

A DECADE OF RESEARCH ON TECHNOLOGY-MEDIATED ENGLISH LANGUAGE PROFICIENCY ENHANCEMENT: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

Background and Purpose: This bibliometric analysis study provides a detailed analysis of the landscape of research on technology-mediated English language skills teaching and learning over the past decade. The goal is to shed light on the most popular subjects, prolific authors, publications, and countries involved. By examining 209 documents retrieved from the Scopus database from 2014-2023, this study aims to reveal significant trends and insights into the evolution of technology-mediated teaching and learning processes.

Methodology: The study utilises bibliometric analysis, with data collection conducted following the PRISMA guidelines. It employed tools such as VOSviewer, Excel, and Tableau. The research involves quantitative metrics to graphically represent publication trends, country contributions and collaborations, prolific authors, and recurring research themes.

Findings: The analysis shows a significant rise in technology-mediated English language teaching publications since 2021, led by the United States, China, and Malaysia. Key topics include e-learning, communication skills, computer-assisted teaching, pandemic's impact, speech recognition, and teaching, highlighting central themes and collaborative networks.

Contributions: It highlights critical trends and areas of focus in technology-mediated English language education. It underscores the importance of prioritising research on technological media in language education and suggests future research directions to enhance English language proficiency, particularly speaking skills.

Keywords: Bibliometric analysis, technology mediated in teaching and learning, English-speaking skills.

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1.0 INTRODUCTION

The use of technology in language education has become increasingly popular in recent years. Rajendran and Yunus (2021) stated that the 21st century requires people to be proficient in English to become global players, and one of the skills highlighted is speaking skills. Teaching and learning speaking skills through technology involves using digital tools and platforms to facilitate the development of oral communication skills. Amanda and Tambusai (2023) viewed it as one possible way to help students learn speaking skills practically and flexibly. Over the last three decades, much debate has been about using technology in language learning (Şahin Kızıl, 2017), especially in speaking skills. Emerging examples of technology-mediated teaching and learning include technology-supported language learning activities, such as task-based language teaching (TBLT), technology-mediated language learning, and experiential learning mediated through advanced information technologies (Mayer & Schwemmler, 2023).

This approach is proven to improve learners' speaking skills, as evidenced by research reporting improvements in learners' speaking skills after engaging in technology-mediated language learning activities (Chen, 2019). Another study evaluated how technology-mediated learning helps English language learners improve their speaking skills and found that technology-mediated language learning activities can effectively improve learners' speaking abilities (Iqra et al., 2023).

Despite increasing interest in technology-mediated teaching and learning of speaking skills, comprehensive bibliometric analysis research in this area is still lacking. Therefore, it is necessary to conduct a bibliometric analysis of technology-mediated English language skills teaching and learning research to identify trends, gaps, and future directions for the field. Thus, this work's principal goal is to do a bibliometric review of research on the application of technology to the instruction and acquisition of English language skills over the last decade. By charting publishing trends, country contributions and collaborations, prominent authors and journals, and the primary subjects of interest in a given field, this research hopes to aid in visualising the scientific landscape of this area. The specific research questions are as follows:

1. What technology-mediated trends in teaching and learning of speaking skills have been published over the last decade?
2. What is the country's contribution and collaboration in technology-mediated teaching and learning of speaking skills?
3. Which authors and journals have contributed the greatest to technology-mediated research in teaching and learning speaking skills?
4. What are the most common and recurring themes explored in studies focusing on technology-mediated speaking skills learning?

This research seeks to enhance current understanding by providing a thorough bibliometric examination of the use of technology in teaching and developing English-speaking skills. Several studies illustrate the application of bibliometric analysis in technology-mediated language learning. Hou and Zhonggen (2023) analyzed synchronous computer-mediated communication in language learning, revealing significant contributions from scholars in the United States and China. Their findings highlight the roles of intercultural competence, social presence, and corrective feedback. Shen and Ho (2020) explored technology-enhanced learning in higher education, noting a significant increase in publications. Rodriguez et al. (2019) and Jing et al. (2024) examined trends and hot topics in technology-supported learning environments, identifying core journals like *Interactive Learning Environments* and *Computers & Education*. Despite growing interest, there is a significant gap in comprehensive studies on the long-term impact of technology integration on English language skills, particularly speaking skills (Johnson, 2019). This literature review lays the foundation for our decade-long

bibliometric analysis, establishing context, identifying gaps, and acknowledging methodological advances to inform our exploration of this evolving field.

