



Exploring Global Research Trends on the Integration of Information Technology in Pragmatic Studies: A Bibliometric Analysis

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ABSTRACT

This study aims to explore global research trends on information technology integration in pragmatics studies through a bibliometric approach. Data were collected from the Scopus database over the past decade (2015–2024), resulting in 30 documents being analyzed. The analysis included document distribution based on publication type, institutional affiliation, author's country of origin, and keyword mapping using VOSviewer software. The analysis results show that most publications come from the United States, followed by the Russian Federation and the United Kingdom. The most productive institutions are RUDN University and Curtin University. The most dominant document type is scientific journal articles. Based on keyword co-occurrence analysis, three main clusters were identified: (1) technology integration approaches and processes, (2) evidence-based studies in educational and language contexts, and (3) communication applications and learning effectiveness. These findings provide a comprehensive overview of the research landscape in information technology integration in pragmatics and can serve as a strategic reference for academics and practitioners in designing more effective language learning innovations in the digital era.

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1. INTRODUCTION

Pragmatics is a branch of linguistics that studies the use of language in social contexts and how speakers and listeners produce and understand meaning based on communication situations (Feruzi, 2024). In linguistics, pragmatics is defined as the conditions that determine whether language use in communication is appropriate (Karthik, 2013). Pragmatics is essential for understanding human language behavior logically and contextually (Feruzi, 2024). Furthermore, pragmatics also encompasses the study of politeness, namely language strategies for achieving social goals and maintaining relationships between speakers. Pragmatics focuses on how speakers and listeners use language effectively in real-life communication, encompassing aspects such as speech acts, implicatures, presuppositions, and the principle of cooperative conversation (Suraganova & Mamirbaeva, 2024; Lubis et al., 2025).

In recent decades, developments in Information Technology (IT) have significantly influenced various disciplines, including linguistics. The integration of IT into pragmatic studies has opened up new possibilities, such as digital corpus-based interaction analysis, the study of communication in social media, and the use of artificial intelligence to detect pragmatic nuances in speech. Global trends indicate increasing interest among researchers in interdisciplinary topics, including the integration of IT and pragmatics (Taguchi, 2011). This phenomenon is reflected in the growth of research on technology-based communication, such as computer-mediated communication (CMC), digital discourse, and the use of text analysis software in pragmatic studies (Walther, 2012). However, few studies have systematically mapped the direction, patterns, and collaboration of research in this field globally over a specific timeframe.

Several previous studies have addressed bibliometric aspects in various fields, including linguistics and IT, as shown in **Table 1**. Most bibliometric research still focuses on education, technology, Islam, sports, and language learning in general. Some have examined topics such as technology integration in Japanese language education, the use of artificial intelligence in language learning, and trends in chatbot use in education. However, no research has specifically mapped how information technology is integrated conceptually and methodologically into the study of pragmatics as a linguistic field.

The emerging research gap is the absence of bibliometric studies that specifically examine the intersection of information technology and pragmatics, both in terms of research themes, methods used, author collaborations, and visual maps of the topic's development. This is crucial because pragmatics has a complex social context dimension, and the use of technology (such as AI, social media, chatbots, and other digital systems) has the potential to change how meaning is produced and interpreted in communication. This lack of research demonstrates the urgency of the need for a comprehensive mapping of trends, collaborations, and directions for research development on the integration of information technology in pragmatics studies globally, particularly in the last decade. This mapping is expected to enrich the cross-disciplinary scientific treasury and provide a strategic reference for new researchers in determining the direction of pragmatics research that is relevant to current technological developments.

Based on this background, this study aims to explore global trends in research integrating information technology into pragmatics studies during the period 2015 to 2024. The study was conducted using a bibliometric approach using data from the Scopus database, which was then analyzed using VOSviewer software to identify keyword collaboration patterns, keyword frequency of occurrence, and thematic visualization of dominant topics. The novelty

of this study lies in the interdisciplinary focus between information technology and pragmatics, which has not been widely studied in previous bibliometric studies. In addition, this study provides methodological and thematic contributions that can be a foundation for the development of pragmatics research in the increasingly dynamic and digitized digital era.

Table 1. Previous research on bibliometric analysis in various fields of science, including linguistics and information technology.

