

Mapping the evolution: a bibliometric dive into TPACK research trends (2020-2023)

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Abstract

The purpose of this study is to present the research trends within Technological Pedagogical Content Knowledge (TPACK) in English Language Teaching (ELT) from 2020 through August 3rd, 2023. Data for this bibliometric study were collected from Google Scholar by filtering publications that mentioned TPACK in ELT. A maximum of 770 papers were mined to quantify how the overall number of publications, citation counts and keyword co-occurrence varied. Taken together, the results show a clear rise in TPACK related publications over this four-year period that mirrors the heightening need to embed technology into teaching language worldwide but especially due to responses around Covid 19 and remote hybrid learning environments. Citation analysis demonstrates influential works on what factors are important in technology use and impacts. The second step of the co-occurrence analysis points to central themes such as pedagogical content knowledge and technology integration which are already emphasized in research literature, alongside an emerging dynamic perspective on COVID-19 impact for teaching practices. These results deeply emphasize the importance of future research targeting towards methodological clarity in TPACK investigations. This study contributes immensely to education and research because it reveals that TPACK plays critical roles in tackling these challenges/opportunities that have been brought about by the adoption of technological advancement when teaching a language.

Keywords: TPACK, English Language Teaching, bibliometric analysis, technology integration, research trends

INTRODUCTION

In the rapidly evolving landscape of education, the integration of technology has become a crucial element in enhancing teaching and learning processes. The framework of Technological Pedagogical Content Knowledge (TPACK) has emerged as a significant paradigm in understanding how educators can effectively integrate technology into their teaching (Amin & Paiman, 2022; Iqbal et al., 2022; Jamil et al., 2023). TPACK, which synthesizes technological knowledge, pedagogical knowledge, and content knowledge, provides a comprehensive approach for educators to design and deliver instruction that meets the demands of the 21st-century classroom (Angraini et al., 2023; Syawallina & Suganda, 2023; Yapıcı & Mirici, n.d.).

Since its introduction, TPACK has garnered substantial attention from researchers and practitioners alike. The framework's ability to address the complex interplay between technology, pedagogy, and content has led to a proliferation of studies exploring its applications across various educational contexts (Haryati et al., 2021; Karimi & Asadnia, 2022; Kusuma, 2022; Li & Tseng, 2022; Lisa et al., 2022; Muslimin et al., 2023; Yapıcı & Mirici, n.d.). In recent years, there has been a notable increase in research focused on TPACK, particularly in response to the global shift towards online and blended learning environments prompted by the COVID-19 pandemic. This surge in interest necessitates a systematic examination of the research trends in TPACK, especially in the post-pandemic era.

Bibliometric analysis offers a powerful tool for analyzing the development and dissemination of research within a particular field. By quantitatively assessing the literature, bibliometric analysis can reveal patterns, trends, and influential works that have shaped the trajectory of TPACK research (Jinyao & Bhattacharyya, 2022; Karakose et al., 2022; Librarian et al., 2021). In this study, a bibliometric approach is employed to map the evolution of TPACK research from 2020 to 2023, providing insights into the key areas of focus, the most prolific researchers and institutions, and the emerging themes that have defined this period.

The years 2020 to 2023 represent a critical period for educational research, marked by the widespread adoption of digital tools and platforms. During this time, the TPACK framework has been increasingly utilized to address the challenges of integrating technology into remote and hybrid learning environments. This study aims to uncover how research on TPACK has evolved in response to these challenges, identifying the most influential publications and the research collaborations that have driven advancements in the field.

Through this bibliometric analysis, we seek to highlight the global distribution of TPACK research, examining how different regions have contributed to the development of the framework. The analysis will also explore the thematic focus of recent studies, identifying the areas where TPACK has been most effectively applied and where further research is needed. By providing a comprehensive overview of TPACK research trends, this study aims to inform future research directions and support educators in leveraging the framework to enhance their teaching practices.

In conclusion, this bibliometric study offers a timely and in-depth exploration of TPACK research trends from 2020 to 2023. By mapping the evolution of the field during this pivotal period, we hope to contribute to a deeper understanding of how TPACK continues to shape the future of education in an increasingly digital world.

