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REVIEW ARTICLE

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Mapping AI-mediated pragmatic competence in EFL: A systematic review of Human–AI interaction and communicative development

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ABSTRACT

The study of AI-mediated pragmatic competence in English as a Foreign Language (EFL) is theoretically divided and methodologically disproportionate models, and there is no pre-existing synthesis of the intellectual organization of the field. The current systematic review fills this gap by considering 361 articles in the Web of Science Core Collection (2021–2025). The study based on the improved bibliometric and science mapping methods (co-occurrence networks, thematic mapping, Lovaka Law and factorial analysis) through Bibloshyny shows the explosive annual growth (74.56%), most significant in China (168 records) and with the terms ChatGPT, artificial intelligence, and discourse. Results indicate that productivity of authors does not follow the Lotka law and thematic maps put Generative AI and Pragmatics as thematic motors. Findings suggest that the existing AI interaction can perhaps socialize learners into machine compatible hybrid pragmatic competences in lieu of entirely genuine competence. The review offers practical solutions to teachers and curriculum creators to intelligently incorporate AI without losing the sociocultural richness. It sets out a methodological model of applied linguistics that is replicable. The originality of the study lies in the fact that it is the first systematic multi-dimensional synthesis of AI-mediated pragmatic competence in EFL, as the individual studies have been replaced by a unifying knowledge structure.

KEYWORDS: pragmatic competence, EFL, AI-mediated interaction, bibliometric analysis, Generative AI

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Introduction

The introduction of artificial intelligence (AI) as a part of second language teaching has triggered a paradigmatic shift in understanding how pragmatic competence the capacity to make correct use of language in social situations is conceptualised, mediated, and evaluated. Whereas AI-mediated language learning tools have spread exponentially since 2020, including conversational agents, intelligent tutoring system, and larger language models like ChatGPT, the topic of human-AI interaction and pragmatic development in the context of English as a Foreign Language (EFL) has been a point of critical under-theorization and empirical fragmentation. The issue here is twofold: to start with, current studies have underrepresented the issue of the contribution of AI to the development of grammatical accuracy and lexical breadth (Abdelhalim and Alsehibany, 2025; Haruna et al., 2024a) and prioritized instead pragmatic competence involving speech acts, discourse management, implicature, and politeness (Ajab Second, the implementation of generative AI in language speakers has proceeded faster than the academic knowledge on how these technologies fundamentally transform the learner-machine communicative relationships, casting any urgent questions on whether the AI-mediated interaction promotes or induces distortion of the pragmatism acquisition (Bubas, 2025; Chen et al., 2025).

The literature gap is also an obviously strong phenomenon when it comes to discussing the study gap. Although there are isolated studies on AI-assisted pragmatic instruction (Ajabshir, 2025; Mahmoudi-Dehaki and Nasr-Esfahani, 2025; Saeedi and Soltani, 2025), there are no systematic reviews as of the intellectual structure of AI-mediated pragmatic competence in EFL. Chatbots have been found to be used in relation to speaking fluency (Matiienko-Silnytska et al., 2025), ChatGPT has been used in relation to writing feedback (Bai and Wei, 2024; Cengiz et al., 2025) and AI in relation to pronunciation training (Abdelhalim and Alsehibany, 2025), Fewer studies still have probed the variation in interaction patterns in human-human and human-AI pragmatic interactions (Dombi et al., 2024; Timpe-Laughlin et al., 2023), or how the implicit linguistic biases of generative AI (Quan and Chen, 2025; Schenck, 2024) could implicitly shepherd learners into Moreover, although the analysis of the bibliometric domains has helped to understand the general trends regarding AI in-education over the long term (Chen et al., 2022), no investigation has reviewed the specifically-thematic development of the areas of collaboration, and current research topics that can uniquely describe pragmatic competence research through AI EFL. This systematic review fills this gap by synthesizing the first comprehensive bibliometric and thematic review of this interdisciplinary area of emerging interest.

The present study covers these gaps by the following objectives: (1) publication and citation trend analysis; (2) identification of influential countries and authors; (3) author productivity analysis with the help of Lotka Law; (4) determination of the key-word trends; (5) network co-occurrence; (6) thematic structure analysis; (7) the visualization of factorial dimensions. The work is timely and high-impactful as it provides a rigorous and data-driven synthesis of an AI-mediated pragmatic competence research in EFL, a conceptually discontinuous area of study, despite the swift technological progress. It goes beyond empirical discoveries in isolation and creates an evidence-based knowledge infrastructure by systematically mapping the intellectual structure, pathways of publication and networks of collaboration within the discipline. This integrative methodology not only increases the theoretical clarity in terms of how AI transforms the pragmatic development, but also reveals submerged patterns, emergent themes, and under-researched intersects, which are typically ignored in other reviews.

Literature Review

The empirical landscape of AI-mediated pragmatic competence in EFL reveals a field characterized by methodological experimentation yet theoretical fragmentation. Early investigations primarily examined rule-based conversational agents and their capacity to simulate pragmatic exchanges. Bailey et al. (2021) found that digital storytelling facilitated by chatbots facilitated L2 participation patterns but pragmatic benefits were inferred, but not directly measured. Likewise, Iftikhar et al. (2025) discovered that smart personal assistants enhanced the speaking competence of the EFL adolescent learners, yet their research did not entail finer pragmatic annotation, and thus merged fluency with pragmalinguistic competence. This confusion is reflected in more recent studies: Wang et al. (2024) found that the use of generative AI chatbots did raise readiness to speak and decreased speaking anxiety, but the pragmatic behaviors that learners learned such as the right request modification or turntaking cues were not studied. There develops an acute tension between investigations that

support the feasibility of AI as a pragmatic scaffold and investigations that uncover its drawbacks. Ajabshir (2025) and Aldaghri & Alshraah (2025) presented some of the rare experimental results that the feedback of chatbots was similarly beneficial to the L2 learners in terms of their pragmalinguistic and sociopragmatic competences in comparison with the teacher feedback, which were the speech acts of apology and request. This was extended to include dynamic assessment in the architecture of chatbots by Saeedi and Soltani (2025) who reported greater pragmatic accuracy gains in adaptive systems compared to non-adaptive systems. Nevertheless, Sim et al. (2025) provided a warning message: ChatGPT turned out to be a valuable teacher, dancers, and pronunciations learning tool in the L2 pragmatics, but technology-mediated intervention between peers offered qualitatively different, and presumably more authentic, pragmatic negotiation mechanisms, especially those related to coping with unforeseen complementary situations.

The research on the individual variations in AI-mediated pragmatic learning is young yet promising. Du et al. (2025) discovered that autistic traits and gender mediated how learners applied AI speaking instruments, wherein more autistic traits correlated with a more comfortable involvement with artificial interlocutors a conclusion which has consequences on inclusive pragmatic teaching. According to Alshraah and Nishat (2023), the introduction of AI had a positive impact on the achievement emotions and readiness to communicate among EFL students, though the impact was mediated by the previous L2 proficiency and acceptance of technology. The socio-emotional threats of AI implementation in L2 education presented by Sun et al. (2025) are the low levels of authentic interaction and over-dependence on AI-created pragmatic scripts used by teachers. Taken together, these studies suggest that pragmatic competence mediated by AI does not have a consistent positive effect, but rather, it has complex interactions with the characteristics of learners, task designs, and the contexts of implementation. Although the literature presents an increasing amount of research, it is theoretically disjointed and methodologically imbalanced and makes it difficult to advance cumulative understanding of AI-mediated pragmatic competence. Numerous studies take a short-term experimental design, which gives precedence to short term performance gains rather than long-term pragmatic growth, which dismisses longitudinal trends (Foster, 2023). Moreover, the literature tends to focus on abilities, like speech acts or feedback processing, and overlooks the complex and dynamic character of pragmatics in the real world of communication (Yamada, 2024). Overreliance on learner perceptions as proxies of competence also and has become a long-standing problem since the perceived effectiveness of AI tools might be inflated (Kaur, 2022). Moreover, cross-cultural and sociopragmatic aspects are not researched thoroughly, including non-Western EFL scenarios (Al-Shammari, 2023). At the methodology level, comparability across studies is hampered by inconsistencies in measurement and analyses framework (Davis, 2025). Most importantly, there has not been a systematic mapping of the intellectual framework and thematic development of this discipline, and this gives a lot of gaps in comprehending how this discipline has evolved.

Research Methodology

Data Source

The Web of Science (WOS) Core Collection was the sole bibliographic database used in this systematic review. WOS was chosen because it has strict journal indexing criteria, the coverage of high-impact publications in the field of applied linguistics and educational technology, and credible citation information that has been necessary in the bibliometric analysis. Past systemic reviews on second language and AI mediated-learning have also used WOS due to their data stability and sophisticated analytical capabilities (Chen et al., 2022; Shang, 2025). WOS results in replicability and reduced bias due to databases, which would not be possible using multiple sources with different indexing criteria.