No.	Title	References
1	Ecoenzymes Production for Environmental Conservation: Techno-Economic and Bibliometric Analysis	Sesrita <i>et al.</i> (2025)
2	Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer	Al Husaeni, Nandiyanto & Maryanti (2023)
3	Multimodal Literacy in English Learning: A Bibliometric Analysis	Christian, Rohmah & Jalaluddin (2024)
4	Literature review and bibliometric mapping analysis: Philosophy of science and technology education	Al Husaeni & Munir (2023)
5	Computational Bibliometric Analysis: Can Digital Transformation Improve the Quality of Islamic Learning?	Al Husaeni & Rahmat (2023)
6	Conceptual Understanding and Sustainability Awareness through AI and Digital Learning	Fiandini, Nandiyanto & Kurniawan (2023)
7	Computational bibliometric analysis on publication of techno-economic education	Ragadhita & Nandiyanto (2022)
8	Utilization of AI Technology in Language Learning	Lubis <i>et al.</i> (2024)
9	What Evidence Supports the Advancement of Language Learning Through Digital Innovation?	Al Husaeni & Haristiani (2025)
10	Sustainable development goals (SDGs) in engineering education: Bibliometric insights	Ragadhita <i>et al.</i> (2026)
11	Effectiveness of Using AR-Based PECS in Communication Skills of Autistic Students	Munir <i>et al.</i> (2025)
12	Trends and Impacts of AI in Developing Computational Thinking Skills	Al Husaeni <i>et al.</i> (2025)
13	Analisis Trend Penelitian Penggunaan Algoritma Penjadwalan	Al Husaeni & Kusnendar (2025)
14	AI Chatbots in Language Education: A Bibliometric Analysis	Liu, Lin & Yu (2024)
15	Application of AI Chatbots in Language Learning Contexts	Gu & Yu (2025)
16	Bibliometric Mapping of Global Research Trends on Technology Integration in Japanese Language Education	Al Husaeni & Haristiani (2024)
17	The research trend of statistical significance test: Bibliometric analysis	Al Husaeni <i>et al.</i> (2024)
18	Explore Research Trends in Hydrology Content Using AI Data	Rochman <i>et al.</i> (2024)
19	Bibliometric analysis of research development in sports science	Al Husaeni (2023)
20	Computational bibliometric analysis of research on science and Islam with VOSviewer	Al Husaeni & Al Husaeni (2022)

2. THEORETICAL FRAMEWORK

2.1. Pragmatics

Pragmatics is a branch of linguistics that studies the relationship between language and the context in which it is used ([Feruza, 2024](#)). In general, pragmatics examines how language meaning is formed, understood, and interpreted by language users based on the

communication situations that surround them (Karthik, 2013). Pragmatics is also defined as the study of the relationship between language and context, as grammatically structured within the language itself (ALSaadi, 2024). Pragmatics focuses on meaning in speech situations and social actions. In a more operational definition, pragmatics is the study of the ability of language users to adapt their utterances to the context so that their communication is appropriate and effective. Therefore, important aspects in the study of pragmatics include the speaker, the interlocutor, the social context, and the purpose of communication (Feruza, 2024; Karthik, 2013; ALSaadi, 2024).

Pragmatics also fills the gaps left unexplained by syntax and semantics. While syntax primarily examines structure and semantics addresses literal meaning, pragmatics explains the meaning of utterances based on the context in which they are used (Ali, 2021). This means that a text or utterance lacks complete meaning without its context. For example, a sign reading "CASHIER" posted on a wall may be meaningless, but the same sign placed on a counter in a shop would convey the meaning of a payment point due to the clear social and physical context. Pragmatics also examines how utterances are used as social acts, influenced by conventions and norms within society (Usmani & Almashham, 2024; Kecskes, 2010; Aijmer & Andersen, 2011). Social context (solidarity) and societal context (power) are two important frameworks that determine the interpretation of utterances in interactions. In this context, language performance is viewed not merely as a linguistic structure, but as part of dynamic social behavior.

In applied linguistics, pragmatic analysis is a crucial tool for understanding aspects of meaning that are not addressed by syntactic or semantic analysis alone. By incorporating social and cultural context, pragmatic analysis enables researchers to uncover implicit meanings, communication strategies, and social relationships reflected in language. Therefore, in a research context, a pragmatic approach is highly relevant for analyzing meaning in speech, both spoken and written, more comprehensively and contextually.

2.2. Information Technology

IT is the technology used to manage data and produce useful information through various processes such as processing, storing, organizing, and disseminating it. The information produced is strategic because it is relevant, accurate, and timely, allowing it to be utilized in various areas of life, from personal needs to business to government (Gupta, 2013; Zen et al., 2023; Touriano et al., 2023).

IT encompasses not only computer technology but also network systems that connect various devices and telecommunications technologies that enable global data distribution (Alenoghena et al., 2023). IT plays a major role in providing access to important information in various aspects of life, such as health, education, recreation, economics, and even spirituality. With the existence of IT, geographical and social boundaries in the exchange of information are increasingly blurred because collaboration and communication can take place without the constraints of space and time. The development of IT has given rise to the concept of electronic life or e-life, as seen in the many new digital-based terms such as e-commerce, e-government, e-learning, e-library, and others. This shows that human life is now increasingly digitalized, where almost all activities can be carried out through electronic systems connected in real time.

IT generally consists of three main components (Yusrin & Zen, 2024; Hisayat et al., 2022; Halim & Al Amin, 2021), namely:

- (i) Hardware, which includes all physical components of the system such as the monitor, keyboard, CPU, printer, and network devices.

- (ii) Software, which consists of the operating system, ready-to-use applications, and programming languages.
- (iii) Brainware, which is the user of technology who plays a vital role in designing, developing, and operating information systems. These human roles include systems analysts, programmers, operators, technicians, and end users.

The role of IT in modern life is vast. IT can replace manual human tasks through automation, strengthen human roles by providing information to support decision-making, and reconstruct work processes to be more efficient. In a social and cultural context, IT has changed the way humans communicate, think, and act, including in the use of language. In the field of language studies, particularly pragmatics, IT has opened up new opportunities to examine the forms and meanings of communication in digital environments. This development highlights the importance of understanding IT as a foundation for studying language interactions that now occur in dynamic and contextual digital spaces.

