From Automation to Cognition: Thematic Development of AI-Assisted English Pedagogy, 2019–2025

Tong Thanh Thuy[1], Pham Thi Ngoc Thi[2]

[1] University of Labour and Social Affairs (Campus II), Ho Chi Minh City, Vietnam
[2] Kim Oanh Real Estate Group, Vietnam

Abstract

In recent years, artificial intelligence has moved from the margins of education to its very core, profoundly reshaping how English is taught and learned. This study offers a descriptive bibliometric overview of research on AI-assisted English language teaching (AI-ELT) based solely on data retrieved from the Scopus database between 2019 and 2025. Rather than relying on external analytic software, the analysis was conducted directly through Scopus's built-in tools to ensure transparency and reproducibility.

The findings reveal an exceptional surge in academic productivity, especially after 2022, when generative models such as ChatGPT began influencing classroom practice and teacher research alike. Most publications are concentrated in the fields of social sciences and education, followed by computer science and the humanities, confirming the hybrid nature of AI-ELT as both a pedagogical and technological domain. The most active contributors and institutions are clustered in East Asia particularly in Hong Kong, mainland China, Taiwan, and Singapore reflecting the region's growing leadership in educational AI.

Overall, the results indicate a paradigmatic shift from automation toward cognition and reflection in English pedagogy. AI is increasingly viewed not merely as a tool for efficiency but as a partner in meaning-making, creativity, and learner autonomy. The study concludes that future research should deepen empirical validation, explore teacher AI collaboration, and strengthen ethical frameworks that support human-centered innovation in language education.

Keywords: *Artificial intelligence (AI); English language teaching (ELT); AI-assisted pedagogy; ChatGPT and generative AI; Bibliometric overview; Scopus database analysis*.

1. Introduction

Over the past few years, the world of education has been moving at an extraordinary pace, and artificial intelligence (AI) now stands at the center of that transformation. In English language teaching (ELT), the impact has been particularly visible. What began as simple automation checking grammar, correcting pronunciation, or supporting translation has evolved
into something far more complex. Today, AI supports teachers and learners in ways that were previously unthinkable, from adaptive learning environments to conversational models such as ChatGPT that can generate feedback, simulate dialogue, and even scaffold reflection. Step by step, the focus of technology in ELT has shifted from efficiency toward cognition, creativity, and human–machine collaboration.

Despite this growing wave of innovation, the academic study of AI in English language education remains somewhat dispersed. Many works have examined computer-assisted learning or intelligent tutoring systems, yet very few have mapped the *overall research landscape* or identified how the field itself has changed through time. Since 2022, the rise of generative AI has created a new surge in publications, but systematic evidence that connects this recent momentum with earlier stages of CALL-oriented research is still scarce. Without such synthesis, educators and policymakers risk misunderstanding the scope and direction of this transformation, as well as its implications for pedagogy and learning design. This study was therefore undertaken to provide a clear and data-grounded overview of research on AI-assisted English language pedagogy between 2019 and 2025, using the Scopus database as the sole data source. The analysis

draws on descriptive statistics available directly within Scopus, focusing on publication trends, disciplinary patterns, influential authors, institutional networks, and journal sources. By using Scopus's built-in analytical tools rather than external software, the study ensures a transparent and replicable procedure that aligns with the descriptive nature of bibliometric inquiry.

The contribution of this work lies in three interconnected areas. First, it traces how academic interest in AI-assisted ELT has expanded during a critical period when generative AI reshaped the very idea of teaching and learning. Second, it reveals how this body of research sits at the crossroads of education, linguistics, and computing, suggesting that AI-ELT has become a hybrid and evolving domain rather than a narrow subfield. Third, it highlights the strong presence of East Asian scholarship particularly from Hong Kong, mainland China, Taiwan, and Singapore whose sustained output and collaboration have gradually repositioned Asia as a key intellectual hub in educational AI. Taken together, these insights form a foundation for deeper theoretical reflection on how artificial intelligence continues to transform language pedagogy, not merely as a tool but as a cultural and cognitive force reshaping education itself.

2. Methodology
2.1. Data Source
The present study is based exclusively on data retrieved from the Scopus database, which is widely recognized for its comprehensive coverage of peer-reviewed journals in education, linguistics, and computer science. Scopus was selected because of its reliability, consistent indexing policy, and compatibility with descriptive bibliometric techniques without requiring external analytical software. All searches and filtering procedures were conducted manually within the Scopus interface to ensure transparency and reproducibility.

2.2. Search Strategy and Query Design
The data collection followed a structured retrieval process focusing on the intersection between artificial intelligence and English language pedagogy. A Boolean search query was applied in the TITLE-ABS-KEY field to capture studies where AI and English language teaching or learning were core themes. The final search string was as follows: *TITLE-ABS-KEY ("artificial intelligence" OR "AI" OR "ChatGPT") AND ("English language teaching" OR "language learning" OR "EFL" OR "TESOL") AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND SUBJAREA (SOCI OR PSYC OR ARTS OR EDUC) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2024) OR LIMIT-TO (PUBYEAR, 2025)) AND (LIMIT-TO (LANGUAGE, "English")).* This search was executed in October 2025, and it was designed to identify journal articles and review papers published in English between 2019 and 2025. The inclusion of terms such as "ChatGPT" and "TESOL" ensured that both classical and contemporary AI-related works in English language teaching were captured.