Data Collection Procedures

The search query was a combination of three thematic clusters: AI technologies, pragmatic competence constructs, and EFL contexts. The search that took place on March 20, 2026, resulted in 615 records at the Web of Science Core Collection. A five year publication date (2021–2025) applied to reflect the latest and technologically contextual developments to trim results to 420 records. Non-article document types (n=35) and non-English documents were then filtered out by document type and language restrictions which reduced the number of records eligible to the eligibility stage to 361 records. The evaluation at this phase entailed all 361

full-text papers that were evaluated, and no documentation was eliminated as the study was engaged in carrying out a thorough bibliometric scrutiny of the complete available pool that passed the initial inclusion standards. Therefore, there were 361 studies that were included in the eventual bibliometric synthesis. The inter-rater reliability based on a 20 percent random sample of the decisions made in terms of eligibility resulted in a Cohen 0.87 that established that there was strong agreement. None of the references was manually curated according to other specifications to ensure objectivity and reproducibility.

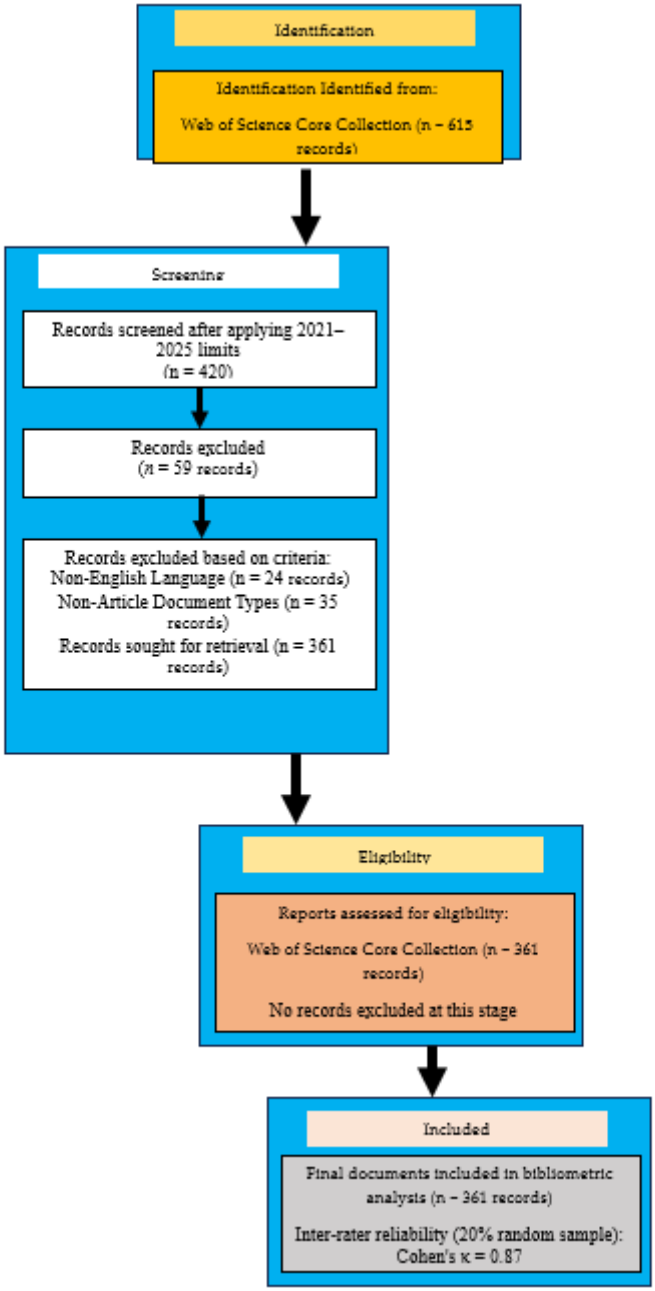

Figure 1 PRISMA 2020 Flow Diagram of the Study Selection Process

The PRISMA 2020 workflow is four-stage (Figure 1). The Identification stage involved initial searching using Web of Science with the identification of 615 records. During the Screening stage, 420 records were screened, having put into effect the 20212025 limits. Records filtered out in this phase were non-English language publications (n=24) and non-article document types (n=35), thus, leaving 361 records at the Eligibility stage. On the Eligibility stage, the assessment was done on all 361 full-text articles, and nothing was excluded because the purpose of the research was to carry out an overall bibliometric analysis of the corpus in general, and the full corpus was available. Therefore, 361 studies were obtained criteria to definal synthesis. Eligibility decisions were determined by using inter-rater reliability on a 20% random sample and a Cohen 0.87 was obtained. Bibloshyny (2017) was the only source that has been used to perform all bibliometric and science mapping

analyses, including descriptive performance analysis, application of Lotka Law, and analysis of keyword co-occurrences, network visualization, thematic mapping, correspondence analysis, and multidimensional scaling.

Data Analysis Techniques

The analysis is based on the use of highly developed bibliometric and science mapping methods through the Bibloshyny (2017) to reveal the intellectual framework of the discipline. The research is performed based on descriptive performance analysis to investigate the trends in publications, citation patterns, and contributors. Law of Lotka is used to evaluate the distribution of authors productivity, which offers information on the dynamics of scholarly concentration and the dynamics of producing knowledge. The keywords are analyzed by co-occurrence to define the dominant research themes and hotspots of the current research, and a network visualization method highlights the collaboration patterns between countries and between authors. Thematic mapping is created to categorize research themes in terms of centrality, density, to differentiate between motor, niche, and emerging areas, and disappearing ones. Correspondence analysis and multidimensional scaling (MDS) are conducted to provide a dimensionality reduction and visualization of factorial structure of the research topic distributions. To conduct qualitative synthesis, thematic data analysis of full-text articles describes the recurrent practice of methodological approaches, theoretical perspectives, and empirical results around AI-mediated pragmatic competence. All of these performed in Bibloshyny (2017), together they give a multidimensional and strong profile of the study of AI-mediated pragmatic competence in EFL with both analytical and methodological rigor.

Results of the Study

Table 1 shows the key bibliometric data of the 361 documents analyzed. The period spans 2021-2025 with a very high growth rate of 74.56 every year, which is showing the rapid growth of interest in AI mediated EFL pragmatics, because of the spread of generative AI-mediated tools, like ChatGPT (Bubas, 2025; Chen et al., 2025). The 361 documents exist in 212 sources, the average number of citations per document is 6.28, which points to a new, but significantly growing, field (the average age of the documents = 1.93). It was authored by 892 authors comprising 83 single-authored documents producing 2.79 co-authors. Co-authorships across countries include 22.44% indicating at least moderate cooperation between countries, mostly between China (as indicated in Table 3). There is diversity in the terminology, which can be seen by the presence of the 1,409 author keywords and 524 Keywords Plus; a maturation towards journal-based dissemination is indicated by the number of articles compared to the proceeding's papers (n=279 vs. n=53) (Ajabshir, 2025; Saeedi and Soltani, 2025).

Table 1 Main Information About the Bibliometric Data

Description	Results
Main Information About Data	
Timespan	2021:2025
Sources (Journals, Books, etc)	212
Documents	361
Annual Growth Rate %	74.56
Document Average Age	1.93
Average citations per doc	6.277
References	16245
Document Contents	
Keywords Plus (ID)	524
Author's Keywords (DE)	1409
AUTHORS	
Authors	892
Authors of single-authored docs	83

Authors Collaboration	
Single-authored docs	87
Co-Authors per Doc	2.79
International co-authorships %	22.44
Document Types	
Article	279
Article; Early Access	28
Article; Proceedings Paper	1
Proceedings Paper	53

Figure 2 shows the trends of scientific publications per year between the year 2021 and 2025. It is an emerging research area with just 2 publications in 2021, indicating an interest in AI-mediated pragmatic competence at early stages of conversational agent studies (Bailey et al., 2021). In 2022, there was a humble resurgence of 13 publications, then 48 in 2023, as advanced large language models were rolled out. In 2024, a drastic change of 111 publications was observed as an extreme large-scale adoption of ChatGPT in EFL research became apparent (Bai and Wei, 2024; Wang et al., 2024). This upward trend ends in the year 2025 with 187 publications, which were more than 60 percent of the total corpus of publications in one year. The fact that pragmatic competence mediated by AI has increased exponentially (a rate of 74.56% per year after all, as shown in Table 1) helps to confirm that this phenomenon has turned into a peripheral questioner and a highly important research question within just a few years (Crompton et al., 2024; Darvin, 2025).