2.3. Bibliometric Analysis

Bibliometric analysis is a quantitative method used to evaluate, map, and measure the development of a scientific field based on scientific publication data (Al Husaeni & Nandiyanto, 2022). This method involves statistical and mathematical techniques to identify publication patterns, citation frequencies, author collaborations, and keyword trends in academic literature (Fiandini & Nandiyanto, 2024). Bibliometrics plays a crucial role in describing the dynamics of a scientific discipline at a macro level, including assessing the extent to which a topic experiences scientific growth, shifts, and dissemination (Verbek et al., 2002; Zupic & Cater, 2015). Bibliometrics are not only quantitative but can also be explained qualitatively. Bibliometrics allow for the visualization of relationships between topics or scientific actors, thus providing a picture of the intellectual structure of a field. The reliability of this analysis is greatly influenced by the selection of representative and valid databases, such as Scopus, known as a highly reputable citation and abstract index database developed by Elsevier.

Commonly used bibliometric indicators include the number of publications, the number of citations, the h-index, co-authorship, co-citation, and keyword co-occurrence (Hassa & Duarte, 2024; Qiu et al., 2014). Using software like VOSviewer, this data can be visualized to understand collaboration patterns, topic concentration, and the growth dynamics of a research theme (Nursaniah & Nandiyanto, 2023; Hofifah & Nandiyanto, 2024; Gunawan et al., 2022). Bibliometrics is particularly well-suited to large datasets or large-scale research aggregations.

In the context of education and linguistics, bibliometric analysis has been used to identify trends such as e-learning, collaborative learning, media utilization, and smart technologies in teaching. However, bibliometrics also has limitations, such as language and regional biases, and the dominance of quantitative data that does not necessarily represent the full quality of research. Therefore, this approach needs to be complemented by a critical understanding of the data context and a combination of quantitative and qualitative metrics to obtain a comprehensive analysis. Considering these strengths and limitations, bibliometrics remains a powerful and relevant method for mapping knowledge structures, evaluating research directions, and identifying development opportunities in specific fields of study.

3. METHOD

This study used a bibliometric approach to explore global trends in research integrating IT into pragmatics studies over the past decade (2015–2024). The main objective of this

approach is to map the scientific structure, author collaboration, keyword frequency, and thematic developments in the interdisciplinary field of IT and pragmatics. The primary data source used in this study was the Scopus database, as it is known as one of the most comprehensive and reputable bibliographic databases in the academic world. Scopus covers various types of publications such as scientific journals, conference proceedings, and books; thus, it is considered relevant and adequate for the scope of this study. Detailed information regarding the use of bibliometrics is explained elsewhere (Rochman et al., 2024; Al Husaeni and Nandiyanto, 2022; Al Husaeni and Al Husaeni, 2022).

The search was conducted using the keywords "Information Technology" AND "Pragmatic" AND "Language," with no document type restrictions, but limited to the period 2015 to 2024 to focus on research developments over the past decade. The initial search yielded 34 documents, and after a selection process based on topic and methodology suitability, 30 documents were selected for further analysis.

Bibliographic data from the search results were then exported in CSV format from Scopus. Next, data cleaning processes were performed, including removing duplicates, aligning author names, and normalizing terms. For data visualization and mapping purposes, VOSviewer software was used to generate network maps. VOSviewer was chosen for its superior visualization capabilities, particularly in depicting structural and temporal patterns within a scientific field. Furthermore, Microsoft Excel was used to perform simple descriptive analyses, such as trends in the number of publications per year and the frequency of terminology, as well as to ensure data validity.

4. RESULTS AND DISCUSSION

4.1. Publication Distribution by Year

Figure 1 shows the development of the number of publications discussing the integration of information technology in pragmatic studies over the past decade (2015–2024). Overall, the publication trend fluctuates without a consistent upward trend from year to year. The peak of publications occurred in 2021 with eight papers, indicating increased research interest in this topic during that period. Conversely, 2023 saw no relevant publications in the dataset, indicating a potential decline in attention or shift in research focus.

The surge in 2021 can be attributed to the accelerated adoption of digital technology in education due to the COVID-19 pandemic. The drastic shift from face-to-face to online learning has sparked numerous studies on the effectiveness and integration of technology in language learning contexts, including pragmatics. This aligns with the previous findings (Liu et al., 2012), who demonstrated that technology-based learning environments create unique experiences, integrating the physical and psychosocial dimensions of education. The fluctuation in publications can also be explained by the complexity of the topic of pragmatics itself, which, according to the literature (Taguchi, 2011), requires a contextual and interactive approach. As digital learning media evolve, particularly with the advent of AI and online platforms, pragmatics learning has begun to receive renewed attention, particularly in exploring aspects of cross-cultural communication and language use in real-world contexts. However, the sharp decline from 2021 to 2020 (with only two publications) indicates a research hiatus, possibly due to uncertainty and initial adaptation to online systems. In the context of institutions and information governance, other reports (Wong & Welch, 2004) suggested that the effectiveness of technology implementation is often related to transparency, institutional readiness, and user engagement factors that can influence the intensity of scientific publications on specific topics.