METHODS

This study employs a bibliometric approach to analyze research trends related to Technological Pedagogical Content Knowledge (TPACK) within the context of English Language Teaching (ELT) from 2020 to 2023. The primary data source is Google Scholar, with data collected using the *Publish or Perish* tool. The keyword "TPACK in ELT" was used to ensure the relevance of the search results to the research focus. A total of 770 papers were analyzed in this study, encompassing various types of publications related to the topic.

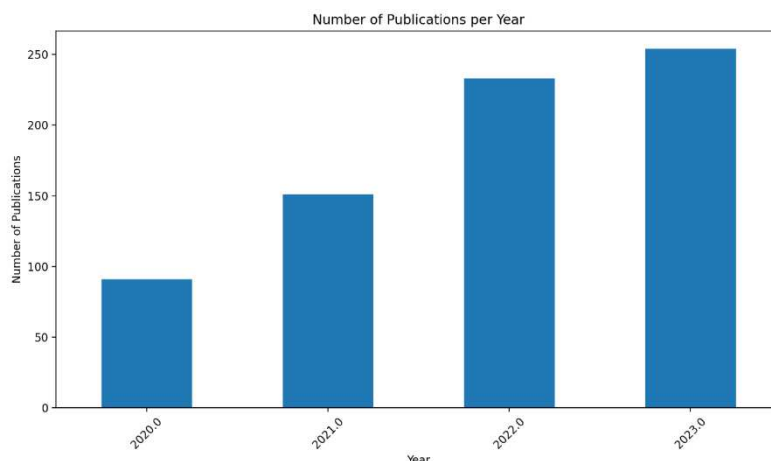
The bibliometric analysis covers several key aspects: the number of publications per year, citation counts, research methods used, and a co-occurrence analysis of keywords appearing in the literature. The number of publications and citations was analyzed to identify trends and the impact of TPACK research in ELT over the specified period. Additionally, the research methods employed in these studies were classified to understand the dominant methodological approaches and explore how TPACK research in ELT has evolved in terms of research design. The co-occurrence keywords analysis was conducted to identify key themes and the relationships between concepts that frequently appear together in the literature.

The analysis was conducted using bibliometric software to process and visualize the data. The findings of this analysis are expected to provide a comprehensive overview of how TPACK research in ELT has developed, including the identification of major trends, the most commonly used research methods, and the connections between key concepts related to TPACK. The results of this study will help identify focused research areas and opportunities

for further investigation, as well as offer insights for practitioners and academics in the ELT field to deepen their understanding of the application of TPACK in English language teaching.

RESULTS AND DISCUSSION

Results

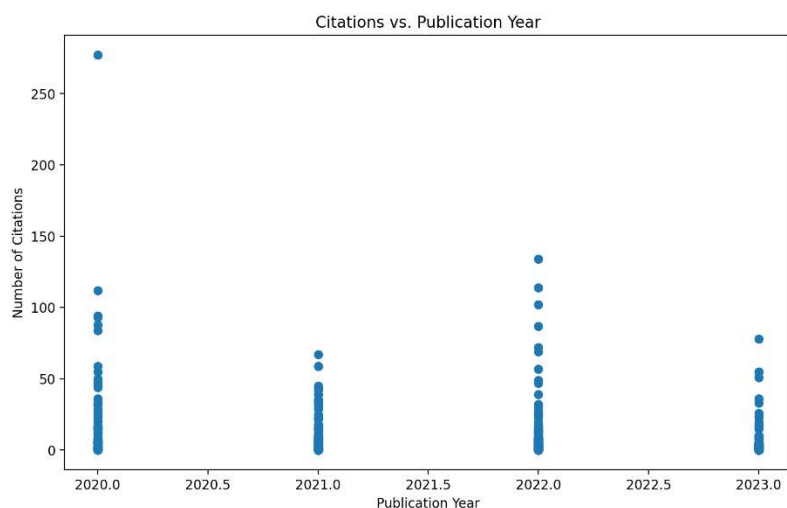


The research articles related to the use of Technological Pedagogical Content Knowledge (TPACK) in English Language Teaching (ELT) have shown a remarkable upward trend from 2020 to 2023. In 2020, there were 91 publications, reflecting an initial but significant interest in the application of TPACK within the ELT context. This number grew substantially in the following year, with 151 publications in 2021, likely driven by the increasing demand for technology integration in education due to the global shift towards remote learning. The momentum continued in 2022, with 233 publications, indicating a deepening engagement with TPACK as educators and researchers explored more nuanced applications of the framework in ELT. By 2023, the number of publications reached 254, demonstrating a sustained and growing interest in this area of study, as the role of TPACK in enhancing English language teaching has become increasingly recognized and valued.