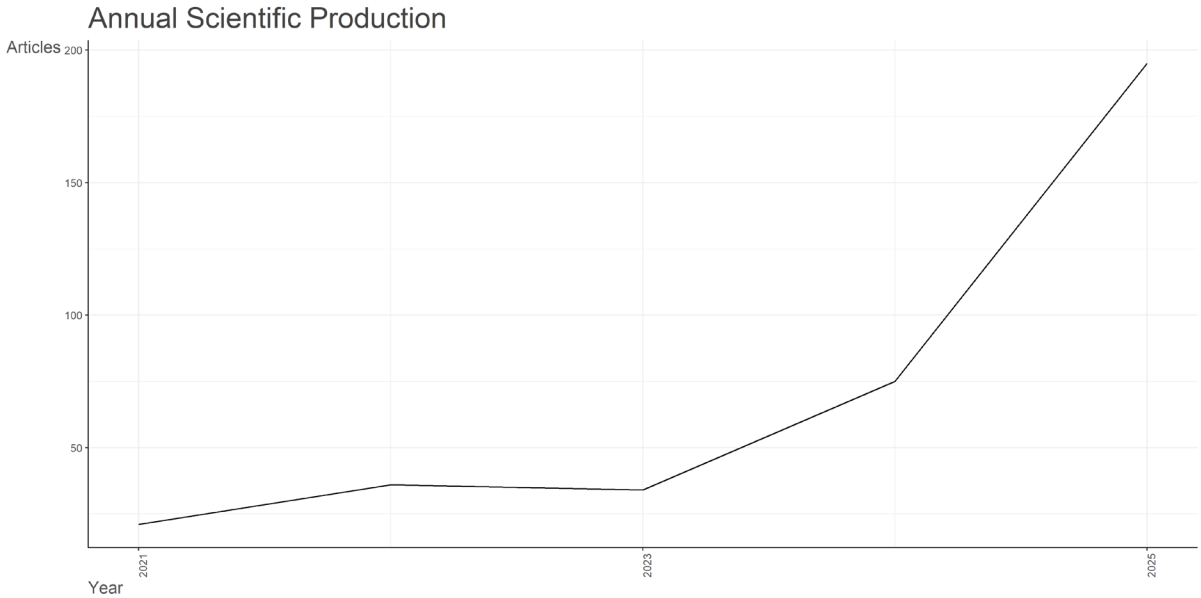

Figure 2 Annual Scientific Publication Per Year from 2021 to 2025

A unique temporal trend is presented in Figure 3 and shows average citations per year between 2021 and 2025. The most recent publications (2021) have the most average amount of citations (around 22) as they form the foundational material of early studies into chatbot-mediated language interaction (Bailey et al., 2021). There was a mean of about 12 citations in the 2022 cohort, and a decrease of to about 6 citations on 2023 publications, which is a normal bibliometric pattern of older publications gaining more citations over time. The means of the 2024 and 2025 years are increasingly lower (under 3 and only slightly more than 0 respectively) in a way that is consistent with their recent publication year and the little time spent on citing the accrual (Chen et al., 2022). Although the values are lower, the field exhibits a consistent scholarly interest, and historical works are still used to shape current research regarding the application of generative AI (Ajabshir, 2025; Saeedi and Soltani, 2025).

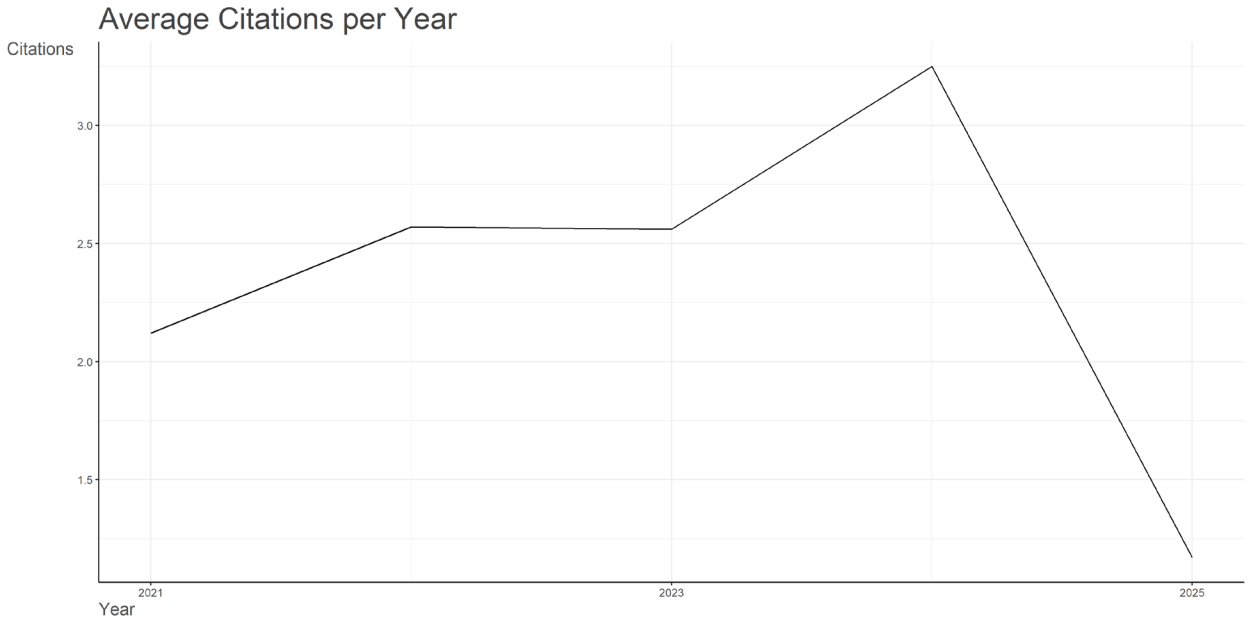

Figure 3 Average Citations Per Year

The country production map (Figure 4) indicates the numbers of records per country or region. China is the leading country with 168 publications in its control, which can be fruitfully explained by extensive investment in AI-mediated language learning studies and implementation of AI-mediated tools like ChatGPT into EFL lessons (Chen et al., 2025; Huang and Wang, 2025). The United States has the second largest number of 41 records, followed by 19 records each in Russia and Taiwan. England (18 records), Ukraine (13 records), Saudi Arabia (12 records), and South Korea (12 records) also show high productivity. This geographic dispersion suggests that AI-mediated pragmatic competence studies have gained acceptance globally, but the production is still based on East Asian and in English case studies. The comparatively smaller production of European and African countries indicates the disparity in the research capabilities and the access to state-of-the-art AI technology (Crompton et al., 2024; Darvin, 2025; Haruna et al., 2025b).

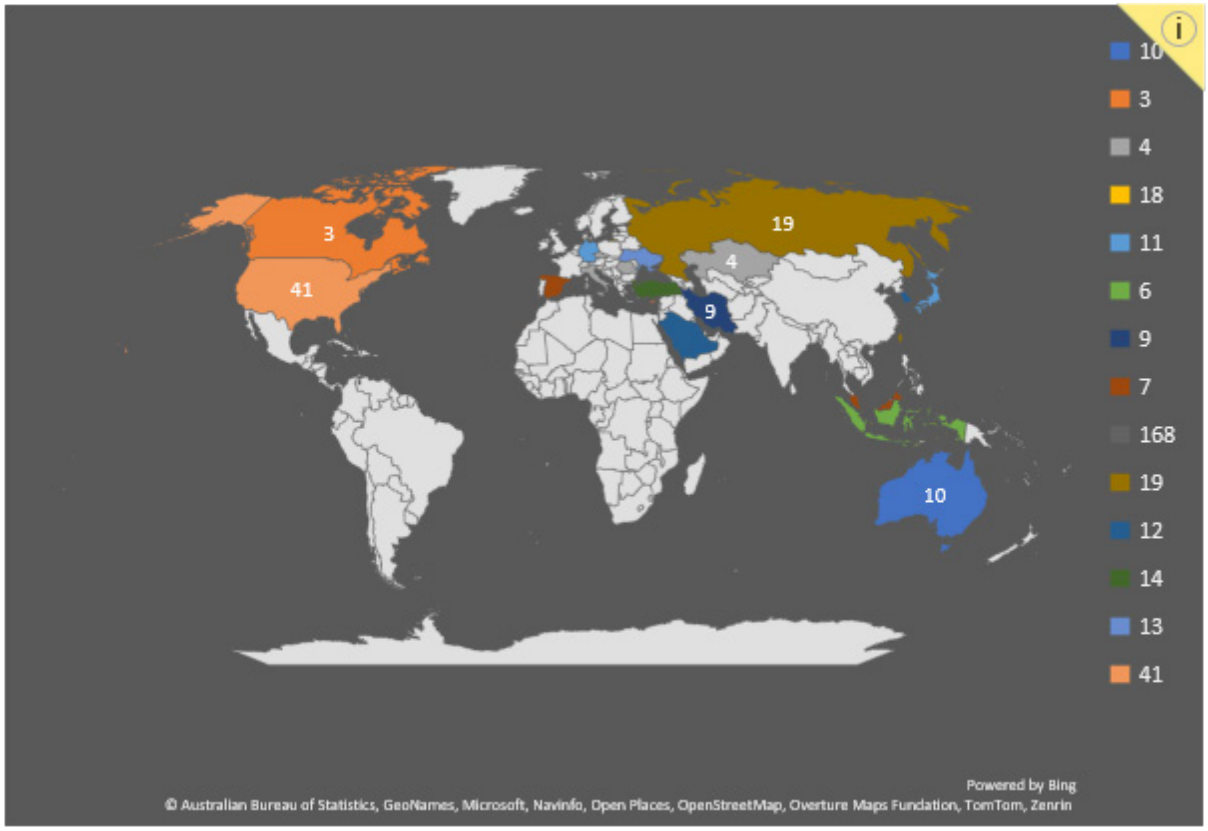

Figure 4 Country Production (Record Count by Country/Region)

Table 2 presents the most relevant authors who published at least three articles. Team Xu JJ has published seven articles (fractionalized = 3.08), which proves the central productivity in AI-driven pragmatic assessment (Karatay and Xu, 2025). Wang H and Zhang Y are next with four articles each (fractionalized = 2.33 and 1.62, respectively). There are books by 23 authors with three articles, Dombi J, Sydorenko T and Timpe-Laughlin V combine their efforts and examine human-AI and human-human pragmatic intercourse (Dombi et al., 2024; Timpe-Laughlin et al., 2023). The fractionalized count of du XW is high (2.50) compared to raw articles (3) meaning that it was almost entirely collaborative work as opposed to single-author work. The general distribution indicates that there is no domineering author, just a moderate distribution of research spread among a community of research workers as opposed to a concentration of a few research groups (as Figure 7 by Law of Lotka indicates).