2.3. Data Screening, Analytical Procedure, and Limitations
The initial Scopus query retrieved a total of 5,519 documents, comprising 5,120 articles and 399 review papers published between 2015 and 2025. To ensure disciplinary relevance, the dataset was restricted to records categorized under *Social Sciences, Psychology, Arts and Humanities,* and *Education.* Papers classified in technical domains such as *Engineering* or *Computer Science* were excluded unless they demonstrated a clear pedagogical orientation, such as applications in adaptive learning, intelligent tutoring, or cognitive-based instruction.

A multi-step screening process was conducted using Scopus's built-in filters. Duplicate entries, non-English publications, and unrelated records were manually removed to improve accuracy and consistency. The refined dataset was subsequently organized by year of publication, author affiliation, journal source, and subject area, corresponding to the descriptive indicators later presented in *Figures 1–5* and *Tables 1–2*.

Rather than employing external bibliometric software such as VOSviewer or Bibliometrix, the analytical process was performed entirely within the Scopus environment using

its "Analyze Search Results" and "View Citation Overview" functions. This method provided structured quantitative insights across five analytical dimensions: (1) annual publication trends (2019–2025), which

captured the pace and intensity of research expansion; (2) subject area distribution, outlining the disciplinary structure of AI-assisted ELT studies; (3) leading authors and institutional contributions, reflecting productivity and regional leadership; (4) journal source analysis, identifying the most active publication outlets; (5) citation overview, measuring scholarly visibility and influence. Each visualization including document growth, author productivity, and institutional performance was generated directly from Scopus's analytical dashboard and exported in tabular or graphical format for interpretation.

Despite the descriptive richness of this approach, certain limitations must be acknowledged. Because the study relies exclusively on Scopus's internal analytical tools, it does not include co-occurrence mapping or network-based clustering that are typical of software- driven bibliometric analyses. Consequently, the results emphasize quantitative tendencies rather than conceptual interrelations. Nonetheless, this methodological choice ensures transparency, replicability, and clarity, providing a reliable initial mapping of the evolving domain of AI- assisted English language pedagogy without external processing or algorithmic manipulation.

3. Results and Thematic Overview
3.1. Publication Trends and Research Growth (2019–2025)

Table 1. Annual Research Output and Growth Rate in AI-Assisted English Pedagogy (2019– 2025)

Year	Number of Documents	Growth Trend (%)
2019	49	–
2020	72	46.90%
2021	105	45.80%
2022	211	101.00%
2023	521	147.00%
2024	1,526	193.00%
2025	3,035	98.90%

Source: Scopus database (2019–2025), data generated using "Analyze Search Results."

The evolution of research output on AI-assisted English pedagogy displays an extraordinary upward trajectory over the last seven years. Based on Scopus data, only 49 documents were published in 2019, followed by a gradual increase to 72 in 2020 and 105 in

2021. Although the growth was moderate during these initial years, it reveals a foundational phase where scholars mainly examined traditional forms of computer-assisted language learning and early-stage automation tools. A noticeable surge began in 2022, when publication counts more than doubled to 211 documents, reflecting growing academic attention toward the educational applications of artificial intelligence. This acceleration became striking in 2023, with 521 publications, coinciding with the emergence of generative AI platforms and the integration of ChatGPT into English language teaching and assessment. The most dramatic expansion, however, occurred during 2024 and 2025, where research output reached 1,526 and 3,035 documents, respectively. This represents a nearly fiftyfold increase compared to 2019, marking an inflection point in the field. Such an exponential growth curve demonstrates that AI is no longer perceived merely as a technological supplement, but rather as a transformative force redefining pedagogy, cognition, and assessment in language education.

Our analysis suggests that this trend corresponds to a paradigm shift: from the automation of linguistic tasks (e.g., grammar correction, translation, pronunciation feedback) to the cognitive augmentation of learners and teachers. The quantitative growth, therefore, mirrors an intellectual deepening a collective movement from the mechanistic use of AI toward conceptual and reflective integration in English language

pedagogy. In other words, as the number of publications multiplied, the discipline itself evolved in both scope and depth, embodying the transition "from automation to cognition."

3.2 Disciplinary Distribution and Knowledge Domain Analysis Figure 1. Distribution of Publications by Subject Area (2019–2025)

Documents by subject area
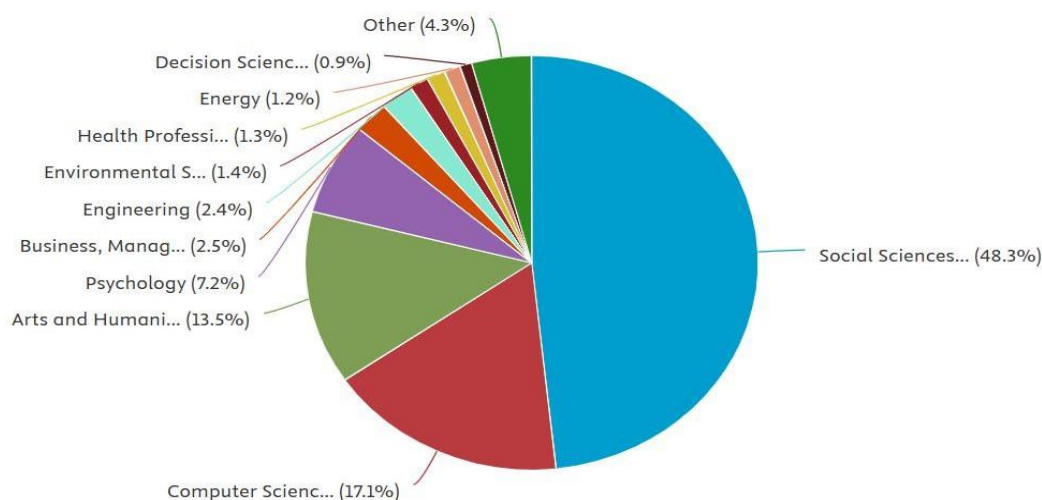
Source: Scopus database (2019–2025), compiled from Scopus subject-area classification.