2.0 LITERATURE REVIEW

2.1 Technology Integration in Language Education

Technology incorporation in language education involves utilising technology as a means to enhance the teaching and learning of languages. Technology integration in language education has been proven to provide many benefits. According to Ritaningrum (2021), a technology integration study highlights the importance of technology integration in language education, including speaking skills. In addition, research by Izzah et al. (2014) found that technology integration in language education can be improved through a communicative approach, emphasising the use of language in real-life situations. This is also very useful for developing speaking skills. Apart from that, Cabrera et al. (2017) found that integrating technology into language education can develop novice teachers to increase their confidence in teaching digitally. Based on those studies, technological integration in language education can potentially improve language teaching and learning.

3.0 RESEARCH DESIGN

This research uses bibliometric analysis to trace developments in technology-mediated teaching and learning of speaking skills. The bibliometric analysis uses quantitative metrics to graphically analyse large numbers of documents published in a particular research field (Baker et al., 2020), including bibliographic aggregation, co-occurrence of keywords, co-authorship networks, and co-citations (Van Eck & Waltman, 2014). Bibliometric methods, which are increasingly used to assess research performance, can be used to quantitatively assess an unlimited number of publications while making claims about qualitative features (Wallin, 2005). The research technique part encompasses the process of selecting a database, establishing search criteria, collecting data, and employing data analysis tools.

Bibliometric analysis is essential for understanding trends and the scientific landscape within a field. According to Donthu et al. (2021), it deciphers large amounts of structured and unstructured data, mapping summaries of scientific knowledge and field evolution. This method helps build a solid foundation for developing meaningful fields, enabling students to gain a thorough understanding, discover knowledge gaps, acquire new ideas, and contribute to the field. Leydesdorff and Vaughan (2006) emphasized its importance in mapping intellectual structures. Waltman and Van Eck (2013) highlighted bibliometrics' role in discovering new research themes. Methodological advances in bibliometric analysis have offered new insights into research patterns and knowledge dissemination. Van Raan (2017) introduced "citation proximity analysis" for a nuanced understanding of a field's intellectual structure.

Researchers chose the Scopus database as the primary source for this research. This database offers a variety of functions, including source title, document type, author and affiliation, and keywords, among others, making it suitable for conducting bibliometric analysis (Sweileh et al., 2016). Since this research focuses on technology-mediated teaching and learning of speaking skills, bibliometric analysis based on the Scopus database is expected to produce reliable and valuable insights.

A thorough search query was established to investigate the topic of using technology to teach and master English-speaking skills. It has two keywords, "Technology-mediated in teaching and learning" and "speaking skills," and their synonyms. Finally, the search queries for "Technology-Mediated in Teaching and Learning" are ("Technology-mediated teaching" OR "Technology-mediated Language Learning (TMLL)" OR "Digital Language Learning" OR "Digital Education" OR "Technology Integration" OR "Multimedia Pedagogy" OR "E-

Learning" OR "Online English Instruction" OR "Computer-Assisted Language Learning (CALL)" OR "Mobile-Assisted Language Learning (MALL)" OR "Technology-mediated language learning" OR "Technology in Language Education" OR "Technology-Enhanced Learning" OR "Pedagogical Technology" OR "Digital Pedagogy" OR "Technological Advances in Language Education" OR "Technological Impact" OR "Multimedia Language Instruction" OR "Media-enhanced English Learning" OR "E-learning and speaking proficiency" OR "Language Learning Platforms" OR "Technological Advancements" OR "Technology Integration in Language Learning" OR "Social media for language learning" OR "EdTech (Educational Technology)" OR "Digital Literacy" OR "Blended Learning" OR "LMS (Learning Management System)" OR "Mobile Learning (M-Learning)" OR "Gamification" OR "Virtual Classroom" OR "Synchronous Learning" OR "Asynchronous Learning" OR "Augmented Reality (AR)" OR "Virtual Reality (VR)" OR "MOOCs (Massive Open Online Courses)" OR "Flipped classroom") Furthermore, to broaden the scope of the search and include all relevant publications, additional synonym expressions associated with Speaking skills context, including "Speaking Skills" OR "Oral Proficiency" OR "Speaking competence" OR "Speaking ability" OR "Speaking accuracy" OR "Speaking Fluency" OR "Oral proficiency" OR "Communication skills" OR "Speaking proficiency" OR "Speech production" OR "Spoken language" OR "Articulation skills" OR "Communicative competence" OR "Communicative competition" OR "Oral communication skill".