Citations

Title	Authors	Year	Cites
Exploring the structural relationship among teachers' technostress, technological pedagogical content knowledge (TPACK), computer self-efficacy and school support	Y Dong, C Xu, CS Chai, X Zhai	2020	277
Factors influencing technology integration in an EFL context: investigating EFL teachers' attitudes, TPACK level, and educational climate	A Raygan, S Moradkhani	2022	134

Pre-service EFL teachers' readiness in computer-assisted language learning and teaching	M Park, JB Son	2022	114
EFL teachers' beliefs and practices about digital learning of English	A Nugroho, I Mutiaraningrum	2020	112
Ready for online? Exploring EFL teachers' ICT acceptance and ICT literacy during COVID-19 in mainland China	B Li	2022	102
Mathematics Teacher's Self-Efficacy of Technology Integration and Technological Pedagogical Content Knowledge.	NSA Bakar, SM Maat, R Rosli	2020	94
TEACHERS' ICT LITERACY AND ICT INTEGRATION IN ELT IN THE INDONESIAN HIGHER EDUCATION SETTING	GN Hafifah, GH Sulisty	2020	93
Relevansi kampus merdeka terhadap kompetensi guru era 4.0 dalam perspektif experiential learning theory	S Priatmoko, NI Dzakiyyah	2020	88
The impact of virtual exchange on TPACK and foreign language competence: Reviewing a large-scale implementation across 23 virtual exchanges	B Rienties, T Lewis, R O'Dowd, I Rets...	2022	87
ICT integration in English language teacher education: insights from Turkey, Portugal and Poland	A Aşık, S Köse, G Yangın Ekşi, G Seferoğlu...	2020	84



The data presented highlights key publications that have significantly contributed to the research on Technological Pedagogical Content Knowledge (TPACK) in the context of English Language Teaching (ELT) and beyond. The study by Dong et al. (2020), which explores the relationship between teachers' technostress, TPACK, computer self-efficacy, and school support, stands out with 277 citations, reflecting its influence in understanding the challenges

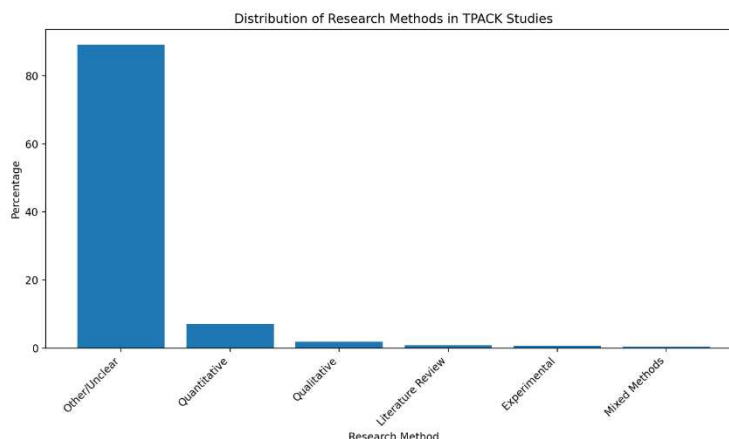
and supports for technology integration. Raygan and Moradkhani's (2022) investigation into the factors influencing technology integration in an EFL context, including teachers' attitudes, TPACK levels, and educational climate, follows with 134 citations, underscoring the importance of these factors in effective technology use. Other notable works include Park and Son's (2022) study on pre-service EFL teachers' readiness for computer-assisted language learning, and Nugroho and Mutiaraningrum's (2020) research on EFL teachers' beliefs and practices regarding digital learning, with 114 and 112 citations, respectively. These studies, along with others listed, indicate a growing body of research focusing on TPACK in ELT, with varying degrees of emphasis on teacher readiness, beliefs, self-efficacy, and the broader educational climate, each contributing valuable insights into the evolving landscape of language teaching in the digital age.