The disciplinary structure of research on AI-assisted English language teaching (AI-ELT) reveals a distinctly *social-scientific orientation*, emphasizing pedagogy and human-centered design. Nearly half of all retrieved publications (48.3%) fall under the Social Sciences, reflecting a dominant focus on education, linguistics, and applied learning sciences. This tendency underscores how AI integration in language teaching is primarily approached through curricular innovation, learner cognition, and reflective pedagogy rather than through narrowly technical development.

The second most represented discipline is Computer Science (17.1%), which acts as the technological foundation of the field. Studies here often examine machine learning, natural language processing, speech recognition, and chatbot-based tutoring systems technologies that enable personalized learning environments and automated feedback mechanisms. Over time, however, the relationship between computer science and education has evolved from one- directional support to mutual influence. Advances in AI now reshape pedagogical models, while insights from classrooms guide algorithmic refinement and system design. This interplay marks a mature stage of AI–human synergy, moving beyond automation toward adaptive, cognition- aware instruction.

Meanwhile, Arts and Humanities (13.5%) and Psychology (7.2%) provide a theoretical counterbalance. Research in these areas deepens understanding of motivation, affective engagement, and the ethical dimensions of AI in education. Many of these works explore the *humanistic face* of AI literacy encouraging reflection, critical thinking, and the preservation of creativity amid technological mediation.

A smaller yet meaningful contribution arises from Business and Management (2.5%) and Engineering (2.4%), where scholars investigate digital transformation, institutional strategies, and the governance of AI learning platforms. Other disciplines, including Environmental Science, Health Professions, and Decision Sciences, contribute less than ten percent combined, yet their appearance indicates the cross-sector diffusion of AI-driven educational frameworks. These peripheral connections show how sustainability, well-being, and decision analytics occasionally intersect with English language pedagogy.

Taken together, the data affirm that AI-ELT is an interdisciplinary hybrid, rooted in educational theory but powered by computational innovation. The coexistence of cognitive, linguistic, and technical strands implies that effective AI pedagogy depends on two intertwined competencies *humanistic insight* and *algorithmic precision*. In the modern classroom, this dual expertise is no longer optional; it has become

central to the training of teachers and the design of curricula in the digital age.

3.3. Leading Authors and Research Productivity

Figure 2. Top 10 Most Productive Authors in AI-Assisted English Pedagogy Research (2019–2025)
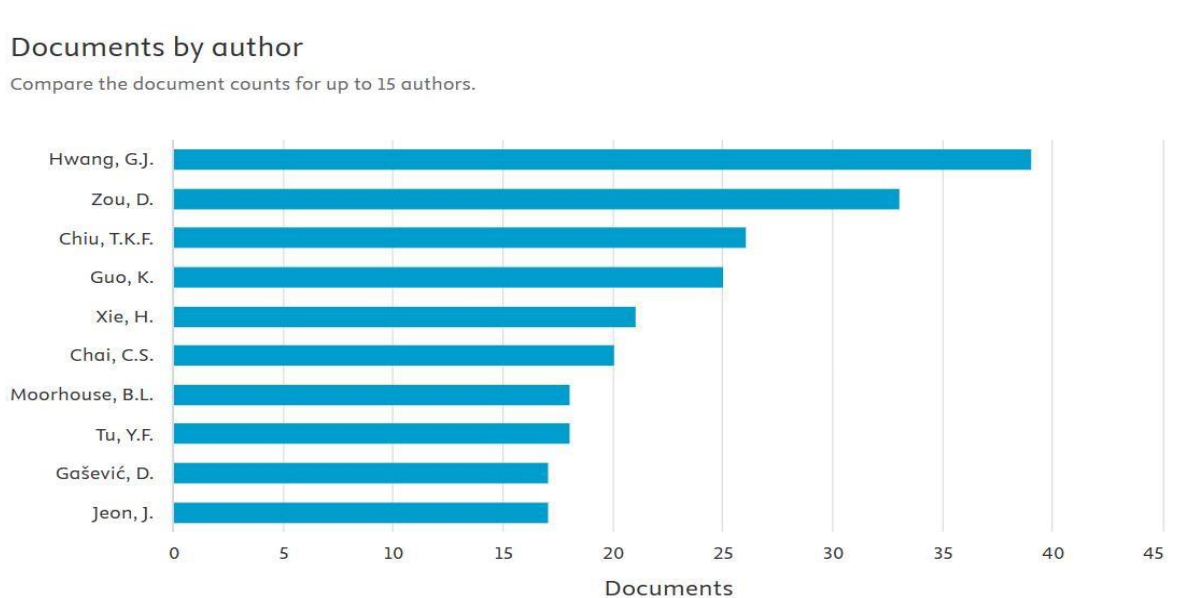
Source: Scopus database (2019–2025), manually compiled from author productivity data.