Table 2 Most Relevant Authors (with ≥ 3 Articles)

Author	Articles	Articles Fractionalized
XU JJ	7	3.08
WANG H	4	2.33
ZHANG Y	4	1.62
BOGDANOVA-BEGLARIAN N	3	0.62
CAO SY	3	0.59
CHEN SY	3	1.08
DOMBI J	3	0.78
DU XW	3	2.50
EGER S	3	0.75
EGUCHI M	3	1.17
FAN L	3	0.92
FENG WS	3	0.58
HUANG Y	3	0.79
KARABULATOVA IS	3	0.60
LI CX	3	0.44
LI XY	3	0.54
SYDORENKO T	3	0.78
TIMPE-LAUGHLIN V	3	0.78
WANG CH	3	1.00
WANG Y	3	1.08
XU J	3	0.90
ZAIDES K	3	0.62
ZHANG JW	3	1.50
ZHANG L	3	0.63
ZOU B	3	1.00
ZOU D	3	0.70

Table 3 shows country production distributed by number of records. Most publications are concentrated in mainland China (168 publications), which has made a strategic investment in AI-enhanced education technology, and the quick introduction of large language models into the classroom (Chen et al., 2025; Huang and Wang, 2025). The United States comes in second with 41 records followed by Russia and Taiwan with 19 records each. The moderate productivity is observed in England (18 records) and Ukraine (13 records). Saudi Arabia and South Korea (12 records each) and Germany (11 records) and Japan (11 records) along with them make up the high end. Such a geographical concentration suggests that AI-mediated pragmatic competence studies are still massively focused on East Asia and some English-speaking countries. The relatively low production in Africa, South America, and even most of Europe is evidence of an unequal distribution of the AI infrastructure and the distinctiveness in the focus of research (Crompton et al., 2024; Darvin, 2025).

Table 3 Country Production (Record Count by Country/Region)

Countries/Regions	Record Count
Australia	10
Canada	3
Croatia	3
Czech Republic	4
England	18
Germany	11
Indonesia	6
Iran	9
Israel	4
Italy	4
Japan	11
Kazakhstan	4
Malaysia	7
Peoples r China	168
Romania	4
Russia	19
Saudi Arabia	12
Singapore	4
South Korea	12
Spain	7
Taiwan	19
Türkiye	14
U Arab Emirates	4
Ukraine	13
USA	41

Table 4 also shows collaboration network measures of the author nodes of ten clusters. In Cluster 1, Xu jj has the highest score in betweenness centrality (3.0) and PageRank (0.071), which means that this author is an important link between different research subgroups, aligning with the high number of never published works of Xu in Table 2 (Karatay and Xu, 2025). Cluster 4 includes Dombi j, Sydorenko t, and Timpe-laughlin v that have the highest scores in perfect closeness (0.5 each), which are the characteristics of close collaboration in the dialogue between humans and AI (Dombi et al., 2024; Timpe-Laughlin et al., 2023). Clusters 5 and 6 display the nearestness (1.0) penalty among nodes comprising of Eger s and Fan l, hinting at isolated yet internally thick research teams. The disaggregation into ten separate clusters shows that there is rather minimal cross-group integration, and that the field is being carried out as loosely knit research communities and not a single intellectual network.

Table 4 Collaboration Network Metrics (Author Nodes)

Node	**Cluster**	**Betweenness**	**Closeness**	**PageRank**
Xu jj	1	3	0.333	0.071
Chen sy	1	0	0.2	0.03
Huang d	1	0	0.2	0.03
Li jl	1	0	0.2	0.018
Bogdanova-beglarian n	2	0	0.5	0.039
Zaides k	2	0	0.5	0.039
Beradze m	2	0	0.5	0.032

Cao sy	3	1	0.5	0.054
Zhang y	3	0	0.333	0.029
Fan yl	3	0	0.333	0.029
Dombi j	4	0	0.5	0.037
Sydorenko t	4	0	0.5	0.037
Timpe-laughlin v	4	0	0.5	0.037
Eger s	5	0	1	0.037
Grunow d	5	0	1	0.037
Fan l	6	0	1	0.037
Feng ws	6	0	1	0.037
Huang y	7	0	0.5	0.037
Zhang l	7	0	0.5	0.037
Huang yh	7	0	0.5	0.037
Li cx	8	0	1	0.037
Li xy	8	0	1	0.037
Wang ch	9	0	0.5	0.039
Zou b	9	0	0.5	0.039
Du yr	9	0	0.5	0.032
Eguchi m	10	0	1	0.037
Kyle k	10	0	1	0.037

Table 5 presents the five most common collaborations between countries in decree of frequency. China United Kingdom has the highest number of collaborative records of 10 consist of records, followed by China United States with 9 record and China Australia has 8 records. There are 4 collaborations in China Pakistan and China Germany. These are robust numbers to verify China as the epicenter of worldwide research collaboration in AI-mediated pragmatic competence in line with its lead publication record in Table 3 (168 records). The significant China-Anglophone country connections imply that China researchers are eager to obtain both methodological and theoretical contributions of the existing Western institutions (Chen et al., 2022). The fact that the frequencies are relatively lower (with the highest frequencies being 10) reflects the fact that international collaboration is present, but it is not high enough as compared to the domestic productivity. This trend suggests that it might open greater possibilities in cross-border collaboration, especially with less-represented areas (Crompton et al., 2024).

Table 5 International Collaboration Pairs (Top 5 by Frequency)

From	To	Frequency
China	United Kingdom	10
China	Usa	9
China	Australia	8
China	Malaysia	4
China	Germany	4

Figure 5 visualizes the country collaboration map, where the node size indicates the volume of publication, and the thickness of the edges reflects the strength of collaboration. China emerges as the central node, with its 168 publications in Table 3, with the thick linking lines towards the United States, England, Australia and Malaysia. This visual pattern has a quantitative relationship with Table 5, where China-United Kingdom (10 collaborations) and China- USA (9 collaborations) are top. It is also found that there are other swarms of collaboration in the

map such as European linkages between Germany, England and Spain and Asian linkages between Japan, South Korea and Taiwan. Highlightedly, there are odd nodes of African and South American nations with small interconnections, which validates an inequal opportunity of global integration in AI-mediated pragmatic competence studies (Darvin, 2025). This geographic dispersal implies that the modalities of collaboration are still circumscribed by the pre-established geopolitical and infrastructural spaces (Crompton et al., 2024).

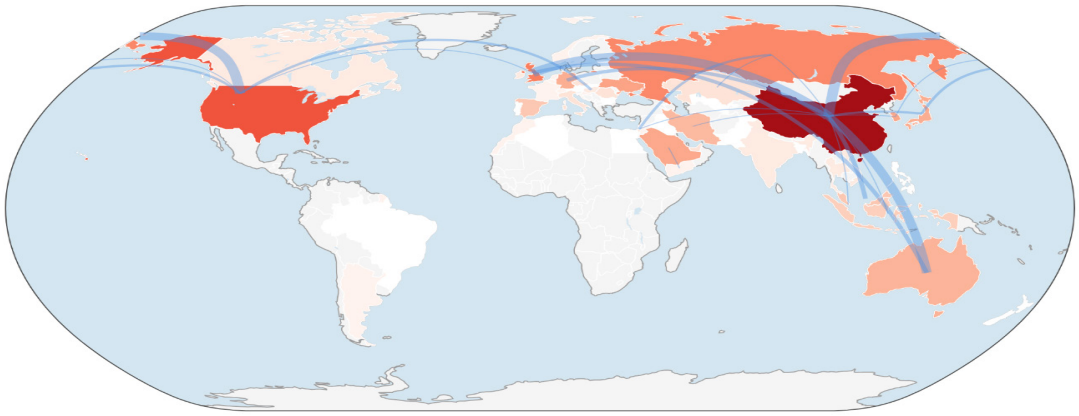

Figure 5 Country Collaboration Map

Figure 6 illustrates the collaboration graph of authors, with nodes in clusters colored in accordance with cluster affiliation and edges illustrating co-authorship associations. The network shows ten different clusters (as it was also the case with Table 4), which means that there is not an integrated field but a fragmented intellectual community. Xu jj is observed as a focal point in Cluster 1, most of the authors relate to it, which validates the role of bridging betweenness of this researcher (betweenness = 3.0 based on Table 4). Cluster 4 demonstrates tight interrelation between Dombi j, Sydorenko t, and Timpe-laughlin v, as such close interaction reflects their long-term cooperation in the comparison of human-AI dialogues (Dombi et al., 2024; Timpe-Laughlin et al., 2023). Several peripheral clusters (Clusters 5, 6, 8) contain solitary dyads or triads, which are indicative of emergent research groups with low levels of externalization. The visuality confirms the locality of collaboration, and there are minimal cross-cluster connections (Chen et al., 2022).