Data extraction was carried out on February 13, 2024. This research also used the guidelines set by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009), which is widely known among the academic community to ensure the accuracy and relevance of the data collected. A strict screening process is implemented following these guidelines. Figure 1 presents a visual representation of the sequential stages of collecting data for analysis.

In the first stage, data searches using keyword strings without filtering for years resulted in identifying up to 1730 publications based on the search strategy described in the previous section. In the next filtering stage, the search criteria were limited to documents published between 2014 and 2023. In addition, it was filtered again to only documents in the form of articles and English. As a result of this filtering process, a total of 1035 documents were removed from the data set. Furthermore, a comprehensive manual review was carried out on the remaining 695 documents to ensure the suitability of the documents to be analysed. This assessment entailed assessing the title and abstract to ascertain their pertinence to the topic of technology-facilitated instruction and acquisition of English-speaking abilities. As a result, 486 documents were excluded because they did not focus on the context of speaking skills. After the screening stage, 209 documents were determined to be relevant and selected for further analysis.

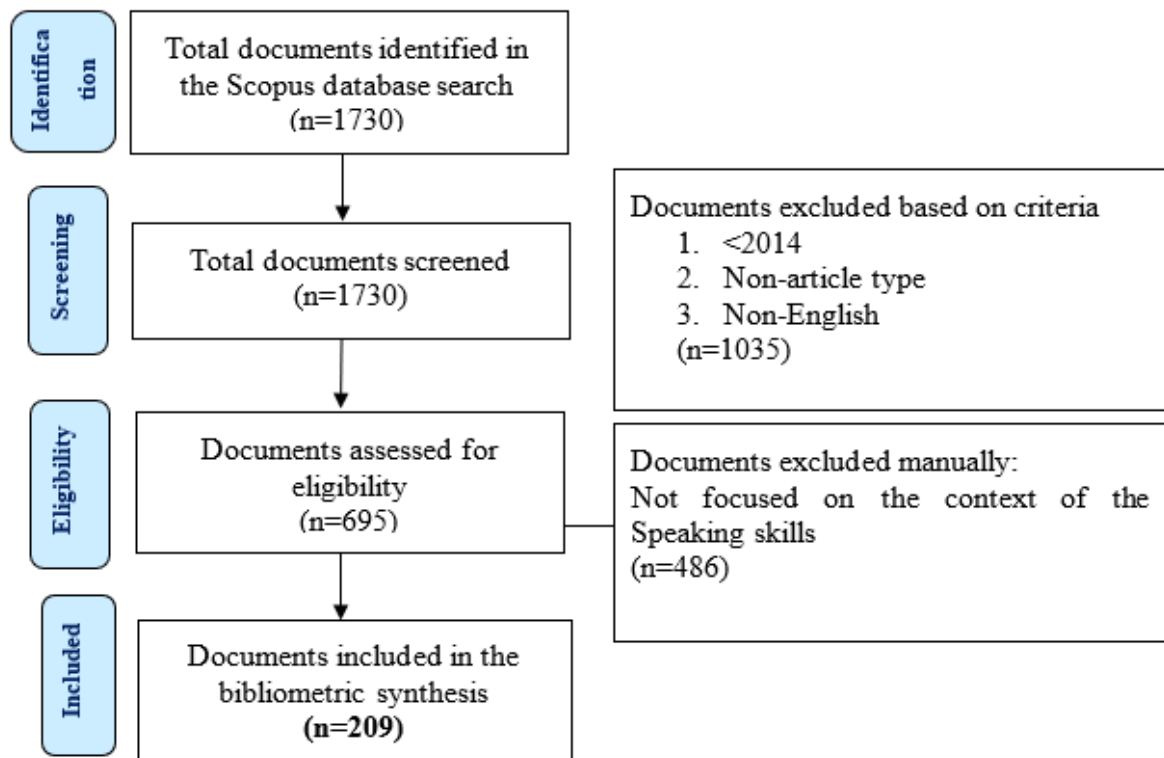


Figure 1: PRISMA flowchart of document identification

4.0 ANALYSIS

This research uses bibliometric analysis as a data analysis method to determine research performance in mediated technology in English language learning and teaching. This bibliometric analysis aims to provide a valuable understanding of publication trends, contributions, and collaborations by countries, key authors, journals, and essential topics in the field. The application used is VOSviewer, which is a computational software package recognised for its ability to build maps and visualise bibliometric networks based on co-occurrence matrices (Van Eck & Waltman, 2010). Tableau and Microsoft Excel were also used to display results. More specifically, publication trends related to this specific domain are explained using data taken from the Scopus database. To visually represent the annual number of publications, a graph was created using Microsoft Excel 2021.