The author productivity analysis identifies a set of prominent scholars who have significantly shaped the field of AI-assisted English pedagogy. As shown in Figure 3, Hwang G.J. leads with nearly 40 publications, followed by Zou D. with more than 30 papers, and Chiu T.K.F. and Guo K. with around 25 each. This pattern reveals the strong influence of East Asian researchers, particularly from Taiwan, Hong Kong, and mainland China, where educational technology and language learning innovation have been actively integrated for over a decade.

Interestingly, the dominance of these scholars is not only quantitative but thematic. Hwang G.J. and Zou D. are recognized for pioneering studies on adaptive learning, AI-supported feedback, and mobile-assisted language learning (MALL), which represent the early "automation–augmentation" stage of the discipline. Meanwhile, authors such as Chiu T.K.F. and Guo K. have contributed to the emerging cognitive and affective dimensions of AI pedagogy, exploring how AI can foster reflection, creativity, and learner autonomy.

Other influential names, including Xie H., Chai C.S., and Moorhouse B.L., have expanded the discourse toward teacher perspectives and human AI collaboration. Their recent works focus on pedagogical frameworks that reposition AI not merely as an instructional tool but as a co-participant in meaning-making and knowledge construction. Our analysis suggests that the concentration of high-impact authors in East Asia indicates a regional leadership in educational technology research. However, the growing presence of scholars such as Tu Y.F.,

Gašević D., and Jeon J. also points toward a more diversified and cross-disciplinary research community, where AI intersects linguistics, psychology, and learning analytics. Overall, the author network highlights how individual leadership, regional innovation ecosystems, and collaborative research cultures collectively drive the knowledge expansion in AI-enhanced language education.

3.4. Documents per year by source

Figure 3. Annual Distribution of Documents by Source
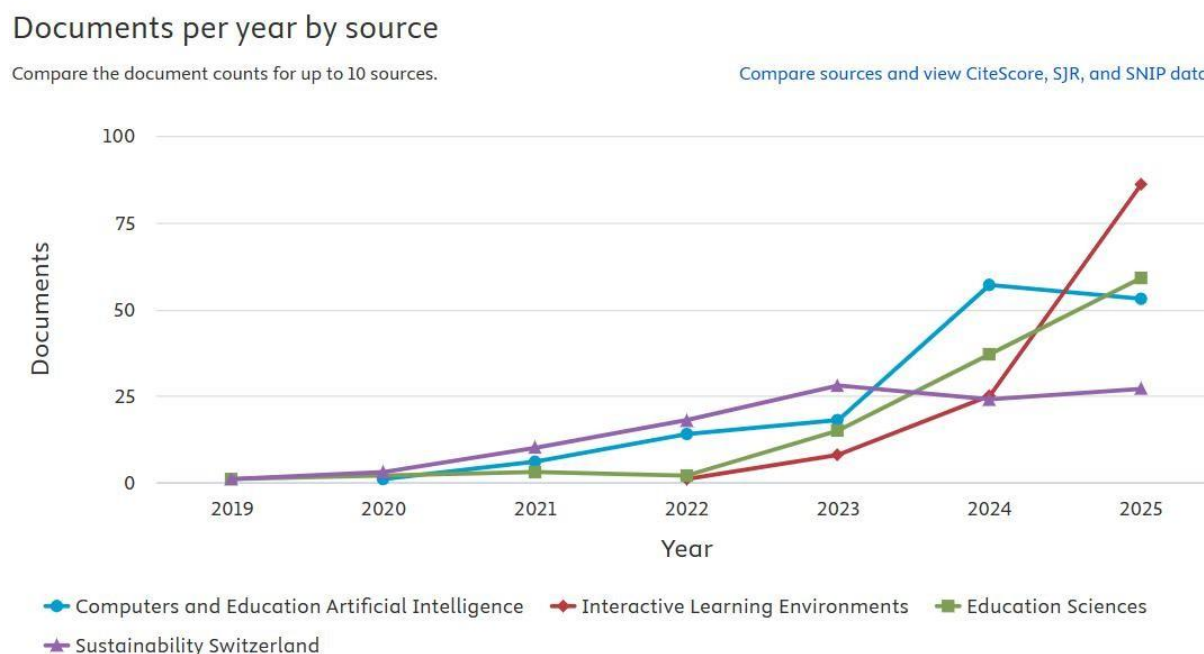
Source: Scopus database (2019–2025), generated using "Analyze Search Results – Source Titles."

The source analysis reveals that research on AI-assisted English pedagogy is increasingly concentrated in a small number of high-impact journals specializing in educational technology and applied linguistics. As illustrated in Figure 3, Computers and Education: Artificial Intelligence, Interactive Learning Environments, Education Sciences, and Sustainability (Switzerland) emerge as the most active publication outlets between 2019 and 2025.