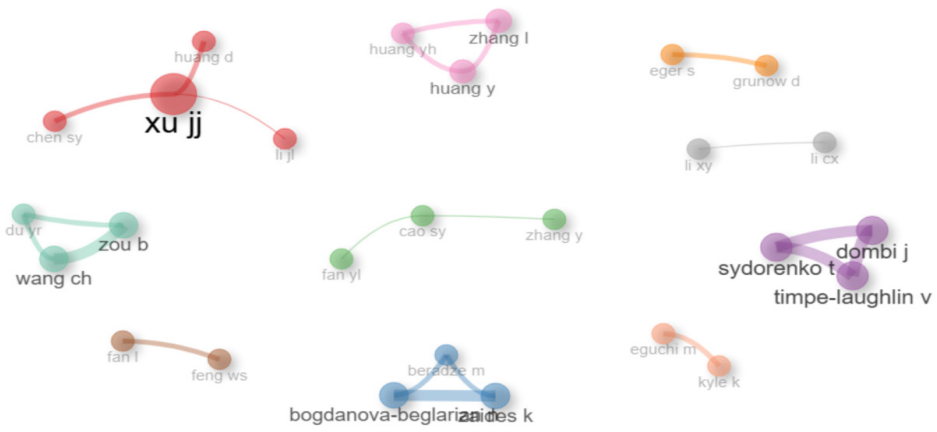

Figure 6 Collaboration Network of Authors

Figure 7 visualizes author productivity using the author productivity via Lotkas Law, a plot of the observed authors proportion versus the theoretical inverse squared distribution. The expected number is 68.9 but the

observed line records 89.9% of authors (802 individuals) publishing a single document. Observed proportion decreases to 6.8% (68 authors) in two documents which is less than theoretical 17.2%. In three documents, the appearance of only 2.2% (20 authors) is observed, in comparison to the theoretical 7.7% appearance. The high dropout reveals that many contributors have only published once, and very few attained the productive level on a regular basis only one author had four publications, and one had six publications. This lack of fit to the Law of Lotka implies that the field is immature, in exploratory mode, and that turnover is high among the researchers instead of a well-established, focused knowledge production regime (Chen et al., 2022; Lotka, 1926).

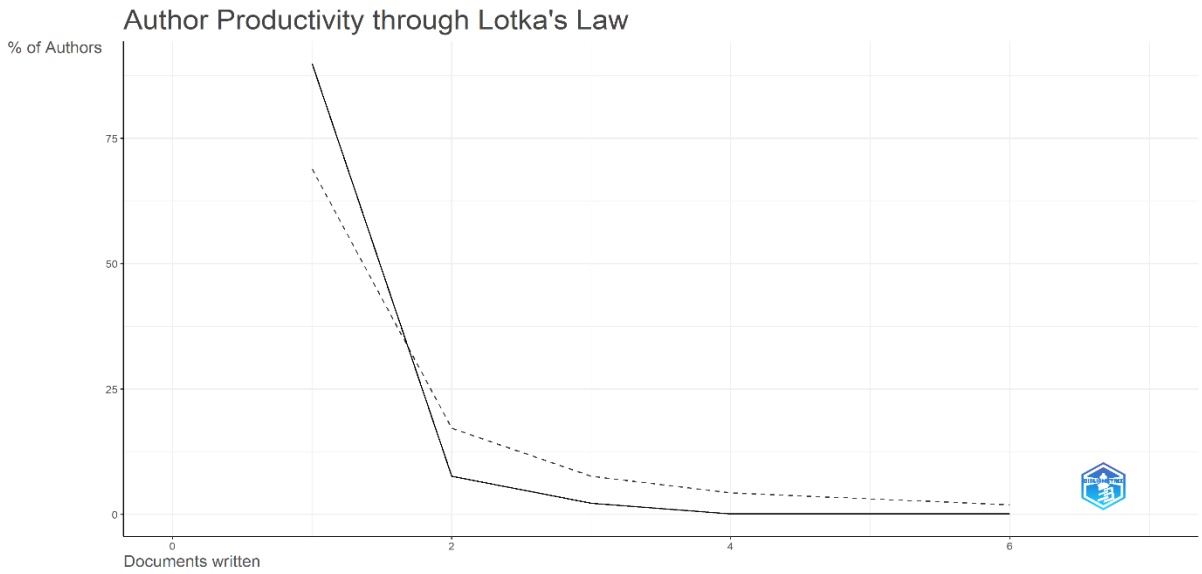

Figure 7 Author Productivity Through Lotka's Law

The top 15 keywords are reported in Table 6. ChatGPT tops the list with 35 instances in it, being the approach to investigate pragmatic competence that the large language models have had since its release to the public (Bubas, 2025; Saeedi and Soltani, 2025). Intelligence only comes next, that is, 31 instances, then there are language (27) and English (24) indicating the EFL focus. Discourse is used 16 times, which shows that the concern about the pragmatic features during the discourse was long-lasting (Dombi et al., 2024; Timpe-Laughlin et al., 2023). Both generative AI and large language models refer to new terms 10 and 9 times each; it is an indication of new shifts in terminology. The ancillary to affective and social dimensions of learners can be seen in the feedback (9), identity (9) and motivation (9). The lack of finely-grained pragmatic constructions like speech acts or politeness among the top 15 is an indication that the terminology is fragmented in the operationalisation of pragmatic competence (Ajabshir, 2025).

Table 6 Most Frequent Words (Keywords) in the Literature (Top 15)

Terms	Frequency
Chatgpt	35
Artificial intelligence	31
Language	27
English	24
Discourse	16
Technology	14
EFL learners	12
Natural language processing	11
Chinese	10

Generative AI	10
Machine learning	10
Feedback	9
Identity	9
Large language models	9
Motivation	9

Table 7 shows trend topics and frequency and time quartile. Deep learning and syntactic complexity have early median years (2022), which denote underlying methodological concerns prior to the generative AI boom (Zhou et al., 2023). ChatGPT shows an annual 2025 medium and 2025 median, which validates its recent and ongoing supremacy since its launch to the public (Bubas, 2025; Saeedi and Soltani, 2025). Artificial intelligence (median = 2024, Q3 = 2025) and generative AI (not shown in frequency column but the emerging one) show long-term relevance. Q3 is 2024 with natural language processing indicating that the consolidation may be a little earlier. The median of discourse (2024) and English (2025) is a continuation of EFL pragmatics. The time resolution between technical (deep learning, syntactic complexity) and tool-related (ChatGPT) terms records how the area is dominated by the technological repositioning (Chen et al., 2025; Crompton et al., 2024).

Table 7 Trend Topics (Frequency and Temporal Quartiles)

Term	Frequency	Year (Q1)	Year (Median)	Year (Q3)
Deep learning	5	2022	2022	2024
Syntactic complexity	5	2021	2022	2025
Coherence	7	2022	2023	2025
Text	6	2022	2023	2025
NLP	5	2022	2023	2025
Artificial intelligence	31	2024	2024	2025
Discourse	16	2023	2024	2025
Natural language processing	11	2022	2024	2024
Chatgpt	35	2024	2025	2025
Language	27	2023	2025	2025
English	24	2024	2025	2025

Figure 8 shows a TreeMap representing the most common words, where the size of a block indicates the frequency of a word. ChatGPT takes up the most space (35 instances), which proves its leading role in the research on EFL pragmatics studies since its launch to the public market (Bubas, 2025; Saeedi and Soltani, 2025). Artificial intelligence seems to be the second most frequent block (31), followed by language (27) and English (24), which are large neighbouring blocks, showing this nature of the field culminators. Discourse (16) and technology (14) are medium-sized blocks, which means that they are continuously devoted to the interactional and instrumental aspects. Smaller blocks such as EFL learners (12), natural language processing (11), Chinese (10), and generative AI (10) identify sub-themes of specialization. This visual hierarchy visibly favors terminologies related to tools as opposed to theoretical pragmatic constructs that will indicate an applied, technology-oriented research orientation (Crompton et al., 2024; Darvin, 2025).

Figure 8 TreeMap of Most Frequent Words

Figure 9 displays a WordCloud of important words, font size being used to indicate frequency. The largest and boldest type indicates that ChatGPT is a key focus of recent pragmatic competence studies in AI mediation (Bubas, 2025; Saeedi and Soltani, 2025). Artificial intelligence and language are other more prominently sized text and English, discourse, and technology moderately represented. Shorter terms like EFL learners, generative AI, feedback, identity, and motivation are peripheral with their mentioning signifying a secondary yet developing area of focus. Remarkably, narrow pragmatic constructs, such as speech acts, politeness, or implicature are virtually unknown due to their appearance in the WordCloud, which is visual evidence of the fragmentation of the terminology of the field and its focus on the technological tools used rather than endorsing pragmatic theory (Ajabshir, 2025; Dombi et al., 2024).

