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A BIBLIOMETRIC REVIEW OF RECENT TECHNOLOGY INTEGRATION FOR YOUNG EFL LEARNERS

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Abstract

This study is a bibliometric analysis of publications on the integration of technology in English learning for young EFL learners from 2020 to 2024. A total of 107 Scopus-indexed articles were analyzed using Biblioshiny and VOSviewer to identify trends, key authors, collaboration networks, and thematic focuses. The results show a steady increase in publications, with the predominance of institutions from East and Southeast Asia. Three main themes were found: digital learning strategies, children's learning contexts, and evaluation technologies. Although collaboration is quite active, international networks are still limited. These findings underscore the growing academic interest in digital-based language learning for children and the need for stronger cross-border research collaboration.

Keywords: digital native, young learners, technology integration, EFL

INTRODUCTION

The development of digital technology has fundamentally changed the way humans interact, learn, and communicate in recent years. The generation that grew up in the digital environment is often called *digital natives,* who are considered more proficient, quick to adapt, and comfortable in using technology, as well as processing information in a different way than previous generations (*digital immigrants*) (Prensky, 2001; Reid, 2018; Q. Wang et al., 2013). This phenomenon is not only relevant for social and technological studies, but it is also very important in the context of foreign language education, especially for young learners who are naturally familiar with digital devices.

In the context of teaching English as a Foreign Language (EFL), technology is now an integral element that supports various learning approaches (Raygan & Moradkhani, 2020). At the children's level, technology integration has a more complex impact.

Research in the context of EFL (English as a Foreign Language) for children incorporating digital technologies has indeed increased significantly in recent years. Recent studies have shown that the integration of technologies such as mobile apps, flipped classrooms, multimodal e-books, and artificial intelligence (AI) has been used to improve students' digital literacy, motivation, language skills, and digital engagement and empathy (Baby, 2025; Faudi et al., 2023; Han et al., 2024; Jeon, 2022; Jiang & Gao, 2020; Liu et al., 2024; Yenphech et al., 2025). However, as the number of publications increases, comprehensive scientific mapping is necessary to understand the direction of research systematically.

As attention to technology-based learning increases, there is a need to understand the patterns, trends, and directions of research in this field. Bibliometric studies are one of the most relevant approaches for analyzing the scientific growth of a field, as they can identify publication trends, citation patterns, collaboration between authors or institutions, and the

impact and influence of a scientific work within the community (Hassan & Duarte, 2024; Lazarides et al., 2023; Lyu et al., 2023; Passas, 2024; Salinas-Ríos & López, 2022).

Although research on technology-based language learning is constantly increasing, it still primarily focuses on the context of higher education and has not addressed much of young learners or children as digital natives (Hidayat et al., 2025; Y. Wang & Kabilan, 2024). Studies at the children's level generally highlight traditional cognitive or pedagogical aspects without systematically looking at the integration of digital technologies (Martínez-León et al., 2024; Yilmaz et al., 2019). In fact, recent studies show the great potential of digital media such as gamification and e-books in improving children's engagement and learning outcomes (Alice Chen et al., 2023; Gunawan, 2025) However, there is no comprehensive bibliometric review that maps this research trend globally in the 2020-2024 period.

This study aims to conduct a bibliometric analysis of scientific articles that discuss the integration of technology into English language learning for young *EFL learners* during the 2020–2024 period. This study maps publication trends, main topics, dominant keywords, and patterns of author collaboration to illustrate scientific developments in this field. This research is guided by the following research questions.

1. What is the trend of research publications on technology integration in young EFL learners?
2. Who are the authors, institutions, and countries that are most influential in this field of research?
3. How are the patterns of collaboration and citation networks formed in these publications?
4. What are the most dominant research topics, keywords, and themes in related literature?
5. What are the potential opportunities for further research on technology integration in young EFL learners?

METHOD

Research Design

This study employs a quantitative bibliometric approach to map trends, collaborations, and research themes related to the integration of technology into English language learning for young EFL learners during the 2020-2024 period. This study is descriptive-exploratory, focusing on identifying publication patterns, dominant keywords, and collaboration networks between authors and institutions.