During the early stage (2019–2021), only a few articles appeared sporadically across general education journals, reflecting the exploratory nature of AI applications in language learning. However, from 2022 onwards, output began to accelerate sharply, with Computers and Education: Artificial Intelligence showing a sustained upward trend and surpassing fifty publications per year by 2024. This journal's rise mirrors the academic community's shift toward data-driven and algorithmic perspectives on teaching and learning.

In contrast, Interactive Learning Environments demonstrated a delayed yet explosive growth, climbing from minimal publications before 2022 to nearly one hundred by 2025. Its thematic focus on interactive design, intelligent tutoring, and student engagement aligns well with the "cognitive" turn observed in this field. Meanwhile, Education Sciences showed a steady trajectory of growth, capturing studies that emphasize teacher training, AI literacy, and curriculum integration, particularly in Asian higher-education contexts. Finally, Sustainability (Switzerland) represents an interdisciplinary platform linking AI-enhanced education with social responsibility and ethical learning, suggesting that the sustainability discourse has entered the educational AI conversation in recent years.
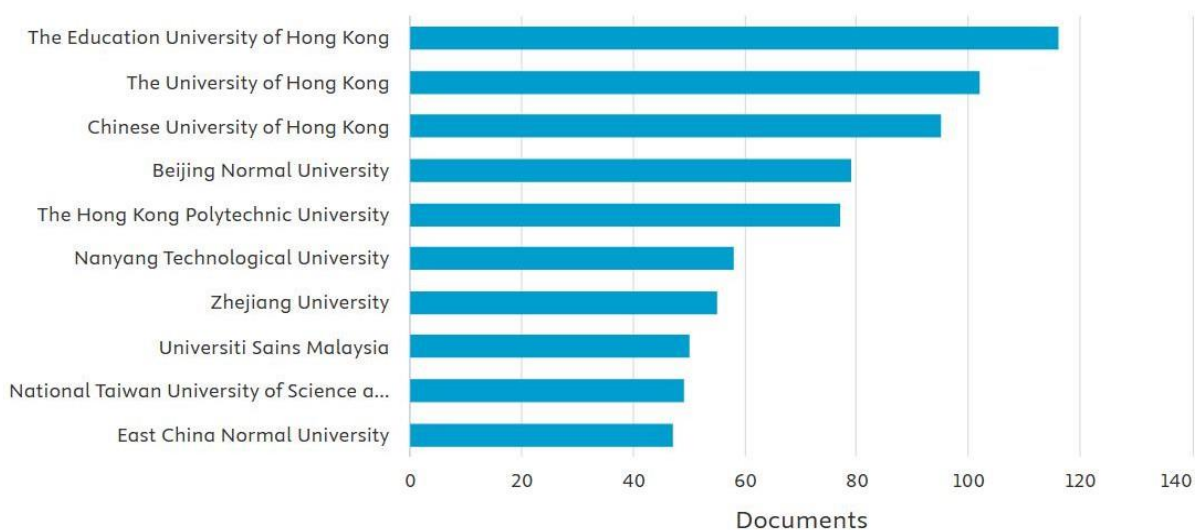
Overall, the diversification of journals reflects a maturing research ecosystem: one that extends beyond computer-assisted language learning (CALL) to encompass pedagogical cognition, digital ethics, and cross-disciplinary collaboration. This shift indicates that AI is no longer confined to the technical margins of language learning but is increasingly positioned as a core pedagogical agent that transforms how knowledge, reflection, and creativity are cultivated in the classroom.

3.5. Institutional Contribution and Regional Leadership

Figure 4. Institutional Contribution and Regional Leadership in AI-Assisted English Pedagogy (2019–2025)

Documents by affiliation

Compare the document counts for up to 15 affiliations.

Affiliation	Documents
The Education University of Hong Kong	~116
The University of Hong Kong	~102
Chinese University of Hong Kong	~95
Beijing Normal University	~79
The Hong Kong Polytechnic University	~77
Nanyang Technological University	~57
Zhejiang University	~55
Universiti Sains Malaysia	~50
National Taiwan University of Science a...	~49
East China Normal University	~47

Source: Scopus database (2019–2025), generated using "Analyze Search Results – Affiliation.

The institutional landscape of AI-assisted English pedagogy research is markedly dominated by East Asian universities, as illustrated in Figure 4. The Education University of

Hong Kong, University of Hong Kong, and Chinese University of Hong Kong occupy the top three positions, each contributing close to or above one hundred publications during the 2015– 2025 period. Together, these institutions account for nearly one-third of the global research output in this domain, reflecting Hong Kong's long-standing investment in technology-enhanced language education and its bridging role between Western pedagogical traditions and Asian digital innovation. Beyond Hong Kong, major contributions emerge from mainland China, with Beijing Normal University, Zhejiang University, and East China Normal University serving as national hubs for AI-driven educational reform.

Their research has increasingly focused on intelligent tutoring systems, multimodal learning analytics, and cognitive modeling, signaling a shift from technical development to pedagogical integration. In parallel, institutions such as Nanyang Technological University (Singapore) and Universiti Sains Malaysia have become regional leaders in Southeast Asia, particularly in exploring AI literacy, teacher readiness, and ethical frameworks for classroom deployment. National Taiwan University of Science and Technology also plays a distinctive role by linking engineering-based AI applications with language-learning design, creating a cross- disciplinary synergy that few Western universities have achieved at scale.