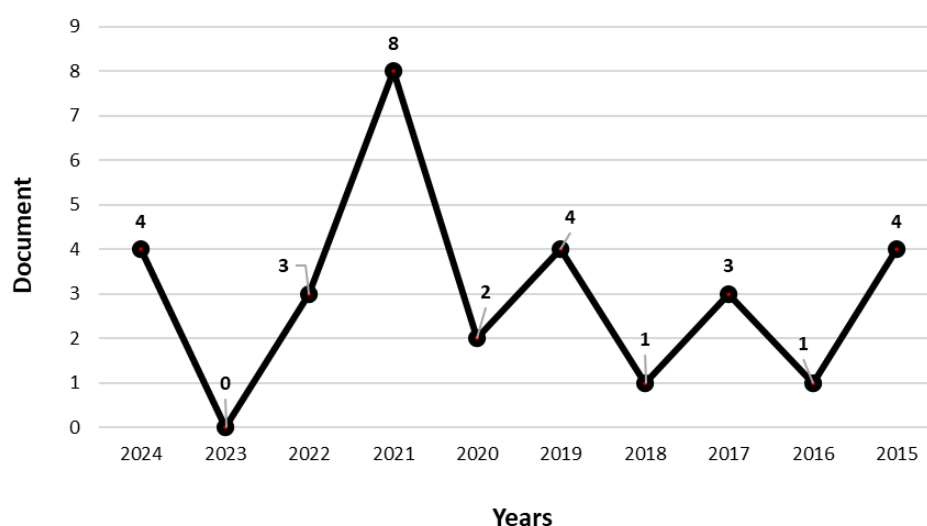


Figure 1. Development of publications on IT and Pragmatics in the last decade.

4.2. Document Type Analysis

Figure 2 shows the distribution of document types discussing information technology integration in pragmatics studies during the 2015–2024 period. Of the 30 documents analyzed, the vast majority (19) were scientific journal articles. Other types included conference papers (3 documents), reviews (2 documents), book chapters (2 documents), books (2 documents), and one document each in the form of notes and editorials. The dominance of journal articles confirms that the topic of information technology integration in pragmatics is predominantly studied in formal academic formats that undergo selection and peer review processes. This is inseparable from the role of scientific journals as the primary medium for disseminating research results, which have high visibility and strong credibility among academics. Several previous studies have shown that scientific journals, especially open-access ones, provide significant opportunities for researchers to increase the readability and scientific impact of their work ([Miguel et al., 2011](#); [Ramesh, 2024](#)).

On the other hand, the contribution of conference papers, while not as numerous as journal articles, remains significant. Academic forums such as conferences provide an initial space for researchers to present preliminary findings, build collaborative networks, and receive direct feedback before further publication in the form of articles or books ([Kennan & Thompson, 2018](#)). This strengthens the conference's position as part of the scientific knowledge dissemination ecosystem. Furthermore, the existence of documents in the form of book chapters and books indicates that this issue has received attention in scientific and educational compilations. This format is often used to frame topics thematically and comprehensively, and serves as a reference in teaching and curriculum development. In the context of technology management and educational development, books are often seen as a strategic medium for conveying a systematic synthesis of theory and practice ([Ball & Rigby, 2006](#)). Meanwhile, documents such as editorials and notes, although few, continue to play a role as reflective or interpretive channels, typically written by experts in their fields. These documents can stimulate conceptual discussions and new directions for future research. Overall, these results demonstrate that the topic of technology integration in pragmatics has been addressed through a variety of approaches to scientific writing. The tendency toward the dominance of journal articles indicates that the scientific community's primary focus remains on the search for theoretical foundations and empirical validation, while the

presence of other documents reflects a growing focus on practical and interdisciplinary approaches in this field.