Data Collection

The data of this study were collected from the Scopus database. From the initial search results, 329 documents were obtained, and a subsequent screening process was conducted to remove duplicates and select articles relevant to the research focus. After the *screening* and feasibility evaluation stage, 107 articles were identified as meeting the criteria and were included in the bibliometric analysis.

The selection was based on inclusion criteria, specifically articles published in English-language scientific journals that discussed the integration of technology into English-

language learning for young learners. Articles that focus on adult learners, non-EFL contexts, or are not empirical research results are excluded from the analysis.

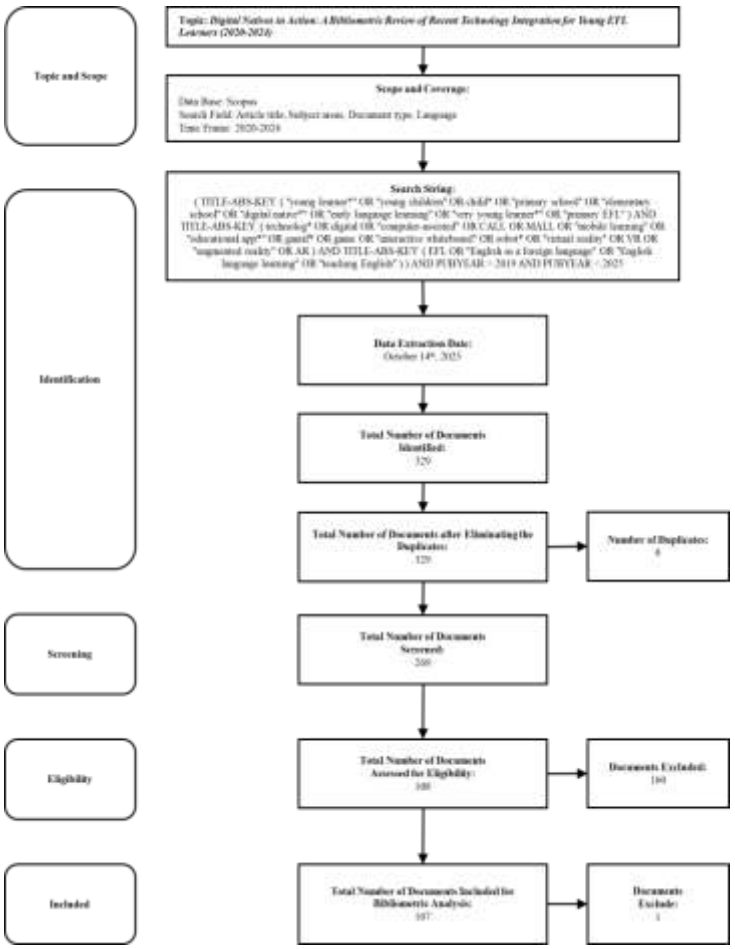

Figure 1. Flow diagram of data collection

Data Analysis

Data analysis was carried out using a quantitative bibliometric approach with the help of two main tools, namely VOSviewer (version 1.6.20) and Biblioshiny (RStudio package Bibliometrix). The first stage involves descriptive analysis to describe the distribution of publications by year, journal, number of citations, and author and affiliate productivity. Next, a network analysis was conducted to map co-authorship, co-citation, and keyword co-occurrence, identifying scientific collaborations, influential references, and dominant themes in this field of research. In addition, a thematic analysis was conducted to group frequently occurring keywords into main thematic clusters, which were then used to trace the evolution of research topics from 2020 to 2024.

FINDINGS AND DISCUSSION

Findings

Key Information Emerging with the Data

Figure 2. Key Information

The bibliometric analysis for the period 2020–2024 includes 107 documents from 70 sources, with an annual growth of 18.92%. There are 270 authors, with an average of 2.58 collaborators per article, indicating strong collaboration despite limited international cooperation (12.15%). A total of 362 keywords reflect a diversity of topics, while the average age of the documents is 2.72 years, indicating a young and developing field. With 992 references and an average of 15.93 citations per article, this study shows a fairly high scientific impact. Overall, the data indicate rapid growth, active collaboration, and increasing academic relevance in the study of technology integration for EFL young learners.