Additionally, a world map was created using Tableau 2023.3 to capture the geographic distribution of publications. In addition, to visualise the collaborative network between countries, VOSviewer 1.6.20 software was used to create a network visualisation map. Moreover, using bibliometric data extracted from VOSviewer 1.6.20, Microsoft Excel 2021 compiled a list of the most prolific authors and journals. In addition, relevant information such as total citations, total publications, Sitescore 2023, h-index, and publisher are included in the analysis for a more comprehensive understanding. Finally, a network visualisation map of co-occurring keywords to identify the research focus was generated using VOSviewer 1.6.20. This analysis helps reveal the interconnections and relationships between keywords in research literature.

After this careful process, 74 keywords were identified from the initial set of 1315 while organising. The minimum occurrence of a keyword is 5. Table 1 presents the primary data from the collected data set, consisting of 209 documents from 138 sources published between 2014 and 2023. The analysis reveals that 676 authors, spread across 61 countries, have contributed to this research area under investigation. In addition, a total of 1315 different author keywords were identified.

Table 1: Data from the data set

Description of the Key Data	Results
Time	2014-2023
Total documents	209
Sources	138
Countries	61
Authors	676
Author keywords	1315

4.1 Technology-Mediated Research Publication Trends in Teaching and Learning in The Context of English-Speaking Skills

The performance of Technology-mediated research in teaching and learning in the context of English-speaking skills is revealed through an evaluation of the annual distribution of published documents. Figure 2 visually presents the results of publications, showing the increasing level of publication output from 2014 to 2023. A significant spike in publications was seen in 2021, with a total of 34; in 2022, it became 40, until the highest in 2023, with 52 publications. It should be emphasised that the number of publications in 2023 shows an increase of about 13 times compared to the number of publications in 2014, which shows a considerable trend in developing works on this topic over time.

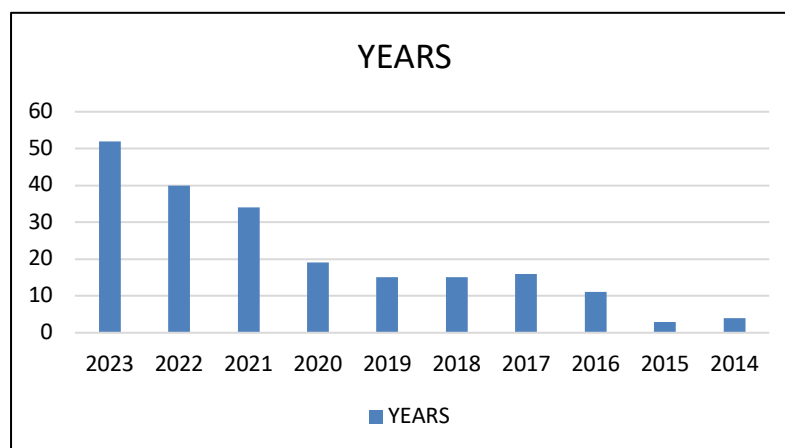


Figure 2: Publication trend between 2014-2023

4.2 Country Contribution and Collaboration

Tableau creates a geographic distribution of publications by country. The results show that a total of 61 countries have contributed to this area of research. The ten countries with the most publications in this research are the United States with 19 publications, then China with 18 publications, Malaysia with 16 publications, Indonesia with 13 publications, India with 11, the United Kingdom with 11, Germany with 10, The Russian Federation with 10, Taiwan 10, and Spain 9 publications. Figure 3 visually depicts these findings, clearly showing that a large

number of publications originate from Asian countries. Even so, the United States represents the European continent with the most publications.