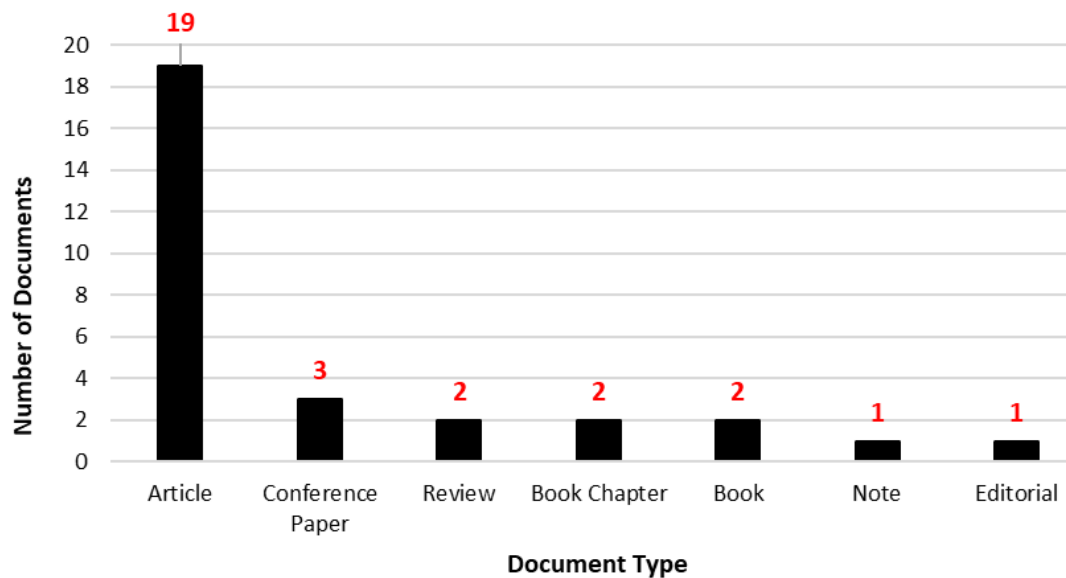


Figure 2. Types of documents published.

4.3. Publication Source Type Analysis

Figure 3 illustrates the distribution of publication source types used in research on information technology integration in pragmatic studies during the 2015–2024 period. Of the 30 documents analyzed, the majority came from scientific journals (23 documents). The remainder were evenly distributed among books (3 documents), conference proceedings (3 documents), and book series (1 document). The dominance of journals as publication sources confirms that research in this field develops within a formal academic framework that emphasizes scientific quality, methodological validity, and theoretical contributions. Scientific journals also serve as a primary channel for gaining academic recognition and reaching the broader scientific community. The role of journals as a primary medium for knowledge dissemination has been widely discussed in previous studies, which demonstrate their crucial role in increasing the visibility and impact of research, particularly when open access ([Miguel et al., 2011](#); [Ramesh, 2024](#)).

Contributions from books and conference proceedings also demonstrate the diversification of knowledge dissemination. Books are often used to compile theoretical and practical thematic knowledge, while conference proceedings serve as an initial means of testing ideas and a forum for discussion among researchers. According to the literature ([Kennan & Thompson, 2018](#)), publication in the form of conference proceedings allows researchers to obtain valuable initial input before publishing their work in reputable journals. The existence of a book series, even if only a single document, still demonstrates that the issue of IT integration and pragmatics is also beginning to be adopted within a sustainable publishing structure, usually for dynamically evolving topics.

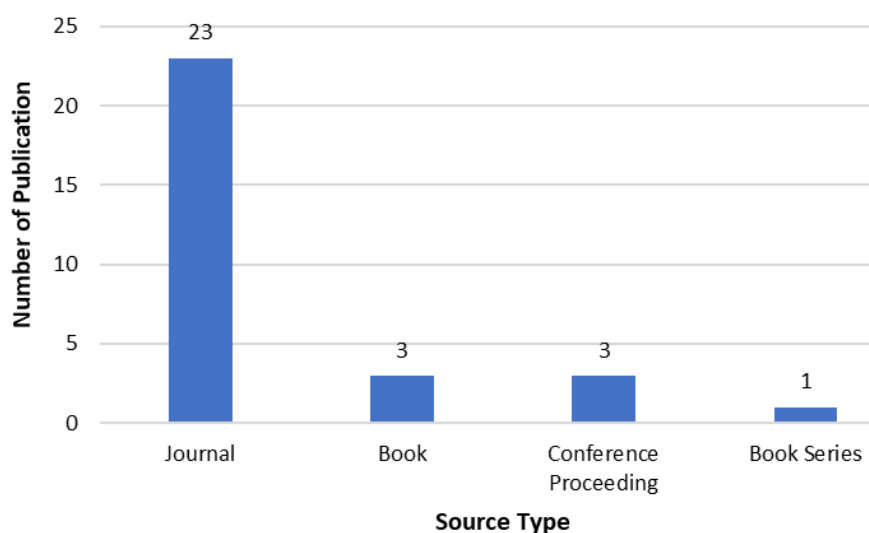


Figure 3. Distribution of publications by source type.

4.4. Mapping of Scientific Subjects

Table 2 shows several subject areas related to research on IT and pragmatics. Research on the integration of IT in pragmatics is spread across 15 different scientific fields. Social Sciences dominates with 10 papers, followed by Medicine with 8 papers, and Arts and Humanities with 7 papers. Furthermore, contributions also come from Engineering and Computer Science (5 papers each), as well as other fields such as Economics, Psychology, Energy, and Decision Sciences, although in smaller numbers.

Table 2. Subject area based on Scopus categories.

No.	Subject Area	Number of Results
1	Social Sciences	10
2	Medicine	8
3	Arts and Humanities	7
4	Engineering	5
5	Computer Science	5
6	Economics, Econometrics, and Finance	3
7	Business, Management, and Accounting	3
8	Psychology	2
9	Materials Science	2
10	Physics and Astronomy	1
11	Multidisciplinary	1
12	Environmental Science	1
13	Energy	1
14	Earth and Planetary Sciences	1
15	Decision Sciences	1

The dominance of social sciences in this study demonstrates that IT integration in pragmatics is widely discussed in social, educational, and communication contexts. This aligns with previous studies ([Bohman, 2002](#)), viewing that practical social science requires a multi-perspective approach, especially when studying complex phenomena such as technology-based interactions. Furthermore, a pragmatist approach to social research, as explained in previous studies ([Kaushik & Walsh, 2019](#)), allows for highly relevant methodological flexibility in integrating IT into studies of language and social communication. Contributions from the field of medicine demonstrate the importance of pragmatic communication in modern

healthcare practices, particularly those based on technology. Previous studies (Glasgow et al., 2021) pragmatic clinical trials demonstrate how IT integration can improve the effectiveness of doctor-patient communication and treatment adherence. This reinforces the point that technology is not only a tool but also a crucial medium for effective and meaningful medical interactions.