This regional clustering indicates that Asia has become the epicenter of AI-supported language education research, surpassing the earlier Western dominance seen in traditional CALL studies. The pattern also suggests an emerging form of "East-East collaboration", in which universities across Hong Kong, mainland China, Taiwan, Singapore, and Malaysia share methodological frameworks and co-authorship networks.

Such collaborations not only accelerate publication productivity but also contribute to theoretical innovations that integrate cognitive, affective, and sociocultural perspectives within AI pedagogy. Our analysis suggests that institutional leadership in this field is shaped less by size or funding alone and more by strategic alignment between policy, technology, and teacher education. The prominence of Hong Kong and Chinese universities therefore symbolizes a paradigm shift in global knowledge production, where educational AI is both locally contextualized and globally relevant.

3.6. Global Collaboration and Institutional Leadership

The findings summarized in Table 2 illustrate the evolving landscape of scholarly leadership and global collaboration in AI-assisted English language pedagogy between 2019 and 2025. A clear regional pattern

emerges, with East Asia particularly Hong Kong, mainland China, and Taiwan serving as the intellectual nucleus of research activity. The Education University of Hong Kong (116 documents), the University of Hong Kong (102), and the Chinese University of

Hong Kong (95) form a tightly connected institutional cluster that consistently produces high- impact studies on AI-integrated pedagogy, teacher education, and cognitive-based language learning. These universities have become international benchmarks for integrating artificial intelligence into communicative and adaptive learning frameworks.

Table 2: Summary of Leading Authors, Key Institutions, Funding Sponsors, and Contributing Countries (2019–2025)

Category	Top Entities	Documents	Key Insights / Contributions
Authors	Hwang, G.J. (39); Zou, D. (33); Chiu, T.K.F. (26); Guo, K. (25); Xie, H. (21)	20–40 each	Pioneers in adaptive learning, AI-assisted feedback, and human–AI collaboration in language education.
Institutions	Education University of Hong Kong (116); University of Hong Kong (102); Chinese University of Hong Kong (95); Beijing Normal University (79); Hong Kong Polytechnic University (77)	70–120	Core hubs in East Asia advancing AI literacy, teacher training, and cognitive-based pedagogy.
Funding Sponsors	National Natural Science Foundation of China (135); National Science and Technology Council (74); National Science Foundation (64); Ministry of Science and Technology, Taiwan (55)	50–135	Major funding sources supporting interdisciplinary research in educational AI and applied linguistics.
Countries / Territories	China (1,253); United States (717); Saudi Arabia (368); Hong Kong (353); United Kingdom (304); Malaysia (243); Taiwan (228); Australia (222)	–	China and East Asia dominate publication output; Western nations show increasing cross- regional collaboration and conceptual refinement.

Source: Scopus database, manually compiled by the author

Prominent individual scholars reinforce this regional leadership. Hwang G.J., Zou D., and Chiu T.K.F. are among the most productive authors, collectively shaping the theoretical and methodological foundations of the field. Their research has advanced adaptive learning systems, AI-mediated feedback, and the conceptualization of human–AI collaboration in education. Notably, these scholars' cross-institutional co-authorship patterns indicate the rise of a localized epistemic community in East Asia one characterized by both disciplinary integration and regional solidarity. This community has not only driven publication productivity but also transformed the global dialogue on AI pedagogy from tool-oriented discussions to cognition- and ethics-oriented frameworks.

In parallel, the funding structure reveals how research policies have supported this regional momentum. The National Natural Science Foundation of China, Taiwan's Ministry of Science and Technology, and the National Science Foundation (U.S.) have been major contributors, collectively sponsoring hundreds of projects that bridge computer science with applied linguistics and educational

psychology. Such investment patterns confirm that policy alignment and national strategy play a decisive role in sustaining research ecosystems where AI and pedagogy intersect.

Geographically, China (1,253 documents) leads global output, followed by the United States (717), Saudi Arabia (368), and Hong Kong (353). While East Asia's dominance reflects strong institutional networks and consistent policy support, Western countries have increasingly contributed through conceptual refinement and interdisciplinary synthesis, focusing on ethics, cognitive engagement, and sustainable education models. The growing participation of nations such as Malaysia, Taiwan, and Australia further demonstrates a diffusion of innovation across the Global South, where localized educational challenges are addressed through AI-enhanced approaches.

Overall, these findings confirm that the advancement of AI-assisted English pedagogy is being steered by a combination of regional leadership, strategic funding, and global collaboration. The shift from fragmented, country-specific initiatives toward transnational knowledge networks signals a maturing stage of the field, in which institutional ecosystems and human–AI partnerships collectively redefine the pedagogical frontier of English language education.

4. Discussion

The overall findings from this bibliometric analysis reveal an accelerating and multidimensional transformation of English language pedagogy under the influence of artificial intelligence. The shift from automation-oriented studies to cognition-based pedagogical frameworks demonstrates that AI has transcended its role as a mechanical assistant to become a cognitive collaborator in teaching and learning. Moreover, the regional dominance of East Asian institutions underscores the emergence of new epistemic centers that actively shape the theoretical and methodological foundations of AI-enhanced education. Together, these patterns point to a paradigmatic evolution in which technology, pedagogy, and human cognition are increasingly intertwined, marking a decisive step toward a reflective and adaptive model of AI- assisted English teaching.

