," 2024.
[6] P. N. Baird *et al.*, "Myopia," *Nat. Rev. Dis. Prim.*, vol. 6, no. 1, p. 99, 2020.
[7] R. H. Bitsko, "Mental health surveillance among children—United States, 2013–2019," *MMWR Suppl.*, vol. 71, 2022.
[8] S. Cunningham, *Causal inference: The mixtape*. Yale university press, 2021.
[9] C. G. Victora, P. Christian, L. P. Vidaletti, G. Gatica-Domínguez, P. Menon, and R. E. Black, "Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda," *Lancet*, vol. 397, no. 10282, pp. 1388–1399, 2021.
[10] R. Chetty, N. Hendren, M. R. Jones, and S. R. Porter, "Race and economic opportunity in the United States: An intergenerational perspective," *Q. J. Econ.*, vol. 135, no. 2, pp. 711–783, 2020.
[11] M. Safaei, E. A. Sundararajan, M. Driss, W. Boulila, and A. Shapi'i, "A systematic literature review on obesity: Understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity," *Comput. Biol. Med.*, vol. 136, p. 104754, 2021.
[12] P. H. Lipkin *et al.*, "Promoting optimal development: identifying infants and young children with developmental disorders through developmental surveillance and screening," *Pediatrics*, vol. 145, no. 1, 2020.
[13] C. Dong, S. Cao, and H. Li, "Young children's online learning during COVID-19 pandemic: Chinese parents' beliefs and attitudes," *Child. Youth Serv. Rev.*, vol. 118, p. 105440, 2020.
[14] N. Tinanoff *et al.*, "Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: Global perspective," *Int. J. Paediatr. Dent.*, vol. 29, no. 3, pp. 238–248, 2019.
[15] O. García and J. A. Kleifgen, "Translanguaging and literacies," *Read. Res. Q.*, vol. 55, no. 4, pp. 553–571, 2020.