Humanities fields (such as linguistics, philosophy of language, and communication ethics) have also made significant contributions to the theoretical understanding of language use in technological contexts. Previous studies (Hui et al., 2024) emphasize that technology-based approaches have become a crucial tool in enhancing the pragmatic competence of non-native speakers, strengthening the bridge between pragmatic theory and its real-world applications. In Engineering and Computer Science, the primary focus is on developing IT systems and platforms that can facilitate pragmatic communication, as in the previous research (Ferreira et al., 2017), which presented a cloud architecture with an embedded pragmatics renderer. This indicates efforts to integrate pragmatic logic into the design of digital systems, such as chatbots, conversational AI, or context-based user interfaces. The presence of papers from Economics, Management, and Decision Sciences demonstrates that the study of pragmatics is also relevant in organizational and policy contexts. For example, a pragmatic approach in IT can influence how organizations convey information, build internal communication systems, and design data-driven decision-making.

4.5. Analysis of Institutions and Contributing Countries

An analysis of the 30 documents reviewed shows that research contributions on the integration of information technology into pragmatics are spread across various institutions and countries (see **Table 3**). Institutionally, RUDN University in the Russian Federation and Curtin University in Australia were the two most productive, each producing two publications during the 2015–2024 period. Meanwhile, most other institutions contributed only one document, reflecting diversity but also indicating the absence of a dominant research center in this field globally. In terms of geographic distribution, the United States emerged as the country with the largest number of institutions involved in publications, followed by the Russian Federation, the United Kingdom, Australia, and China. This aligns with these countries' positions as centers of research and innovation, particularly in the fields of information technology and linguistics. The dominance of institutions from developed countries reflects the support of adequate research policies and academic infrastructure, as well as established international collaboration networks. The presence of institutions such as the University of California, Berkeley, the Mayo Clinic, and Vanderbilt University Medical Center demonstrates the active role of the higher education and healthcare sectors in exploring the use of IT in the context of pragmatic communication.

Interestingly, several institutions from developing countries have also begun to show involvement, such as Udayana University and Warmadewa University from Indonesia, as well as Ahmadu Bello University from Nigeria and Pavlodar Pedagogical University from Kazakhstan. Although their contributions are still limited, this shows that the issue of technology integration in pragmatics has transcended geographical boundaries and is beginning to receive global attention, including in Southeast Asia and Africa (Elena & Lilia, 2018). It is also worth noting that most of the institutions involved are from higher education institutions, although there are also public service institutions and government agencies such as the Agency for Healthcare Research and Quality (USA) or the Federal Penitentiary Service of Russia. The presence of these non-academic institutions confirms that the issues of

pragmatics and information technology also have practical value that can be applied in the management of professional communication and public service (Ben-Arye *et al.*, 2016).

Table 3. Institutions and countries of origin of most researchers.

No.	Affiliation	Documents	Country
1	RUDN University	2	Russian Federation
2	Curtin University	2	Australia
3	Tonghua Normal University	1	China
4	Sinyeon Middle School	1	South Korea
5	IPLATO Healthcare	1	United Kingdom
6	Rutgers University	1	United States
7	Rural Health Academic Centre	1	Australia
8	University of Otago, Christchurch	1	New Zealand
9	Baylor College of Medicine	1	United States
10	Agency for Healthcare Research and Quality	1	United States
11	University of Northumbria	1	United Kingdom
12	Mayo Clinic	1	United States
13	Tel Aviv University	1	Israel
14	The University of Auckland	1	New Zealand
15	Slovak University of Technology in Bratislava	1	Slovakia
16	University of Minnesota Medical School	1	United States
17	Linköpings Universitet	1	Sweden
18	Ahmadu Bello University	1	Nigeria
19	Michael E. DeBakey VA Medical Center	1	United States
20	State University of New York at Plattsburgh	1	United States
21	National Cancer Institute (NCI)	1	United States
22	Brno University of Technology	1	Czech Republic
23	Göteborgs Universitet	1	Sweden
24	Southern Methodist University	1	United States
25	Commonwealth of Massachusetts	1	United States
26	Atilim University	1	Turkey
27	National University of Defense Technology, China	1	China
28	Kalashnikov Izhevsk State Technical University	1	Russian Federation
29	University of California, Berkeley	1	United States
30	Technická Univerzita v Košiciach	1	Slovakia
31	University of Washington School of Medicine	1	United States
32	Royal Belfast Hospital for Sick Children	1	United Kingdom
33	University of Minnesota Twin Cities	1	United States
34	Linguistics University of Nizhny Novgorod	1	Russian Federation
35	Queen's University Belfast	1	United Kingdom
36	Vanderbilt University Medical Center	1	United States
37	Pyatigorsk State University	1	Russian Federation
38	Volgograd State University	1	Russian Federation
39	Universitas Udayana	1	Indonesia
40	Gyeongin National University of Education	1	South Korea
41	Nizhny Novgorod State Technical University	1	Russian Federation
42	Kazakh Ablai Khan University of International Relations and World Languages	1	Kazakhstan
43	Russian Biotechnological University	1	Russian Federation
44	Moscow State University of Technologies and Management	1	Russian Federation
45	Brno University of Technology	1	Czech Republic

Table 3 (continue). Institutions and countries of origin of most researchers.