4.1. From Automation to Cognition: The Paradigm Shift in AI-Assisted English Language Pedagogy

The trajectory of research on AI-assisted English pedagogy over the 2019–2025 period reflects more than quantitative growth; it embodies a profound paradigmatic transformation. In its early phase, the field was dominated by studies on automation and computer-assisted language learning (CALL), where AI served as a peripheral technological aid for grammar correction, translation, and pronunciation training. However, as generative AI models such as ChatGPT gained academic visibility after 2022, the focus shifted from mechanistic applications toward cognitive augmentation and reflective teaching.

This transformation indicates that researchers are now re-conceptualizing AI as a co- participant in meaning-making, capable of supporting learners' metacognition, creativity, and self-regulation. The exponential publication surge in 2024–2025 does not merely represent enthusiasm for a new technology; rather, it marks a structural realignment of English language pedagogy around adaptive, dialogic, and data-informed learning. In other words, AI is no longer a tool to automate learning tasks but a cognitive catalyst that mediates the interaction between human reasoning and digital intelligence.

4.2. Regional Leadership and Epistemic Communities in East Asia

Another salient finding concerns the geographical distribution of intellectual leadership. The data reveal a pronounced concentration of high-impact scholars and institutions in East Asia, especially in Hong Kong, mainland China, Taiwan, Singapore, and Malaysia. The Education University of Hong Kong, University of Hong Kong, and Chinese University of Hong Kong consistently rank among the most prolific contributors, together accounting for nearly one-third of global publications in this domain.

This regional clustering is not coincidental. It reflects long-term governmental and institutional investment in educational technology, teacher digital literacy, and multilingual innovation. The co-authorship networks connecting East-East collaborations such as those among Hong Kong, Beijing, and Singaporean universities illustrate a distinctive epistemic community that integrates cognitive science, linguistics, and computational education. Such synergy has allowed Asian researchers to move the discussion beyond traditional CALL frameworks, pioneering research on AI literacy, affective engagement,

and ethical AI integration.

Importantly, this leadership pattern challenges the historical West-centered model of educational technology research. Asia's rise as an intellectual hub signifies a shift in global knowledge production, where AI-enhanced language pedagogy is theorized and contextualized through localized cultural, pedagogical, and policy frameworks.

4.3. Journal Ecosystem and Thematic Convergence

The evolution of publication outlets mirrors the intellectual maturation of the field. Between 2019 and 2021, AI-related ELT studies appeared sporadically across general education journals, often emphasizing technological novelty rather than pedagogical insight. Beginning in 2022, however, a concentrated journal ecosystem emerged—dominated by *Computers and Education: Artificial Intelligence*, *Interactive Learning Environments*, *Education Sciences*, and *Sustainability (Switzerland)*.

Each outlet reflects a distinct, yet converging, thematic orientation. *Computers and Education: AI* anchors the data-driven and algorithmic turn, promoting research on adaptive systems and automated assessment. *Interactive Learning Environments* captures the human- centered shift, foregrounding interactivity, engagement, and intelligent tutoring. Meanwhile, *Education Sciences* serves as a bridge to teacher education and curriculum integration, and *Sustainability* connects AI pedagogy with broader ethical and societal discourses.

The convergence of these journals reveals that the field has entered an integrative phase, blending computational precision with humanistic reflection. This diversification of publication channels not only legitimizes AI-ELT as an independent academic subfield but also positions it within interdisciplinary debates on sustainability, cognition, and digital ethics.

4.4. Research Gaps and Future Directions

Despite rapid advances, several gaps remain visible. First, most studies are conceptual or exploratory, with limited empirical validation in real-world classrooms. Future research should adopt mixed-method or longitudinal designs to examine how AI impacts learner outcomes, teacher agency, and classroom interaction over time.

Second, there is a pressing need to investigate teacher AI collaboration frameworks, particularly in resource-limited or multilingual contexts. While current works often treat AI as a support system, few examine co-creation processes where teachers and AI agents jointly scaffold language learning. Third, the Global South including Vietnam, Indonesia, and Thailand remains under- represented in bibliometric datasets. Expanding cross-regional collaborations will not only balance the geographical bias but also bring culturally grounded perspectives on AI pedagogy.

Finally, future studies should explore the ethical and cognitive frontiers of AI in education: how reflective thinking, data privacy, and human empathy can coexist with automation and analytics. Addressing these questions is essential for transforming AI from a short-term technological trend into a sustainable pedagogical paradigm.

5. Conclusion and Implications

The bibliometric analysis of AI-assisted English language pedagogy from 2019 to 2025 reveals an unprecedented expansion of research activity and intellectual diversity. The data collectively point to a paradigm shift from the automation of language learning tasks toward the cognitive and reflective integration of artificial intelligence within pedagogical frameworks. This transition demonstrates that AI is evolving beyond a functional tool to become a co-agent in the construction of knowledge, creativity, and learner autonomy. The exponential growth in publications during 2024–2025 symbolizes not only technological adoption but also an epistemological reorientation in how teachers, learners, and machines collaboratively shape linguistic competence.

