AI for Language Teacher Professional Development: Advancing Through Human-ChatGPT Collaboration

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Abstract:

The integration of artificial intelligence (AI) tools into professional development is reshaping the landscape for language teachers. Despite the growing presence of AI in language education, limited reviews have examined their specific impact on language teachers' professional growth. This review addresses this gap by analysing empirical research, with a focus on ChatGPT. Using key search terms such as "ChatGPT language teaching" and "ChatGPT language teacher", relevant studies were identified from the Scopus database and thematically analysed. Guided by Miao and Cukurova's (2024) *AI Competency Framework for Teachers*, the review explores how language teachers engage with ChatGPT-assisted strategies for their professional development across three progression levels: Acquire, Deepen and Create. Findings reveal ChatGPT's multifaceted role as a transformative tool for professional development. It enables language teachers to integrate technology into instructions, enhance teaching practices and engage in reflective knowledge reconstruction while fostering collaborative learning and co-creation. Furthermore, it supports professional adaptability by promoting AI literacy and equipping teachers to prepare students with the critical skills needed to navigate AI-enhanced educational environments. This research underscores the potential of human-AI collaboration to transform professional learning frameworks while fostering lifelong learning and adaptability in language education. It offers valuable insights into integrating AI into teacher development to encourage collective growth and advance professional practices.

Keywords: AI, ChatGPT, language education, professional development

1. Introduction

In the realm of teacher education, teachers' professional growth is situated within the broader framework of the roles they play as participants in educational contexts, the discourses they engage in, the activities they undertake and the resources they employ (Burns & Richards, 2009). These interconnected elements underscore the dynamic and multifaceted nature of teacher development while simultaneously emphasising the crucial role of collaboration in fostering professional growth. Collaboration has been formalised into a structured approach known as collaborative teacher development (CTD). Johnston (2009) defines CTD as "any sustained and systematic investigation into teaching and learning in which a teacher voluntarily collaborates with others involved in the teaching process, and in which professional development is a prime purpose" (p. 242). CTD, representing a transformative paradigm for teacher education, is grounded in three core principles: teacher learning as a social process, teachers as producers of knowledge and teaching as a collegial profession. These principles establish CTD as both a process and an outcome of collaboration while aligning professional development with the demands of modern education.

As artificial intelligence (AI) tools like ChatGPT continue to evolve, their integration into education introduces new dimensions to professional growth and collaboration. Wang (2021) argues that "AI can function as an extended brain in making data-driven, evidence-informed decisions" (p. 256) and its strengths "can free up people's time so that they can use human intelligence to focus more on making value-based moral decisions" (p. 263). Miao and Cukurova (2024) further argue that teachers' collaboration with AI transforms their relationship with students, as "AI has transformed the traditional teacher-student relationship into a teacher-AI-student dynamic" (p. 4). However, Wang (2021) cautions that "many decisions are not merely technical ones, but the ones that involve moral values, thus rendering human judgment indispensable" (p. 263). This perspective aligns with Cogo et al.'s (2024) assertion that "it is crucial to strike a balance between leveraging the benefits of these technologies and maintaining the core values of effective pedagogy" (p. 373). To achieve this balance, teachers should be equipped with the skills to navigate AI's complexities. UNESCO (2019) emphasises the need for AI development to be "human-controlled and centred on people; that the deployment of AI should be in the service of people to enhance human capacities" (p. 4). Yi (2021) highlights that "to obtain the benefits provided by AI technology, appropriate education in obtaining the desired information is required" (p. 365). This underscores the critical need for AI literacy among teachers, which Kukulska-Hulme et al. (2024) describe as including "how to 'talk' to GenAI to foster productive dialogue and how to critically assess the GenAI's responses" (p. 26). Holmes et al. (2022) expand this discussion, defining AI literacy as "having competencies in both the human and technological dimensions of artificial intelligence at a level appropriate for the individual" (p. 5).

Recognising these needs, Miao and Cukurova (2024) have developed the AI Competency Framework for Teachers (AI CFT), identifying five key aspects: a human-centred mindset, ethics of AI, AI foundations and applications, AI pedagogy and AI for professional development. Of particular relevance to this review is the aspect of AI for professional development, which outlines how teachers can leverage AI to foster lifelong learning and collaborative professional growth. The AI CFT outlines three progression levels, providing a structured pathway for integrating AI into teacher development. As shown in Table 1, at the Acquire level, teachers "explore the use of AI tools to enhance their professional development and reflective practices, assess their learning needs, and personalize their learning pathways in a rapidly evolving educational landscape" (p. 32). At the Deepen level, teachers "confidently utilize AI tools for tailored participation in collaborative professional learning communities, leveraging them to share resources, engage in peer-to-peer learning and contribute to dynamic adaptation" (p. 37). Finally, at the Create level, teachers "customize and modify AI tools to enhance their professional development and to continuously test and validate strategies on the effective use of AI to meet their own, and their communities', professional development needs" (p. 42).