Figure 9 WordCloud of Key Terms

Figure 10 shows the network of co-occurrence of keywords, where each node is a term (word), and an edge shows co-occurrence between two terms. There are several different clusters that form, and this demonstrates how the field has been segmented thematically. ChatGPT and other artificial intelligence tools are in the centre of a cluster that is linked to language, English and EFL learners, with the demonstration of how the tools of generating AI can serve as a base of current research (Bubas, 2025; Saeedi and Soltani, 2025). Another cluster includes discourse, pragmatics, and speech acts, but in peripheral form, implying a secondary focus on pragmatic constructs and prioritizing technology (Ajabshir, 2025). Natural language processing, large language models, and corpus linguistics are connected under another cluster, which reflects the methodological approaches of computational linguistics. The network indicates a minimal bypass between the technical AI terms and the theoretical pragmatic concepts, verifying the fractured intellectual organization of the field, where separate, although to some degree, research streams technology and pedagogy run (Dombi et al., 2024; Timpe-Laughlin et al., 2023).

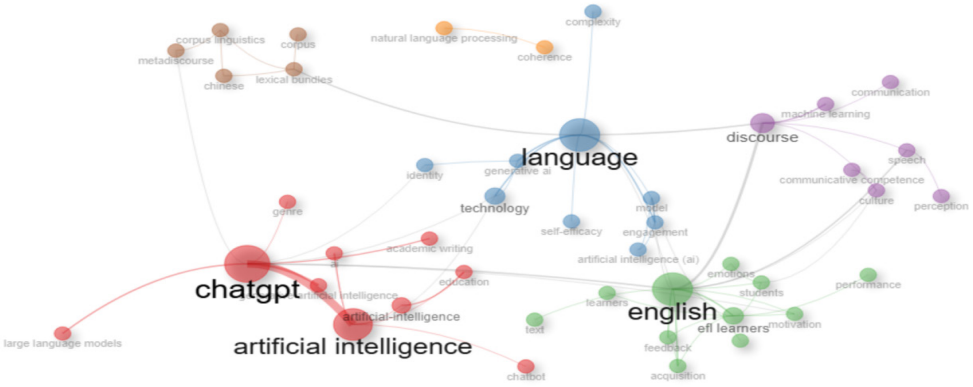

Figure 10 Co-Occurrence Network of Keywords

Co-occurrence network measures of nodes (by cluster) are provided in Table 9. ChatGPT has the highest betweenness centrality (326.80) and PageRank (0.087) in Cluster 1; that is, this term is the most important bridge in between various research themes as it is the most frequent in Table 7 (Bubas, 2025; Saeedi and Soltani, 2025). The next one is artificial intelligence with betweenness of 153.00 and 0.054 PageRank. In Cluster 3, the highest betweenness (427.21) and PageRank (0.097) are observed in English, which can be attributed to its successful linkage of EFL-specific research. EFL students has a moderate betweenness (85.87) and PageRank (0.050). Cluster 4 has discourse with betweenness of 100.57 and Cluster 6 has betweenness of lexical bundles of 88.06. These metrics prove that general terms (ChatGPT, English) are intellectual centers, and more specific pragmatic entities play a peripheral role in the network (Dombi et al., 2024; Timpe-Laughlin et al., 2023).

Table 9 Co-occurrence Network Metrics (Selected Nodes by Cluster)

Node	Cluster	Betweenness	Closeness	PageRank
Cluster 1				
Chatgpt	1	326.801	0.012	0.087
Artificial intelligence	1	153.000	0.009	0.054
Cluster 3				
English	3	427.211	0.013	0.097
EFL learners	3	85.867	0.010	0.050
Cluster 4				

Node	Cluster	Betweenness	Closeness	PageRank
Discourse	4	100.571	0.010	0.048
Cluster 6				
Lexical bundles	6	88.060	0.008	0.032

Table 10 shows four thematic groups along with their words of representative. Cluster 1, which is called Pragmatics, applies to the speech acts, acquisition of the second language, accuracy, communication, impoliteness and prosody, which represent the key pragmatic competence constructs under consideration in the AI-mediated contexts (Ajabshir, 2025; Dombi et al., 2024). Cluster 2, the "Linguistic Features" one, integrates linguistic features with mental disorders and psychological conditions, implying a niche study of the individual differences in the AI-mediated learning (Du et al., 2025). Cluster 3, "Natural Language Processing," includes corpus linguistics, metadiscourse, argumentative writing, and large language model, which suggests the methodological orientations towards computations (Su and Ye, 2025; Yu et al., 2024). Cluster 4 which is Generative AI uses AI-aided language learning, critical thinking, chatbot, and EFL as the technology-oriented stream of research. The decisive division of pragmatic theory (Cluster 1) and technological tools (Cluster 4) confirm the fragmentation of the field (Crompton et al., 2024).

Table 10 Thematic Map: Clusters and Their Constituent Words (Abridged)

Cluster	Cluster Label	Representative Words
1	Pragmatics	Pragmatics, speech acts, second language acquisition, accuracy, communication, impoliteness, prosody
2	Linguistic Features	Linguistic features, mental disorders, psychological states
3	Natural Language Processing	Natural language processing, corpus linguistics, metadiscourse, argumentative writing, large language model
4	Generative AI	Generative AI, artificial intelligence (AI), AI-assisted language learning, critical thinking, chatbot, EFL

The thematic map (strategic diagram), shown in Figure 11, views themes through two dimensions centrality (horizontal axis, indicating a theme's connectedness to the rest of the research network) and density (vertical axis, indicating internal cohesion). The upper right quadrant (motor theme) and pragmatics are found in the upper-right quadrant (motor themes), meaning that these areas are developed and most importantly related to the whole field and are the research core (Ajabshir, 2025; Saeedi and Soltani, 2025). In the basic themes category, the lower-right quadrant (basic themes) contains both these centralized topics, which are both Natural Language Processing and Linguistic Features, yet they also exhibit high centrality and decrease in density (Su and Ye, 2025; Yu et al., 2024). None of the themes are presented in upper-left (niche) or lower-left (emerging or declining) quadrants, which indicates that the field does not have specialized topics that are isolated and oriented at the center but rather focuses on those existing motor and basic themes that are already well-established (Chen et al., 2022).

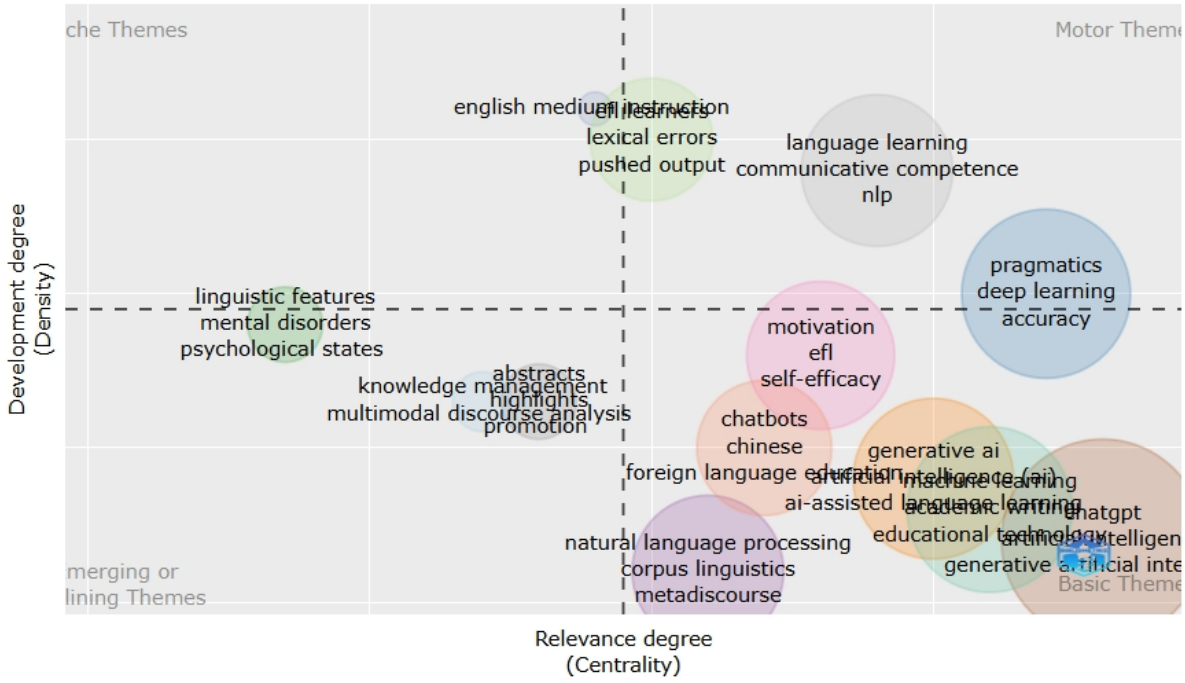

Figure 11 Thematic Map (Strategic Diagram)

Correspondence Analysis (CA) factorial map, which indicates the two-dimensional distribution of research topics, is presented in Figure 12. The horizontal axis (Dim1) splits technology centered vocabulary like ChatGPT and generative AI on the right with learner centered vocabulary like EFL learners and motivation on the left, indicating a technology-pedagogy axis (Chen et al., 2025; Haruna et al., 2025). Vertical dimension (Dim2) separates discourse-level (discourse, coherence) and lower-level (lexical bundles, syntactic complexity) constructs, showing a granularity axis (Zhou et al., 2023; Shin et al., 2025). The field of pragmatics and speech acts steps into the middle zone, which means that it mediates between the technological and pedagogical issues (Ajabshir, 2025; Dombi et al., 2024). Such a field is multidimensional, which is supported by this field structure.