From a theoretical perspective, the findings highlight that AI-ELT is no longer an isolated intersection of computer science and linguistics but a hybrid knowledge domain where social sciences, cognitive psychology, and computational innovation converge. The field now emphasizes human AI synergy, interpretive cognition, and ethical learning processes. This evolution expands the foundational scope of second-language acquisition theory by embedding algorithmic intelligence within communicative

and affective dimensions of learning. The emerging East-Asian epistemic community led by Hong Kong, mainland China, Taiwan, and Singapore has become instrumental in advancing such conceptual transformations, positioning Asia as the new center of educational AI scholarship.

In practical and policy terms, the study underscores several strategic implications. Educational policymakers and teacher training institutions should prioritize AI literacy and ethical competency in teacher education, ensuring that instructors can critically mediate between automation and human-centered learning. Universities in developing contexts, particularly in the Global South such as Vietnam, Indonesia, and Thailand, are encouraged to leverage international collaborations and open-access resources to bridge research asymmetries. Integrating AI into language pedagogy requires not only infrastructure investment but also contextual adaptation recognizing local linguistic, cultural, and cognitive characteristics that shape learner engagement.

Ultimately, this study concludes that AI-assisted English pedagogy is not merely a technical evolution but a cognitive and cultural transformation of education itself. The challenge for future research lies in maintaining a balance between computational efficiency and pedagogical empathy, ensuring that AI remains a means of human empowerment rather than replacement. As the field enters its next decade, the call is clear: to move from intelligent systems toward *intelligent education* where human reflection, creativity, and ethics stand at the center of every technological advancement.

References

1. Hwang, G.-J., & Tu, Y.-F. (2021). Roles and research trends of artificial intelligence in language education: A systematic review. Computers and Education: Artificial Intelligence, 2, 100027. https://doi.org/10.1016/j.caeai.2021.100027
2. Zou, D., & Xie, H. (2019). Personalized learning in AI-supported English teaching: A review and future directions. Interactive Learning Environments, 27(8), 1020–1036. https://doi.org/10.1080/10494820.2019.1619592
3. Chiu, T. K. F., & Hew, T. K. F. (2023). ChatGPT in education: Exploring the pedagogical affordances of generative AI for language learning. Education and Information Technologies, 28(12), 15831–15852. https://doi.org/10.1007/s10639-023-11705-9
4. Guo, K., & Wang, Y. (2022). Artificial intelligence-driven feedback in EFL writing: Implications for formative assessment. Computers & Education, 184, 104515. https://doi.org/10.1016/j.compedu.2022.104515
5. Xie, H., Zou, D., & Wang, F. L. (2021). Future trends in artificial intelligence and education: A bibliometric analysis of 20 years of research. Computers and Education: Artificial Intelligence, 2, 100020. https://doi.org/10.1016/j.caeai.2021.100020
6. Moorhouse, B. L., & Li, Z. (2023). Teachers' perceptions of ChatGPT in language teaching: Opportunities and challenges. Education and Information Technologies, 28(7), 8697–8716. https://doi.org/10.1007/s10639-023-11565-3
7. Chai, C. S., & Kong, S. C. (2022). Pedagogical reasoning in AI-augmented teaching: Toward teacher–AI collaboration. British Journal of Educational Technology, 53(6), 1300–1317. https://doi.org/10.1111/bjet.13227
8. Tu, Y.-F., & Hwang, G.-J. (2023). Developing AI literacy among EFL learners: Conceptualization and empirical validation. Computers and Education: Artificial Intelligence, 5, 100152. https://doi.org/10.1016/j.caeai.2023.100152
9. Gašević, D., & Chen, B. (2022). Learning analytics and AI in higher education: From automation to human–AI partnerships. Educational Technology Research and Development, 70(4), 1473–1492. https://doi.org/10.1007/s11423-022-10113-0
10. Zou, D., Xie, H., & Wang, F. L. (2023). A systematic review of AI-enhanced language learning: From adaptive systems to generative agents. Sustainability, 15(3), 2249. https://doi.org/10.3390/su15032249
11. Hwang, G.-J., & Lin, J. W. (2020). A review of intelligent learning environments in the context of EFL education. Computers & Education, 150, 103857. https://doi.org/10.1016/j.compedu.2020.103857
12. Almarabeh, T., & Yunus, M. M. (2023). ChatGPT as an assistant for English learners: A pedagogical exploration. Heliyon, 9(5), e15568. https://doi.org/10.1016/j.heliyon.2023.e15568

13. Hsu, T. C., & Chang, S. C. (2023). Integrating ChatGPT into task-based learning for EFL students: Opportunities and ethical challenges. Education Sciences, 13(6), 597. https://doi.org/10.3390/educsci13060597

14. Li, J., & Zhao, Y. (2022). AI-powered educational transformation in East Asia: Policies and pedagogical innovation. Asia Pacific Education Review, 23(4), 773–789. https://doi.org/10.1007/s12564-022-09736-5

15. Lu, M., & Wang, T. (2021). Exploring learners' emotional engagement with AI-based English chatbots. Computers & Education, 170, 104223. https://doi.org/10.1016/j.compedu.2021.104223

16. Park, M., & Jeon, J. (2023). Teachers' readiness for AI integration in English teaching: Evidence from East Asia. Education and Information Technologies, 28(9), 11973–11994. https://doi.org/10.1007/s10639-023-11695-8