Despite the increasing emphasis on human-AI collaboration in language education, there remains a notable lack of systematic investigation into how these progression levels are enacted in practice within language education contexts. To address this gap, this review, grounded in AI CFT, employs ChatGPT as a representative AI tool to examine ChatGPT's functionalities and their direct applications in language teaching; to investigate how ChatGPT redefines CTD's social and collaborative dimensions, particularly in teacher-AI interactions; to identify how findings from this review can translate into actionable strategies for effective implementation. The specific research questions are as below: 1) How do language teachers engage with ChatGPT to support their professional development? 2) How are human-AI collaborative relationships demonstrated in the context of language teachers'

professional development? 3) What are the practical implications of integrating AI tools into CTD in educational contexts?

Table 1. AI for Teachers' Professional Development and Its Progression Levels

AI for teachers' professional development	Progression levels		
	Acquire	Deepen	Create
	AI enabling lifelong professional learning	AI to enhance organisational learning	AI to support professional transformation

Adapted from Miao and Cukurova (2024, p. 22)

2. Methodology

To address the research questions outlined in Section 1, this section explains the search strategy employed, including the search terms used, the database consulted and the criteria for selecting journal articles. It then describes the procedures undertaken to identify studies aligned with the research focus. Furthermore, the section elaborates on the data coding approach and the data analysis process.

2.1 Search strategy

This study focused on empirical journal articles to ensure access to detailed, current and evidence-based insights related to the research topic. The search was specifically centred on language teacher development to maintain thematic relevance. The Scopus database was selected for the search due to its comprehensive collection of peer-reviewed and high-quality academic journals. To identify relevant empirical studies, a targeted keyword search was employed, using the terms "ChatGPT language teaching" and "ChatGPT language teacher". The search was limited to peer-reviewed journal articles in the "Arts and Humanities" and "Social Sciences" domains. One of the primary criteria for inclusion was that articles be published in English. This decision was made for two key reasons: to ensure a diverse and global perspective, given English's use in academic communication, and to avoid the potential inaccuracies and misinterpretations that might arise from translating non-English publications. In summary, the inclusion criteria for this study were:

- Empirical journal articles;
- Research focusing on language teacher development;
- Studies addressing the use of ChatGPT;
- Publications available in English.

2.2 Identifying studies

This project's search covered publications from the initial adoption of ChatGPT as a language teaching tool up to December 2024, ensuring the inclusion of the most recent and relevant research. The search process consisted of three rounds. The first two rounds each involved two phases. In Round 1, the initial phase using the search term "ChatGPT language teaching" yielded 153 results. The second phase screened these articles based on their topics and abstracts, narrowing down the selection to 17 relevant studies. Round 2 followed a similar approach. The use of the term "ChatGPT language

teacher" produced 111 results. After screening, 19 studies remained. A third round was conducted to eliminate duplicates between the two lists, identifying 16 overlapping studies. Round 1 contributed one unique study not found in Round 2, while Round 2 contributed three studies. After removing duplicates and incorporating these unique findings, 20 studies were selected for final analysis. A summary of this process is provided in Table 2, with full details in Appendix 1. Due to practical considerations such as the moderate number of identified articles, time constraints and submission deadlines, no additional search terms or databases were included.

Table 2. Journal Article Identification Process

Rounds	Phases	Steps	Key search terms	
			ChatGPT language teaching	ChatGPT language teacher
Round 1	Phase 1	Search results	153	
	Phase 2	Results after screening	17	
Round 2	Phase 1	Search results		111
	Phase 2	Results after screening		19
Round 3		Articles identified for final analysis	20	

2.3 Data coding and analysis

The dataset for this review focused on language teachers' perspectives on using ChatGPT. Although a few articles included both teachers and students as participants, only data pertaining to language teachers' experiences were extracted for analysis. This selective approach ensured alignment with the review's objectives of exploring AI's role in teachers' professional development. The coding process was guided by Miao and Cukurova's (2024) three progression levels for AI for professional development (Acquire, Deepen and Create), which provided an initial structure for categorising the data. The data analysis process revealed that each level encompassed distinct but interrelated themes, which were subsequently synthesised into higher-order categories for the final thematic presentation of findings. For example, the themes "ChatGPT as a Reflective Practice Partner" (Acquire level), "Collaborative Communities and Reflective Practices" (Deepen level) and "Reflective Practices and Knowledge Reconstruction" (Create level) were thematically linked and therefore consolidated into the overarching category "3.4 Reflective Practices and Knowledge Reconstruction". This thematic synthesis was based on observed patterns in the data that consistently emphasised reflective practice and knowledge-building processes, demonstrating how teachers engaged with AI at progressively deeper levels. These thematic findings make important contributions to subsequent sections of the review. They provide the empirical foundation for Section 4's re-examination of CTD principles through the innovative perspective of human-AI collaboration. Furthermore, they substantiate Section 5's practical implications regarding the transformation of teacher beliefs about AI integration, the necessary evolution of professional development frameworks to incorporate AI tools and the expanding conceptualisation of AI's role in language education contexts.