Publication Trends

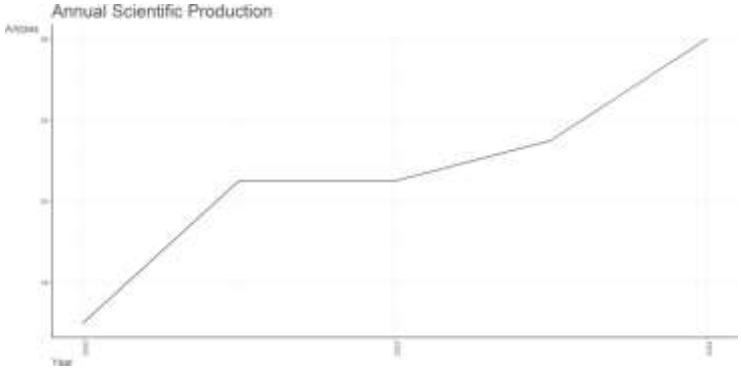

Figure 3. Publication trends diagram

Data shows an increase in the number of publications from 14 articles in 2020 to 28 articles in 2024. A significant surge occurred in 2021, with the number of publications rising to 21 articles, and steady growth continued into 2023 (23 articles) and peaked in 2024. This trend reflects the strong influence of the digital and post-pandemic era on foreign language teaching practices, where technology is no longer a complement, but a core part of a learning strategy that adapts to the characteristics of the digital generation that encourages teachers and institutions to adopt various digital platforms, mobile learning, social media, and artificial intelligence to adapt to the characteristics of the digital generation (Jeong, 2023; Ju-Zaveroni & Lee, 2023; Meniado, 2023; Moorhouse, 2024). Therefore, the current digital era has underscored the central role of technology in the learning of English among young learners.

Most Relevant Authors

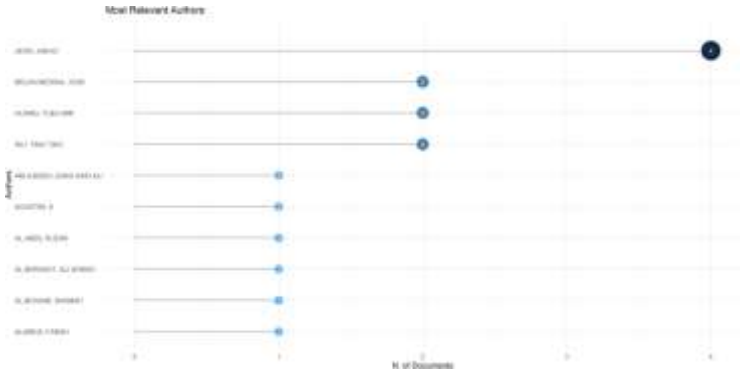

Figure 4. Most relevant authors

The Most Relevant Authors visualization shows the distribution of author productivity in the topic of technology integration for *young EFL learners*. Jeon, Jaeho is the most dominant author with 4 publications, indicating the most consistent and influential contribution in this field. Several other authors such as Belda-Medina, Jose, Huang, Yueh Min, and Wu, Ting Ting each have 2 publications, showing active involvement but not yet as intense as the lead authors. Most of the other authors have only come up with 1 publication, indicating that the field is still dominated by sporadic contributors and does not yet have many groups of researchers with sustained high productivity. Overall, this pattern suggests that technology integration research for *young EFL learners* is still evolving, with one key author and many individual contributions scattered.