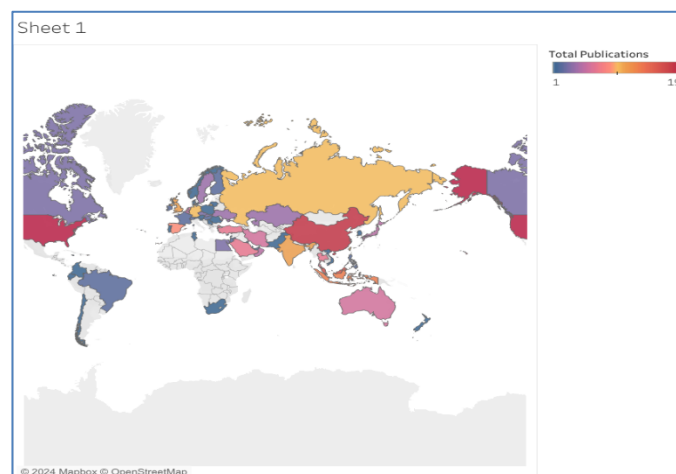


Figure 3: Geographical distribution of publications by country

The country collaboration network was generated using VOSviewer, where data collected from the export of Scopus documents to CSV shows 63 countries and 43 countries are not connected to other countries in terms of collaboration and are therefore not represented on the map. The VOSviewer application shows 12 clusters differentiated by colour, which shows significant international collaboration in technology-mediated research in teaching and learning in the context of English-speaking skills. The most extensive cluster, represented in red, includes three countries (namely China, Hong Kong, and India). The second cluster contains three countries (Malaysia, Oman, and Saudi Arabia). The third cluster contains two countries (Australia and Germany). The fifth cluster contains two countries (Taiwan and the United Kingdom). The sixth cluster contains two countries (Japan and the United States). The seventh to twelfth cluster each consists of one country, namely Indonesia, Iran, the Russian Federation, Spain, Thailand, and Turkey. 20 of the 63 countries are interconnected with the 19 total links. Based on the network visualisation in Vosviewer, China is the highest country in its collaboration on research on the topic of technology-mediated teaching and learning in the context of English-speaking skills. Moreover, In the overlay visualisation, China also appears to be a country that has recently produced publications on this topic.

4.3 Most Productive Authors and Journals

From 2013 to 2023, a total of 676 authors contributed to the research field of technology-mediated teaching and learning in the context of English-speaking skills. Based on the data presented in Table 2, there are ten authors with the highest total publications. Altogether, they produced two publications each on this topic. Yunus, MM emerged as the most productive author with 232 publications. Then there were Shorey, Shefaly, Shadiev, Rustam, Lahiri, Utama, Ang, and Neo Kim Emily, who were listed as prolific writers affiliated with the Asian continent.

Concerning citation metrics, Bouchard Stéphane garnered the highest number of citations among the ten authors, with a total of 5,941 citations. He was also the author who produced the earliest publications from 1933 to 2023.

Table 2: Top ten productive authors

Author's Name	ID	Year of first publications	Affiliation	Country	TP	TC	<i>h</i>
Yunus, MM	57218893299	2007	Universitas Kebangsaan Malaysia , Bangi	Malaysia	232	2590	21
Shorey, Shefaly Y.	55913700600	2014	NUS Yong Loo Lin	Singapore	212	4002	34
Bouchard, Stéphane	7006810892	1933	Université du Québec en Outaouais , Gatineau	Kanada	207	5.941	41
Shadiev, Rustam	24825659700	2008	Universitas Zhejiang, Hangzhou	China	150	2323	28
Lahiri, Uttama	35119157400	2005	Institut Teknologi India Gandhinagar	India	92	1164	17
Ang, Neo Kim Emily	23099412200	2007	National University Health System	Singapore	83	1994	27
Laborda, Jesús García	57223272843	2007	Universidad de Alcalá	Spanyol	60	327	9
Morsomme, Dominique	19035550000	1993	Université de Liège , Liege	Belgia	53	701	15
Hussin, Supyan	36761044000	2010	Universitas Kebangsaan Malaysia	Malaysia	43	350	10
Peñalver, Elena Alcalde	57160934600	2014	Universidad de Alcalá	Spanyol	37	57	4

Note: TP = Total Publications, TC = Total Citations, *h* = *h* index

Table 3 presents the top 10 most productive journals from a total of 138 journals analysed. The journal with the highest publications is the Sustainability (Switzerland) journal, with a total of 13,531 publications in 2023, followed by the Education Sciences journal and the Education and Information Technologies journal. All journals that appear in Table 3 are journals that are actively producing in 2023, and the results of analysis on the Scopus database show that these ten journals produced more than three special publications on the topic of Technology-mediated teaching and learning in the context of English-speaking skills.