Source/ Publication Journal Title	Total
International Journal of ...	14
English Language Teaching	11
Journal of English Language Teaching	7
Sustainability	7
... : Journal of English Language Teaching	6
researchgate.net	6
... TPACK and CALL in English Language Teaching	6
Frontiers in Psychology	4
English Education Journal	4
Teaching English with Technology	4

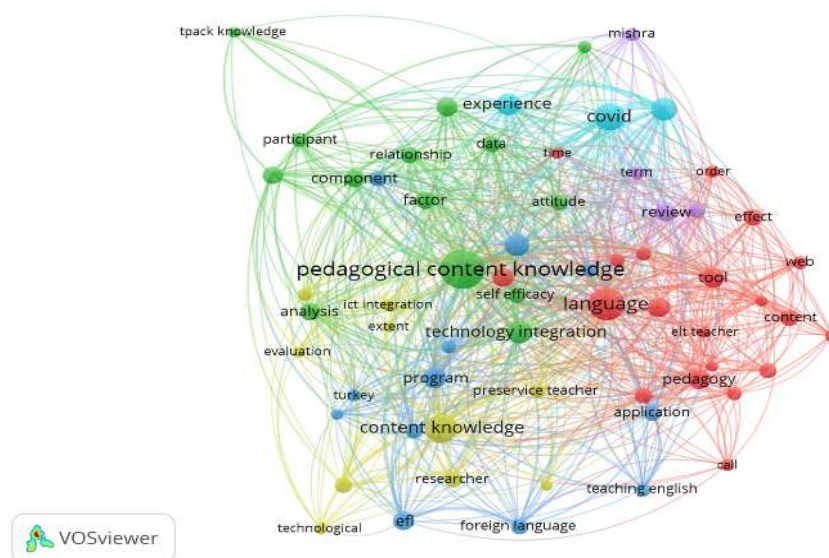
The data on the top 10 sources by the number of publications reveals the prominent platforms where research on Technological Pedagogical Content Knowledge (TPACK) in English Language Teaching (ELT) is disseminated. Leading the list is the *International Journal of...* with 14 publications, indicating its significant role in publishing TPACK-related research. *English Language Teaching* follows closely with 11 publications, showcasing its strong focus on integrating technology within ELT. Both the *Journal of English Language Teaching* and *Sustainability* have contributed 7 publications each, reflecting a blend of pedagogical focus and sustainability considerations in TPACK research. Other notable sources include *Journal of English Language Teaching* and *researchgate.net,* each with 6 publications, alongside specialized works such as those on TPACK and CALL in ELT. *Frontiers in Psychology,* *English Education Journal,* and *Teaching English with Technology* each

contributed 4 publications, highlighting their roles in exploring the psychological, educational, and technological aspects of TPACK within the field of ELT. This distribution underscores the diversity of sources that are advancing the conversation around TPACK in English language education.

Research Method used



The analysis of research methodologies in TPACK studies within English Language Teaching (ELT) reveals a significant gap in methodological clarity. A striking 89.22% of the abstracts reviewed did not clearly specify the research methods employed. Among the studies that did specify their methodology, quantitative methods were the most commonly used, accounting for 7.01% of the research. Qualitative methods were employed in 1.82% of the studies, while literature reviews made up 0.91%. Experimental methods were utilized in 0.65% of the studies, and mixed methods approaches were the least represented, appearing in just 0.39% of the research. This distribution highlights a predominance of quantitative approaches among those studies that do disclose their methods, but also underscores the need for clearer methodological reporting across the field.



The co-occurrence analysis of keywords in TPACK-related research within English Language Teaching (ELT) reveals several key themes and connections that shape the field. **"Pedagogical Content Knowledge"** emerges as a central and prominent keyword, underscoring its foundational importance in the literature. Closely linked to this is **"Technology Integration,"** highlighting the strong relationship between these two concepts as educators seek to merge content knowledge with technological tools. Keywords such as **"Language,"** **"Content,"** **"Teaching English,"** and **"ELT Teacher"** emphasize the focus on language education and the specific challenges of teaching English. The presence of **"COVID"** reflects the recent shifts in pedagogy due to the pandemic, indicating an adaptation in research to address these contemporary issues. The network also reveals distinct clusters: the green cluster centers on foundational concepts like **"Pedagogical Content Knowledge,"** while the blue cluster focuses on empirical and current issues such as **"COVID"** and **"Experience."** The red cluster is characterized by a focus on technology and language education, with terms like **"Language,"** **"Web,"** and **"ELT Teacher."** These clusters and connections illustrate the diverse yet interconnected themes within TPACK research in ELT, highlighting both traditional educational concerns and the evolving impact of technology and global challenges.