Most Relevant Affiliation

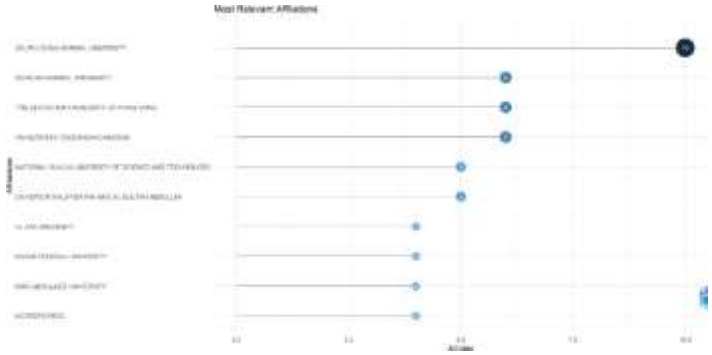

Figure 5. Most relevant affiliation

The Most Relevant Affiliations graph shows the institutions that are most actively publishing research on technology integration for *young EFL learners*. South China Normal University topped the list with 10 articles, confirming its role as a major research center in this field. Under it, Sichuan Normal University, The Education University of Hong Kong, and Ganesha University of Education each contributed 6 articles, demonstrating the strong and consistent contributions of institutions in Asia. Other institutions such as National Yunlin University of Science and Technology and Universiti Malaysia Pahang Al-Sultan Abdullah have 5 articles, while some other universities contribute 4 articles. Overall, this distribution shows that research is dominated by Asian institutions, particularly from China, Hong Kong, and Southeast Asia, which are the main drivers of the development of technology integration research in EFL learning for children.

Country Production Over Time

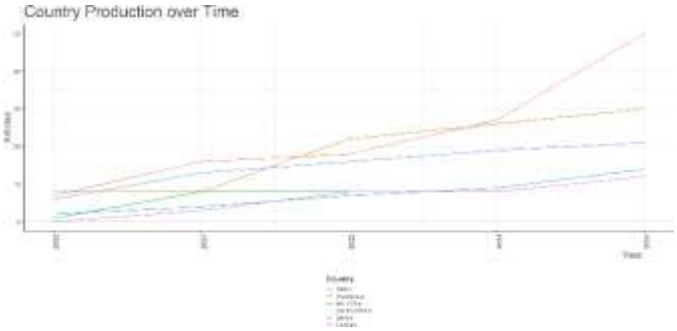

Figure 6. Country production over time

The Country Production over Time graph shows the growth trend of research publications from 2020 to 2024 on the topic of technology integration for *young EFL learners*. Indonesia showed the most significant increase. The number of publications rose sharply after 2022 and reached the highest position in 2024, signaling a strong acceleration of research activities in recent years. China and Malaysia showed stable and consistent growth throughout the observation period. China has been at a high level of production since the beginning, while Malaysia has shown a gradual increase without an extreme surge. Saudi Arabia, Spain, and Turkey contribute less, but still show an increasing trend over time, signaling a growing research interest despite its limited scale. Overall, this graph shows that research production is increasing in all countries, with Asia as the main contributor and the latest surge driven primarily by Indonesia.

Collaboration Network

Figure 7. Collaboration network

Visualization of collaborative networks indicates that the pattern of cooperation among authors in this field remains limited to small groups. Most writers collaborate in pairs or groups of two, without forming a large, interconnected network. The largest cluster is at the center of the network, with Huang, Yueh Min, as the most prominent author, signaling his role as a relatively more active contributor than the rest of the group.

Co-Occurrence Network

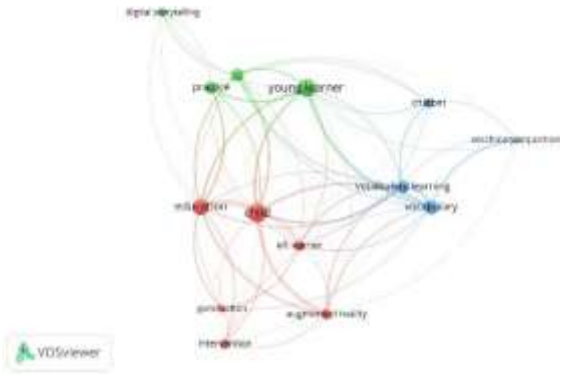

Figure 8. Co-occurrence network

The co-occurrence network shows three main clusters that represent the focus of technology integration research for *young EFL learners*. Cluster 1 (Red) focuses on children's EFL education based on technological interventions, with the main keywords *child*, *EFL learner*, and *education*. Technologies such as *gamification* and *augmented reality* are dominant as a means of increasing engagement and learning outcomes. Cluster 2 (Green) emphasizes pedagogical practices and the development of young learners, with *young learners* at the centre. *Digital storytelling* emerged as an approach that supports children's cognitive and language development through narrative-based learning. Cluster 3 (Blue) focuses on vocabulary learning and AI-based technology, characterized by *vocabulary learning*, *vocabulary acquisition*, and *chatbots*. This cluster reflects the latest research trends in the use of AI for vocabulary mastery in early childhood EFL learners.