Table 3: Top ten productive journals

Rank	Journal	TP (%)	TC	CiteScore 2023	The most cited article(references)	Times Cited
1	Sustainability (Switzerland)	13531	370077	6.8	N/A	N/A
2	Education Sciences	1251	15418	4.6	What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature	146
3	Education and Information Technologies	1187	17007	9.6	Interacting with educational chatbots: A systematic review	105
4	BMC Medical Education	989	14145	4.8	Revolutionising healthcare: the role of artificial intelligence in clinical practice	13
5	World Journal of English Language	395	319	0.5	Attachment Anxiety and Covert Narcissistic Pangs as Reflected in Tennessee William's The Glass Menagerie	3
6	International Journal of Learning, Teaching and Educational Research	334	2193	2.1	Embedding Sustainable Development Goals to Support Curriculum Merdeka Using Projects in Biotechnology	5
7	International Journal of Emerging Technologies in Learning	289	9056	5.0	Enhancement of Online Education in Engineering College Based on Mobile Wireless Communication Networks and IOT	38
8	International Journal of Information and Education Technology	242	1821	2.7	Applying Gamification Technique and Virtual Reality for Prehistoric Learning toward the Metaverse	8
9	International Journal of Instruction	183	4109	4.3	The Impact of Inquiry Collaboration Project-Based Learning Model of Indonesian Language Course Achievement	5
10	Computers and Education	163	20040	26.5	Effects of artificial Intelligence-Enabled personalised recommendations on learners' learning engagement, motivation, and outcomes in a flipped classroom	43

Note: TP = Total Publications, TC = Total Citations.

4.4 Key Topics of Interest

Keyword analysis is a valuable tool for researchers who wish to identify emerging trends in a particular scientific field (Guo et al., 2016). In this study, author co-occurrence keywords were used as the primary unit of analysis in the bibliometric investigation, with VOSviewer used to identify emerging areas of research interest. Of the total of 1315 keywords analysed, 74 keywords appeared to meet the specified inclusion threshold, with a minimum of five occurrences. However, 6 of them were excluded from the list analysed because they did not match the topic. As seen in Figure 5. Based on the size of the nodes, the top 10 keywords most frequently used in technology-mediated learning research in the context of English language skills were identified. The most prominent keywords include "e-learning" with 58 occurrences, "students" with 33 occurrences, "people and humans" with 32 and 31 occurrences, "Teaching" with 29 occurrences, "communication" with 28 occurrences, "skills communicate" with 27 incidents, "Interpersonal communication" with 22 incidents, "blended-learning" with 22 incidents, and "Virtual reality" with 19 incidents. These findings suggest that e-learning, communication, and teaching are key focus areas in technology-mediated research in the context of English language skills.

The identified set of keywords was systematically categorised into three different groups represented by different colours, each representing a specific research topic. The largest cluster, depicted in red, includes 41 keywords, including "e-learning", "communication skills", "speaking skills", "virtual reality", etc. This highlights the central theme of this research as technology-mediated effectiveness in teaching and learning. The green cluster, consisting of 20 keywords such as "curriculum," "people," and "problem-based learning," centres on the relationship of strategies and objects to technology-mediated teaching and learning. The blue cluster, with seven keywords including "Teaching", "students", and "education", is the link between the teaching object and the teaching media. The keywords identified recently by research are "artificial intelligence", "gamification", "augmented reality", and "mobile learning".

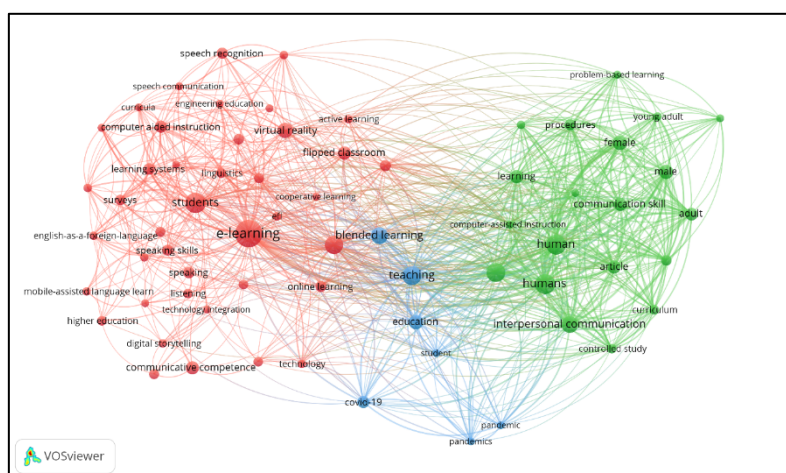


Figure 4: Co-occurrence network of author keywords (occurrence threshold ≥ 5)