No.	Affiliation	Documents	Country
46	Pavlodar Pedagogical University	1	Kazakhstan
47	Universitas Warmadewa	1	Indonesia
48	Federal Penitentiary Service of Russia	1	Russian Federation
49	Wuhan Business University	1	China
50	Handelshögskolan	1	Sweden

This cross-national engagement also indicates the importance of international collaboration in the development of technology-based pragmatics studies. As explained in previous studies (Luo, 2001), the success of cross-cultural collaboration in an academic context depends on the personal and institutional ties developed through ongoing collaboration. This is relevant to the finding that although most of the papers originate from a single institution, there is significant potential for expanding international networks on this topic. Furthermore, this trend also indicates that foreign language teaching in the digital age has become a strategic area for many countries, particularly in enhancing global competitiveness through education. The Russian Federation, for example, demonstrates a high level of publications on this topic, in line with the other findings (Dmitrenko & Akhmadullin, 2023) that digitalization in language teaching is now a major focus of Russian higher education policy.

4.6. Keyword Analysis and Research Focus

Figures 4 and 5 display the results of network visualization and overlay visualization based on co-terminology emerging in the literature on the integration of information technology in pragmatics studies. Based on this mapping, three main clusters were formed based on the interrelationships between keywords (see Table 4). The first cluster (red) indicates the dominance of keywords such as information technology, process, research, development, creation, and practice. This cluster illustrates the primary focus of research related to the integration of technology into language development processes and pragmatics research practices. The dominance of this cluster aligns with the global trend that places technology as the primary foundation in digital approaches to language and pragmatics teaching. A study by previous studies (Al Husaeni & Haristiani, 2025) shows that digital technology has significantly driven innovation in the development of pragmatics learning methods, particularly through the Dare platform and AI-based systems.

The second cluster (green) consists of keywords such as language, study, evidence, time, patient, and paper. This cluster more closely represents a scientific, evidence-based approach to the study of language and pragmatics. This suggests that much research in this field is also focused on scientific validity and the collection of empirical evidence, reflecting the depth and rigor of the methodological approach. As explained in research by previous studies (Aijmer & Andersen, 2011), pragmatic approaches are often associated not only with social communication but also with empirical contexts in professional practices such as medicine and psychology. The third cluster (blue) consists of keywords such as student, application, effectiveness, knowledge, and communication. This cluster indicates that the research focus is also directed at the application of technology in educational settings, specifically to improve communication effectiveness and student acquisition of pragmatic knowledge. Previous research (Al Husaeni & Al Husaeni, 2022) states that the implementation of digital applications has been proven effective in improving students' pragmatic skills, especially when the technology is used in interactive and adaptive learning contexts.

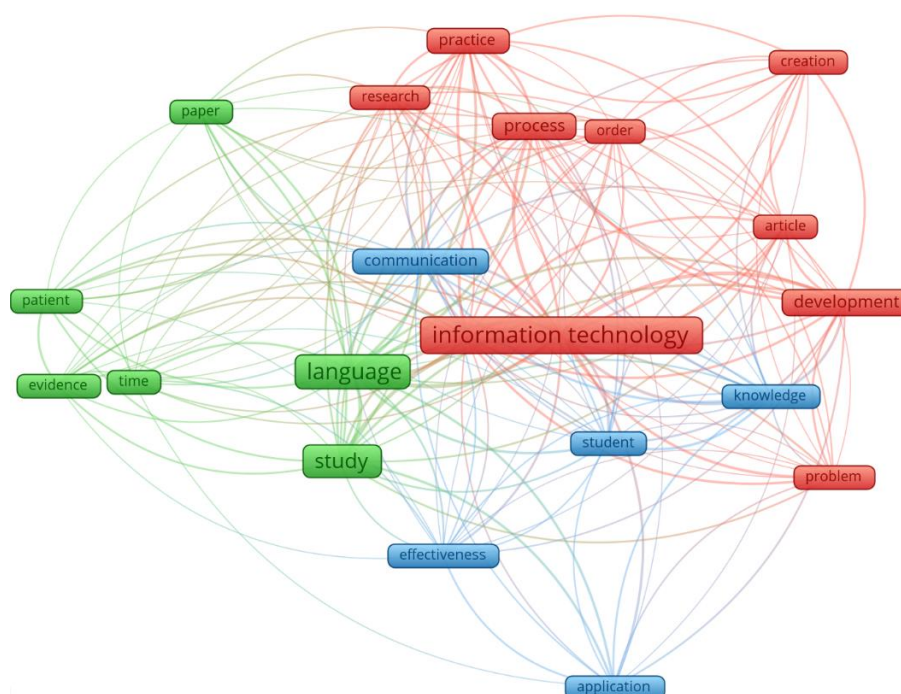


Figure 4. Network visualization by co-word.