Discussion

The results of this bibliometric review show that research on the integration of technology in EFL learning for young learners is growing rapidly but is still in the early stage of structural development. The high rate of publication growth since 2020 reinforces previous findings that the COVID-19 pandemic has become a major trigger for technology integration in foreign language learning, not only as a trigger for change, but also as accelerating the transformation of foreign language pedagogy towards a more inclusive and innovative digital era (Mafulah et al., 2025; Masterson, 2020; Yi et al., 2024). Technology is no longer positioned as a complement, but as a core part of language learning design.

Despite this, authorship patterns suggest that this field is still dominated by individual contributors and small-scale collaborations, with relatively low levels of international collaboration. This pattern was also found in previous bibliometric studies in the field of educational technology, which stated that local context-based research often develops faster than cross-border collaboration due to the ease of coordination and more intensive interaction (Fiscarelli et al., 2021; Sarigöl et al., 2017). The limitations of this global collaboration have the potential to hinder the strengthening of theoretical frameworks and the transfer of best practices between educational contexts.

The dominance of Asian institutions and countries, especially China, Indonesia, and Malaysia, shows that this region is a major center for the development of technology-based EFL research for children. This is in line with research findings from Bindulem & Handayani (2025), Machmud et al. (2021) and Zhi et al. (2023) which affirm that supportive national policies and increased digital access are the main drivers of accelerating the adoption of

educational technology in Asia, although infrastructure gaps and human resource readiness remain major challenges. The surge in publications from Indonesia after 2022 also indicates that the increasing attention to children's English education is increasing and increasingly directed towards contextual and sustainable approaches in dealing with global and local challenges (Gayatri et al., 2023; Khalisa, 2025; Zein et al., 2020).

From the thematic side, the co-occurrence network shows that research is concentrated on technological interventions, pedagogical practices, and vocabulary development. The strong focus on gamification and augmented reality is consistent with the findings of Ding et al. (2024), Li et al. (2024) and Nadeem et al. (2023), which affirm that immersive technology and game-based learning are effective strategies to improve children's overall learning motivation and engagement. Meanwhile, the emergence of chatbots in vocabulary clusters reflects the latest trend of using AI in language learning, which has been shown to support adaptive and interactive vocabulary learning (Wen et al., 2024).

However, the dominance of vocabulary themes also reveals a clear research gap. Research has rarely explored other language skills such as speaking, writing, and pragmatism, as well as the long-term impact of technology use on children's language development. This is in line with the criticism made by Zhang & Zou (2020) who emphasized that long-term evaluation and continuous adaptation are indispensable to maximize the benefits of technology in language learning, not just short-term outcomes. Overall, the findings of this study confirm that the integration of technology in EFL learning for young learners is a relevant, fast-growing, and innovative field, but it still requires strengthening international collaboration, diversifying linguistic focus, and a more balanced pedagogical approach. By expanding the scope of research and strengthening global collaboration networks, the field has great potential to produce more sustainable theoretical and practical contributions.

CONCLUSION AND SUGGESTION

This study confirms that the integration of technology in language learning for children is no longer a temporary trend, but a sustained transformation in language education. The accelerated development observed over the past five years reflects a clear paradigm shift toward adaptive, collaborative, and digitally mediated learning experiences. As evidenced by this review, technology-enhanced EFL instruction for young learners has moved beyond the margins of educational research and now constitutes a strategically significant field with direct implications for early language education.

Looking ahead, future research should focus on consolidating theoretical frameworks and methodological approaches capable of explaining how technology shapes children’s language development, cognitive processes, and motivation. Stronger cross-disciplinary engagement and international collaboration will be essential to building a more robust knowledge base and ensuring that digital innovations meaningfully address the diverse needs of young EFL learners in global educational contexts.

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