5.0 DISCUSSION

5.1 Trends in Technology-Mediated in Teaching and Learning Research Publications in English-Speaking Skills Contexts

In terms of publication pathways, the findings of this research show a continuous and substantial increase in the number of documents related to technology-mediated teaching and learning in the context of English-speaking skills between 2021 and 2023. This observation is in line with previous research showing increasing academic interest in the integration of technology-based learning in English education (Hariadi & Simanjutak, 2020). The recent surge in the application of technology in teaching and learning speaking skills can be attributed to rapid technological advances. Nevertheless, the primary factor driving this significant rise since 2021 could be attributed to the aftermath of the COVID-19 pandemic, which prompted the extensive adoption of digital transformation measures throughout the crisis. It is recognised that technology has the potential to revolutionise traditional approaches to English language teaching and learning. It is possible that the trend of publications about technology as a language learning medium will increase every year, considering that technology in the current era is increasingly sophisticated and diverse.

5.2 Country Contributions and Collaborations

The results of this research show that the United States represents the American continent with the most publications. Apart from that, China, Malaysia, and Indonesia, as three Asian countries, have made significant contributions and collaborations in the field of technology-mediated research in teaching and learning, especially in the context of speaking skills. These

findings are consistent with the statements of Rahim and Sandaran (2021), who highlight the increasing importance of technology in Asian countries and its impact on English language teaching and learning. Additionally, the findings of this research reveal that academics from Asian countries demonstrate a higher level of commitment towards exchanging ideas and sharing best practices regarding technological advancements, especially amidst the ongoing global pandemic. These results are in line with previous research conducted by Hwang and Fu (2019), which supports the idea that scholars from Asia show a higher level of interest in technology as a learning medium compared to their counterparts from other regions. Therefore, it can be said that fostering international collaboration and encouraging knowledge exchange among Asian scholars will make a significant contribution to technological progress and development on a global scale.

5.3 Most Productive Authors and Journals

Regarding authors who have demonstrated extraordinary productivity, it is worth highlighting that 6 of the 10 authors with the highest levels of journal production are affiliated with academics on the Asian continent, like Yunus, MM, who comes from Malaysia, and Shorey, Shefaly Y. from Singapore. Moreover, their publications have garnered a considerable number of citations in the scientific community. These results underline the outstanding contribution and impact of Asian scholars in the field of technology as a learning medium, especially in the context of English-speaking skills. In addition, the results obtained from the bibliometric analysis show that *Sustainability (Switzerland)* and *Education Sciences* are the most productive journals in the field of technology-mediated research in teaching and learning in the context of English-speaking skills. These findings indicate that these publications have acknowledged the significance of particular research areas and have provided a venue for scholars to publish their scholarly contributions. Additionally, it is essential to highlight that most of the leading journals identified in this study have total publications of over a thousand in just 2023 and total citations in the tens of thousands. This shows that these journals have a significant influence on the work of writers from all over the world on various topics, specifically technology in English language learning.

5.4 Key Topics of Interest

The current investigation used keyword co-occurrence analysis to distinguish the main research themes prevalent in the e-learning research domain in the EFL context from 2014 to 2023. Through this analysis, six main topics of interest emerged, namely "e-learning", "communication skills", "computer-aided instruction", "pandemic", "Speech recognition" and "teaching." These findings show that the themes of "e-learning", "communication skills", and "teaching", especially in the pandemic era, continue to receive great scientific attention both in the broader field of e-learning research and especially in the context of technology as a medium for learning speaking skills. English. Several studies have focused on evaluating the effectiveness of new technological tools used in teaching and learning English-speaking skills. Other important research areas are cooperative learning, problem-based learning, and blended learning, and the flipped classroom has emerged as a strategy that is in line with valuable technological media such as gamification, artificial intelligence, virtual reality, augmented reality, digital storytelling, etc. facilitating more straightforward access to learning English-speaking skills. Speaking skills encourage creative learning, especially in the EFL area, to take advantage of emerging technologies. The COVID-19 pandemic has undeniably presented new problems to education worldwide. They were starting with online learning, which then requires all educational elements, including teachers and students, to utilise technology so that learning continues even remotely. This fact has received a lot of attention in the academic literature,

where academics have been involved in extensive discussions to gain broader insight into the integration of technology as a learning medium.