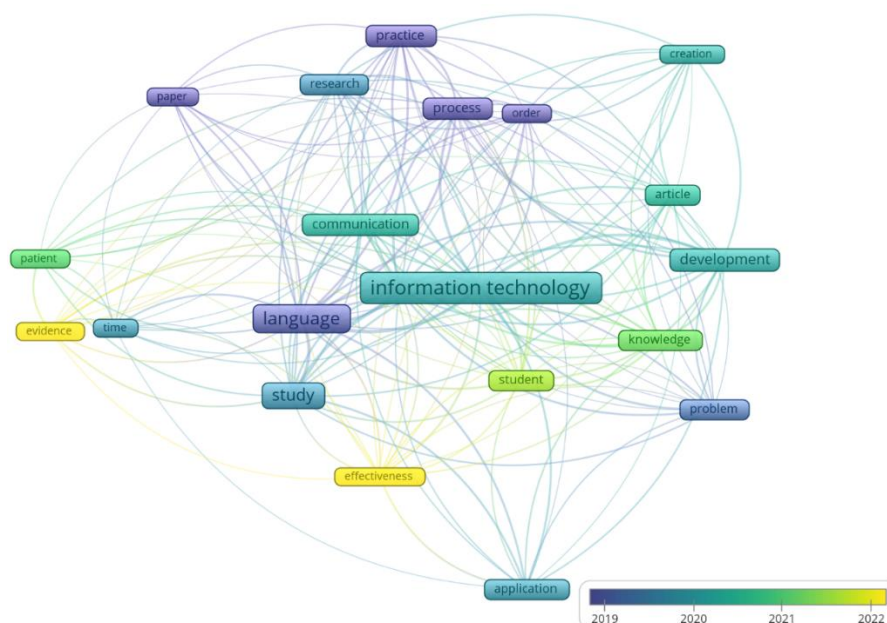


Figure 5. Overlay visualization by co-word.

Table 4. Cluster groups based on network visualization.

Cluster	Number of Items	Keyword
1	10	approach, article, creation, development, information technology, order, practice, problem, process, research
2	6	evidence, language, paper, patient, study, time
3	5	application, communication, effectiveness, knowledge, student

Meanwhile, the overlay visualization in **Figure 5** illustrates the temporal evolution of keywords. Yellower colors indicate newer keywords, such as application, student, and effectiveness, which have become a focal point in recent years. This indicates a shift from a theoretical and structural focus to practical applications in technology-based education and communication. This finding reinforces the argument that current research is increasingly moving towards developing pragmatic technology-based applications that consider effectiveness and student learning outcomes (Al Husaeni et al., 2024). Overall, this analysis shows that the integration of information technology in pragmatic studies is developing in three main orientations: (i) method development and innovation, (ii) evidence-based approaches and academic studies, and (iii) practical applications in education and communication. These developments indicate that interdisciplinary studies between linguistics, information technology, and education are increasingly strengthening and complementing each other. Finally, this study adds new information regarding language education, as reported elsewhere (see Fatawi et al., 2024; Luckyardi et al., 2024; Farida et al., 2024; Damayanti & Santosa, 2024; Bangun et al., 2024; Karmaker, 2025; Olutola & Gift, 2025; Nasution & Mulyadi, 2025; Ramlan, 2024; Suzuki et al., 2024; Puspitosari & Setiawati, 2024; Ramdani et al., 2024; Yuliani & Hernawati, 2024; Herniwati et al., 2024; Sutedi & Juangsih, 2024).

5. CONCLUSION

This study successfully maps global research trends on the integration of information technology in pragmatic studies during the period 2015–2024 using a bibliometric approach. The analysis results show that this topic has attracted the attention of scholars from various disciplines and countries, with contributions predominantly from the United States, followed by the Russian Federation, the United Kingdom, and Australia. The most productive institutions include RUDN University and Curtin University, while journal articles are the most common document type used to convey research results. In terms of scientific subjects, research on this topic is spread across various fields such as social sciences, medicine, humanities, engineering, and computer science, indicating a strong interdisciplinary character. Keyword mapping reveals three main clusters: technology integration approaches in learning, evidence-based applications in linguistics and education, and the use of technology to improve the effectiveness of communication and learning processes. These findings indicate that although this topic has not yet achieved a large number of publications, it is developing in a clear direction and is becoming more mature.

This study recommends the need for more intensive international collaboration to encourage the exchange of knowledge and best practices, particularly in the development of technology-based curricula and digital pragmatics training. Researchers are also advised to expand their exploration to more diverse cultural and linguistic contexts to gain a more comprehensive understanding of technology integration in pragmatics. However, this study has limitations, including the relatively limited number of documents and its sourcing from only one database (Scopus), which may not represent the full range of related publications globally. Therefore, further studies are recommended to utilize a broader range of data, including from Web of Science, Google Scholar, and regional databases, and to adopt mixed methods to qualitatively strengthen the bibliometric findings.

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7. AUTHORS' NOTE

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