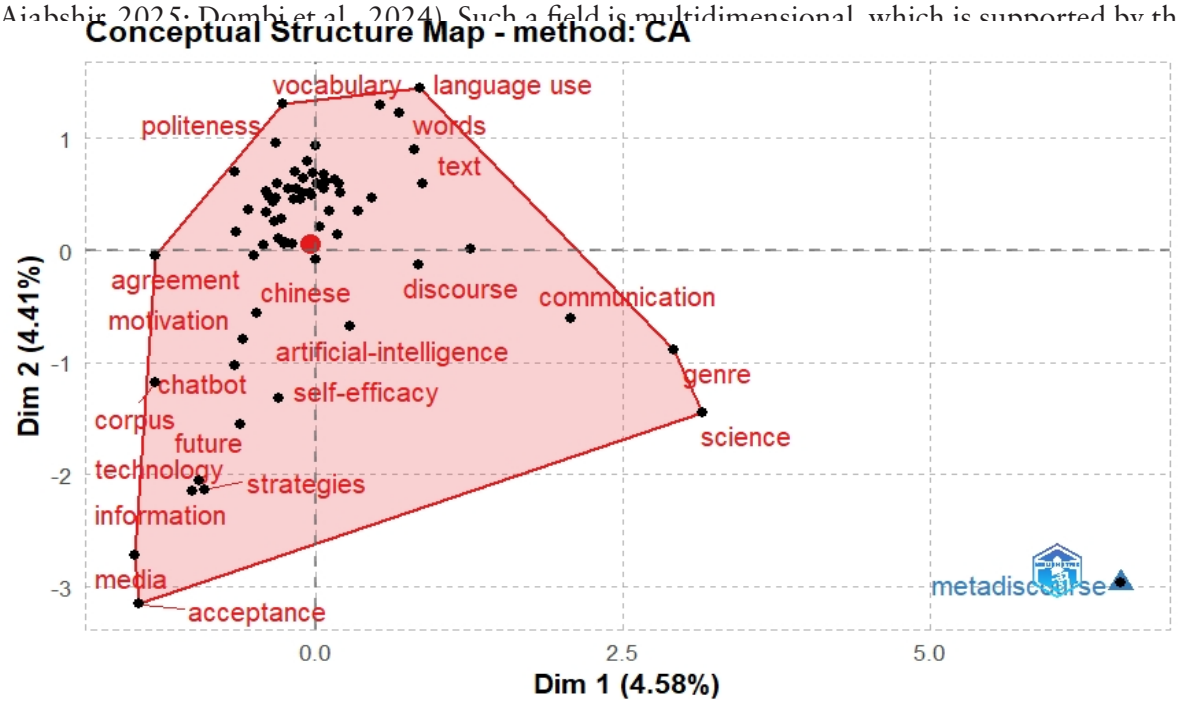

Figure 12 Correspondence Analysis (CA) Factorial Map

Figure 13 shows Multiple Correspondence Analysis (MCA) factorial map, which builds on the CA and analyzes multiple categorical variables simultaneously. The two-dimensional solution provides an evident divide between the research themes based on the Div1 attribute that pits technology-focused terms (ChatGPT, generative AI, large language models) on the right side against and learner-focused ones (EFL learners, motivation, anxiety, willingness to communicate) on the left (Bubas, 2025; Chen et al., 2025; Wang et al., The distinction between discourse-level pragmatics (discourse, pragmatics, speech acts, politeness) in the upper portion and linguistic characteristics (lexical bundle, syntactic complexity, accuracy) in the lower portion is shown by the Dim2 (Ajabshir, 2025; Dombi et al., 2024; Zhou et al., 2023). Artificial intelligence is at the forefront as it relates to it

being a parent term in which several other sub-domains are related. The lack of strong clustering of technology and pragmatic between the two constructs on the diagonal ensures that the field remains fragmented (Crompton et al., 2024).

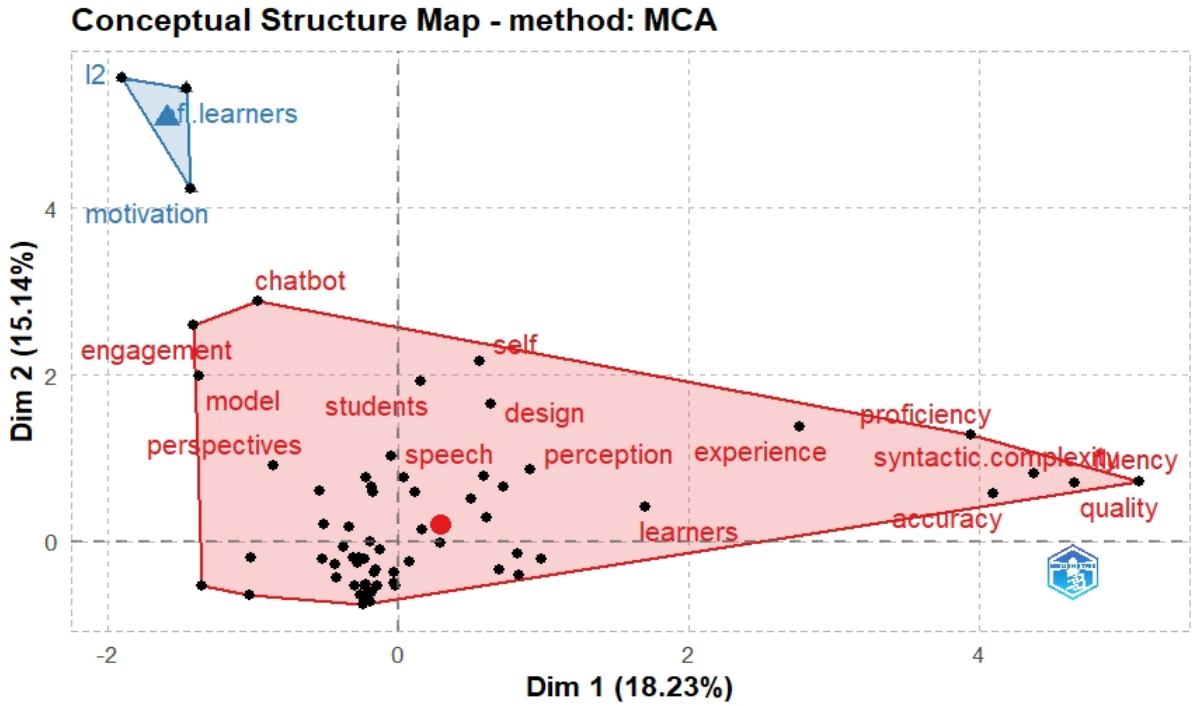

Figure 13 Multiple Correspondence Analysis (MCA) Factorial Map

Figure 14 shows the Multidimensional Scaling (MDS) map and is a representation of the proximity relationships between the research terms using co-occurrence patterns. The distance between terms is the closer they are to each other, the more the terms are used in the same documents. The map shows three different groupings. A thick around ChatGPT, generative AI, and artificial intelligence fill the central-right area, which confirms that these words in technology represent the intellectual center (Bubas, 2025; Saeedi and Soltani, 2025). A second cluster (pragmatics, speech acts, discourse and politeness) is in the upper-left quadrant, suggesting that all these pragmatic constructs constitute a unified but dislocated thematic group (Ajabshir, 2025; Dombi et al., 2024). The third cluster including EFL students, motivation, anxiety and willingness to communicate fall in the lower-left part, which displays the learner-affective dimensions (Chen et al., 2025; Wang et al., 2024). The significant gap between the technology cluster and the pragmatics cluster validates the fragmented intellectual organization of the field in which the technological tools and the pragmatic theory are not integrated in a sufficient way