5.5 Discussion of Related Works

This bibliometric study provides a comprehensive overview of the research landscape regarding technology-mediated teaching and learning in the context of English-speaking skills, offering a more comprehensive perspective than previous review studies. Previous research also exists on bibliometric analysis of ten years of e-learning focused on EFL (Feifei Chen, Zhejiang Yuexiu University, China). And there are many other studies on technology-mediated language learning. Although previous research has provided valuable insights, its scope is still limited, resulting in a fragmented understanding of technology-mediated teaching and learning that focuses on speaking skills. In contrast, this bibliometric analysis not only covers these topics but also offers a broader perspective on research trends in this field. In addition, many studies have used quantitative methods to explore technology as a learning and teaching medium in various educational fields, such as health sciences education, higher education during the COVID-19 pandemic, and the intersection between technology as a learning medium. Based on the initial search database, which has focused on the search string, there are still many other academic fields regarding communication skills using technological media. Still, they do not focus on English-speaking skills. Only a few specifically focus on the context of English-speaking skills. This research aims to address the existing gap by offering a comprehensive analysis of the field. It covers various aspects such as publication patterns, country contributions and partnerships, active authors and journals, and significant subjects of interest. This study serves as a valuable resource for newcomers who wish to conduct research in this field. The results of this study have important consequences for different individuals or groups involved in the field of language instruction, especially English-speaking skills, including practitioners, researchers, teachers, and students. For researchers, it is crucial to continue to carry out in-depth empirical investigations in various research fields related to technology-mediated teaching and learning. This includes examining the specific effectiveness of technological media and exploring new technological challenges and opportunities, including exploring emerging themes to broaden the scope of the research. By using more effective technological media and conducting further research, the field of English-speaking skills can improve quality language education outcomes.

5.6 Limitation

Although this research method was carried out very carefully and used all quantitative analysis, several problems need to be considered. One of the limitations is related to the choice of the Scopus database as the only data source. Although Scopus is considered the largest and most diverse database with broad document coverage across various disciplines, certain vital documents may be excluded, which could influence the findings. Another limitation concerns the criteria used to collect these documents. This research is limited to articles that have undergone peer review and only those in English. As a result, excellent conference papers, book chapters, or articles in languages other than English that could provide important insights into research trends and the boundaries of research fields on this topic may have been overlooked in the analysed references.

6.0 CONCLUSION

Through bibliometric analysis of 209 documents taken from the Scopus database from 2014 to 2023, this research offers a comprehensive overview of technology-mediated teaching and learning research on English-speaking skills. The main findings of this investigation are

summarised as follows. First of all, over the last decade, a consistent level of publication output has been observed in the field of technology-mediated teaching and learning of English-speaking skills. Notably, there was a significant increase in the number of publications from 2021 to 2023, indicating a substantial increase in research activity over the past three years post-pandemic. Additionally, the United States, China, and Malaysia have emerged as prominent contributors and collaborators in this field, indicating significant engagement and partnerships in conducting research in this area.

Additionally, among the identified authors, Shorey, Shefaly, Bouchard, Stéphane, Shadiev, Rustam, Lahiri, Uttama, Ang, and Neo stand out as the most prolific contributors to this field. Regarding leading journals, the Sustainability (Switzerland) journal, the Education Sciences journal, and the Education and Information Technologies journal have been identified as the most productive journals in the domain. Finally, co-occurrence keyword analysis revealed six main themes, namely "e-learning", "communication skills", "computer-aided instruction", "pandemic", "Speech recognition" and "teaching".

Apart from contributing to general knowledge about hotspots and limitations of literature in the landscape of Technology-mediated teaching and learning on English-speaking skills, this research also brings valuable implications for practitioners, researchers, teachers, and students to give more importance to this field. To advance future research in the context of English-speaking skills, it is recommended to study the specific aspects of technology as a learning medium more deeply. This includes examining the specific effectiveness of technological media and exploring the challenges and opportunities of new technologies, including exploring emerging themes to broaden the scope of the research. All language education stakeholders need to collaborate to optimise technology as a learning medium, especially in learning English-speaking skills from various interdisciplinary fields.

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