Discussion

The research findings underscore the dynamic and rapidly evolving nature of TPACK-related studies in the context of English Language Teaching (ELT) from 2020 to 2023. The steady increase in publications over these years reflects a growing interest and recognition of

the importance of integrating technological knowledge with pedagogical and content knowledge to enhance language teaching. This upward trend also mirrors the broader shifts in educational practices, especially as educators and institutions worldwide adapted to remote and hybrid learning environments due to the COVID-19 pandemic. The continuous growth in publications suggests that TPACK has become an increasingly vital framework for addressing the challenges and opportunities presented by technology in ELT.

The analysis of citations reveals that certain studies have significantly influenced the field, indicating key areas of focus within TPACK research in ELT. The high citation counts of works by Dong et al. (Dong et al., 2020) and Raygan and Moradkhani (Raygan & Moradkhani, 2022) highlight the critical role of understanding teachers' attitudes, self-efficacy, and the institutional climate in successful technology integration. These studies, along with others that explore teacher readiness and beliefs, underscore the necessity of addressing both psychological and contextual factors to fully realize the potential of TPACK in ELT. The diversity of cited works suggests that while there is a consensus on the importance of TPACK, there are various pathways through which it can be explored, each contributing uniquely to the broader discourse on technology-enhanced language teaching.

The analysis of publication sources further illustrates the varied platforms that have become central to disseminating TPACK research in ELT. The prominence of journals such as the **International Journal of...** and **English Language Teaching** indicates a strong focus on educational research, while the inclusion of sources like **Sustainability** and **Frontiers in Psychology** points to the interdisciplinary nature of TPACK studies. These journals serve as crucial venues for discussing the integration of technology in teaching, reflecting the multifaceted challenges and considerations in the field. The distribution of publications across different journals also suggests that TPACK research is not confined to traditional ELT platforms but spans across broader educational and psychological contexts.

The analysis of research methodologies reveals a significant concern regarding the lack of clarity in methodological reporting. The fact that 89.22% of studies did not clearly specify their research methods in abstract data. This gap underscores the need for more transparent and precise reporting to ensure the reliability and reproducibility of findings. Despite this, the predominance of quantitative methods among the studies that did disclose their methodology suggests that researchers are primarily focused on empirical investigations, possibly due to the need to measure the effectiveness of TPACK implementations in measurable terms.

The co-occurrence analysis of keywords provides valuable insights into the central themes and connections that define TPACK research in ELT. The prominence of "Pedagogical Content Knowledge" as a central keyword reaffirms its foundational role within the TPACK framework. The strong association with "Technology Integration" highlights the ongoing efforts to merge traditional pedagogical approaches with technological advancements. Furthermore, the emergence of keywords related to language education, such as "Language," "Content," and "ELT Teacher," emphasizes the specific challenges (Angraini et al., 2023) and opportunities of applying TPACK in the context of English language teaching (Syawallina & Suganda, 2023). The presence of "COVID" as a significant keyword reflects the adaptation of research to address the unprecedented shifts in teaching practices brought about by the pandemic.

Overall, these findings contribute to a deeper understanding of the current state of TPACK research in ELT. The increasing interest in this area, coupled with the identification of key influences and emerging themes, suggests that TPACK will continue to be a critical framework for future research. However, the identified gaps in methodological clarity highlight the need for more rigorous research designs and transparent reporting practices. As TPACK continues to evolve, it will be essential for researchers to address these challenges and build upon the existing body of knowledge to further enhance the integration of technology in language teaching.

CONCLUSION

The research findings highlight the growing significance of TPACK in English Language Teaching (ELT), reflecting an increased focus on integrating technology with pedagogical and content knowledge, particularly in response to the global shift towards remote and hybrid learning during the COVID-19 pandemic. Key studies have shaped the discourse, emphasizing the importance of teachers' attitudes, self-efficacy, and the broader institutional context in successful technology adoption. However, despite the rising interest, the analysis reveals a critical need for improved methodological clarity in TPACK research to ensure the reliability of findings. As TPACK research in ELT continues to expand, addressing these methodological gaps will be crucial for advancing the framework and its application in language education.

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