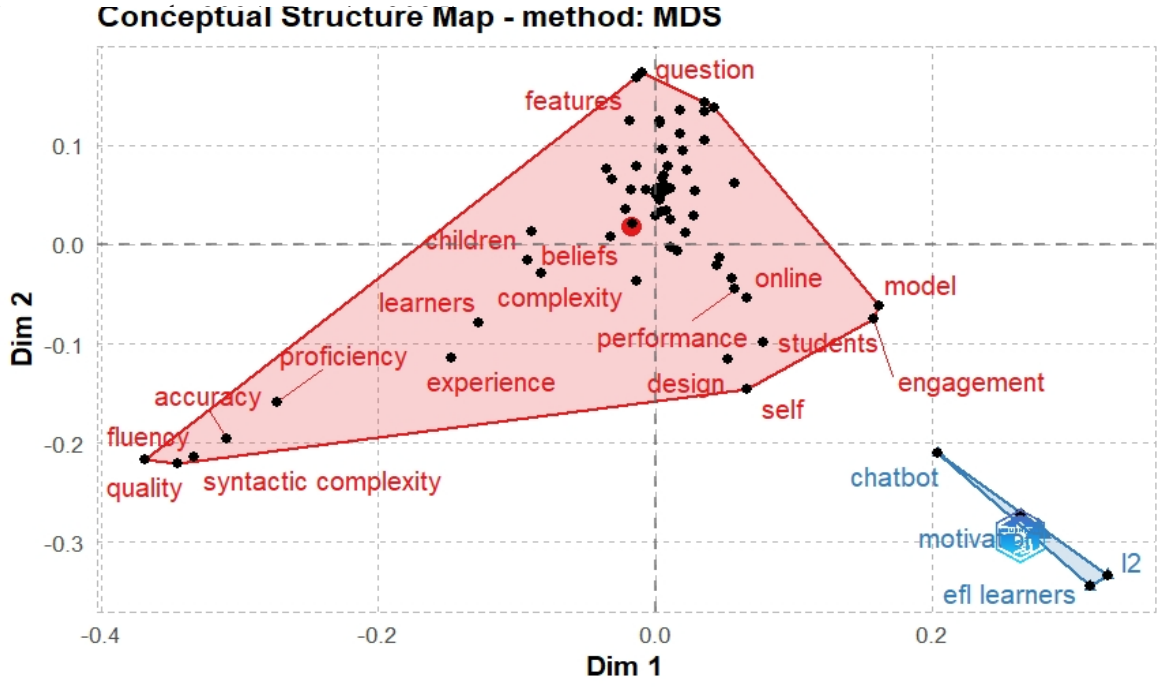

Figure 14 Multidimensional Scaling (MDS) Map

Discussion of the Study

The trend of exponential increase recorded in this review between 2 articles in 2021 and 187 in 2025 is not academic talk, but a sign of the basic change of discipline unleashed by the popular availability of generative AI systems. This frenzy was not due to the incompleteness of the established pragmatic competence research, but rather a result of the fact that ChatGPT and other tools radically changed the state of material resources in which EFL learners could train pragmatic skills (Beuls and Van Eecke, 2024). Large language models give people unconstrained, context-sensitive interaction even at scale, in comparison to rule-based chatbots that needed pre-programmed scripts to operate and depended on interactions between humans and costly immersion programs to offer some pragmatic input (Abdelhalim and Alsehibany, 2025). That it has been concentrated in 20242025, as opposed to growing steadily over the entire five-year horizon, suggests that generative AI was a disruptive technological burst, and not an evolutionary change (Bubas, 2025). The development of AI was not staged but was interrupted by the sudden capabilities of AI, which provoked a reconsideration of what the pragmatic teaching automated would be able to do (Cengiz et al., 2025).

The fact that China dominated the publication output (168 records) by far casts doubt in the generalisability of conclusions that are starting to come out of this area. The majority of the Chinese EFL contextual conditions are that most of what the literature states regarding AI mediated pragmatic competence might be culturally specific interactional strategies, politeness practices and power relationships between the learners and the technology (Quan and Chen, 2025). The very notion of pragmatic competence is already culture-specific--what is the right request of apology greatly depends on the linguistic group (Schenck, 2024). Where the Chinese learners have disproportionately acquired knowledge by interacting with Western-built AI systems (ChatGPT, Gemini), the knowledge base becomes susceptible to naturalizing a hybrid, technology-influenced pragmatic register, possibly ungeneralizable to other EFL settings (Mahmoudi-Dehaki and Nasr-Esfahani, 2025). The high rates of collaboration between China and Anglophone countries recorded in this review are indicative of the fact that geographic concentration remains intact to the degree that methodological and theoretical contributions of Western institutions curb some insularity (Chen et al., 2022; Shang, 2025).

This fact that the law of Lotka has been violated in the productivity of authors and that we are in a phase of pre-maturation of the field. Having 89.9% of authors with a single publication, the research community is very high in what bibliometricians label transient authorship - researchers working in AI-mediated pragmatics one time, and then drop out of the field (Lotka, 1926). This trend is starkly different to established disciplines in which there is a consistent group of prolific writers continuing to create knowledge (Chen et al., 2022). What the implication suggests is disturbing: scientists are possibly even placing AI-mediated pragmatics as a trendy topic that can be followed in one study, instead of a series of investigations (Aldaghri & Alshraah., 2025). The field will not develop a critical mass of scholars without longitudinal commitment since the danger is that the field is going to generate localized non-cumulative statements that do not add up to constructing a sturdy theory (Matiienko-Silnytska et al., 2025). The very few active writers who showed consistent output, like Xu JJ, and the creative trio comprised of Dombi, Sydorenko, and Timpe-Laughlin, thus have a disproportate burden of intellectual continuity (Karatay et al., 2025; Dombi et al., 2024; Timpe-Laughlin et al., 2023).

A deeper underlying epistemological issue is read between the integrative openness of the thematic fragmentation visualized in co-occurrence networks and factorial maps. The terms associated with technology (ChatGPT, generative AI, large language models) have their own clusters, and pragmatic concepts (Speech acts, politeness, implicature) are elementary, and the nodes between these two domains are difficult to find (Su and Ye, 2025). This divide implies the existence of two parallel literatures: one that research what AI can do technologically, and one that studies what learners need pragmatically (Yu et al., 2024). There is not much talking between the two. Scholars within the technology stream praize the fluency and scalability of AI and never ask questions about the pragmatic output models of AI being target-like norms (Jiang and Hyland, 2025). The scholars in the pragmatics stream report the weaknesses of learners without accounting in detail how the affordances of AI such as the lack of patient limits, the absence of judgmental reactions, the absence of social anxiety, etc. may help learners practice in conditions of impossibility in a human-human interaction (Tai and Chen, 2024; Wang et al., 2024). This disunity postpones the key question of the field: not the question of AI being able to teach pragmatics, but under what circumstances, to what learners, to which purposes (Du et al., 2025; Sun et al., 2025).

The analysis of the temporal trend exacerbates the situation. The terms like deep learning and syntactic complexity (median 2022) were replaced by ChatGPT (median 2025) or captured a radical shift in general AI methods to specialized generative models (Zhou et al., 2023). But this re-ornithic, high-tech reorientation has its dangers. Pragmatic transfer, longitudinal development, and sociocultural appropriateness are among the questions that may be pushed aside as researchers pursue the next big AI model (Hasan et al., 2025; Huang & Wang, 2025). It is possible that the field is producing numerous studies of numerous tools, without producing deep understanding of a particular phenomenon (Qin and Dong, 2025). This fear is validated by the fact that the fine-grained pragmatic constructs of high-frequency keyword sets are not only absent in the field but are actively discussed more regarding ChatGPT in the field than about politeness, artificial intelligence versus implicature (Tan, 2025). AI-mediated pragmatic competence study will not yet be guided by pedagogy, but by technology until the momentum shifts towards pragmatics-first inquiry (Darvin, 2025; Crompton et al., 2024).

Conclusion and Implication

This systematic review contends that AI-mediated research on pragmatic competence in EFL has experienced an explosive growth since 2021, but that theoretical solidification has lagged this growth. The discipline is still divided on two planes, in geography, where China leads the world production, and in theme, where technology-oriented research exists independently of pragmatics-oriented research. There is deviation of author productivity on expected distributions meaning that they have high researcher turnover and low cumulative knowledge. Although there is a growing body of research to consider ChatGPT and generative AI, the keywords of fine-grained pragmatics like speech acts, politeness, and implicature are banal to the discourse of the field. This lack of relation to the technological passion and the material of pedagogy is the main issue facing the field. In terms of educators, the results warn of unthoughtful AI implementation. Existing data indicates that interaction facilitated by AI can lead to the formation of hybrid pragmatic registers that are not a priori like human-human standards. Instructors are thus advised to present AI as an opportunity to practice in a structured manner instead of impacting on the real interaction. Curriculum designers need to incorporate the most crucial aspects of digital literacies that explicitly juxtapose AI produced pragmatic output with target community norms to teach learners how to suppress non-target-like socialization. To the researchers, the research field nestles on both long-term, programmatic enquiry as opposed to the isolated tool-focused research. The longitudinal designs of pragmatic development across longer periods of interaction between AI are urgently required. Thematic fragmentation requires intentional bridging work which ties up computational possibilities with pragmatic theory. The network of collaborations must also be extended beyond China-Anglophone to encompass underrepresented areas so that the findings can be generalizable. Smart policymakers should focus on fair distribution of AI infrastructure to invest in teacher preparation, which focuses on practical scaffolding. AI-mediated language program evaluation frameworks should feature areas of pragmatic competence as opposed to basing evaluation on fluency or accuracy. In the absence of conscious effort, the subject area will breed technologically advanced students who can speak fluent, but pragmatically inauthentic. The timeframe during which the role of AI in pragmatic development has shaped the future is open, yet it must be closed through a swift intervention on the levels of research, pedagogy, and policy.

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Authors' contributions
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Conflicts of Interests
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