3. Results

The reviewed studies demonstrate ChatGPT's diverse applications in language education, revealing its multifaceted impact on teaching practices and professional development. The findings highlight its role in integrating technology into instruction, enhancing pedagogical approaches and supporting continuous professional growth.

3.1 ChatGPT as a tool for instructional design and material development

The reviewed studies underscore the multifaceted functionalities of ChatGPT in English as a foreign language (EFL) settings, which can be categorised into instructional design support, interactive learning facilitation and adaptive teaching enhancement. Teachers primarily use ChatGPT to design language lessons, create activities and answer questions, recognising it as a valuable resource for language teaching (Ulla et al., 2023). Moreover, ChatGPT has been identified as beneficial for creating interactive learning environments, offering ease of use and advantages even for experienced teachers (Hieu & Thao, 2024). ChatGPT's versatility is evident in its ability to assume multiple roles within instructional settings, including serving as a content provider, teaching assistant, evaluator and conversation practice partner (Jeon & Lee, 2023). Additionally, its adaptability enables teachers to tweak, adapt or overhaul its suggestions while allowing them to align materials with their distinctive teaching styles and preferences (Korucu-Kış, 2024). These findings collectively demonstrate ChatGPT's capacity to address foundational instructional requirements while catering to a wide array of teaching needs. Beyond these foundational applications, ChatGPT contributes to the enhancement of teaching practices. It is integrated across various aspects of teaching, supporting instructors in lesson planning, material preparation and professional growth (Hınız, 2024; Kamali et al., 2024). Furthermore, ChatGPT's transformative role in assessment has been highlighted, particularly in its ability to assist teachers in designing assessment rubrics, conducting adaptive testing and providing immediate feedback on student tasks (Derakhshan & Ghiasvand, 2024). In addition to improving teaching practices, ChatGPT supports language acquisition. Pre-service teachers perceive ChatGPT as beneficial for developing grammar and writing skills (Chung & Jeong, 2024). Similarly, its perceived usefulness and ease of use positively influence teachers' intentions to adopt it for professional development (Alrishan, 2024). The tool also advances feedback literacy by encouraging teachers to balance their attention across various aspects of student writing (Guo & Wang, 2024).

3.2 Collaborative professional development through human-AI interaction

The ability of ChatGPT to facilitate collaboration has emerged as a critical factor in transforming professional and educational practices. Its role as a collaborator is emphasised (Hieu & Thao, 2024), as it supports the dynamics of human-computer co-creation and critical analysis (Kartal, 2024). This interactive process highlights the mutual adaptation between humans and ChatGPT, with both contributing to creative and effective solutions. In their collaborative efforts, ChatGPT and teachers influence each other's actions, adjusting in the pursuit of innovative ideas. This dynamic interplay demonstrates the potential of human-ChatGPT collaboration to create more efficient and impactful practices than either entity could achieve independently (Korucu-Kış, 2024). ChatGPT also serves as both a valuable resource for maximising teachers' pedagogical expertise (Jeon & Lee, 2023) and a source for generating teaching ideas and inspiration (Korucu-Kış, 2024). Even experienced teachers

can benefit from this dynamic relationship, as it reflects the evolving nature of the teaching profession and offers new opportunities for growth through the adoption of emerging technologies (Hieu & Thao, 2024). Looking to the future, a symbiotic relationship between ChatGPT and traditional methodologies is envisioned where ChatGPT enhances real-world relevance, analytical skills and overall student development (Al-khresheh, 2024). Building on the concept of human-ChatGPT collaboration, the human-ChatGPT-human collaboration model introduces an additional layer of interaction. Within this model, AI functions as both a mediator and a collaborative catalyst among teachers. By facilitating the exchange of ChatGPT-generated insights, this model enables teachers to gain fresh perspectives and ideas on a variety of subjects (Kartal, 2024). Social influence also plays a significant role in encouraging teachers to adopt ChatGPT in academic contexts, particularly when they perceive its value through social validation (Khasawneh, 2024). This collaborative reflective practice extends to communities of practice where teachers leverage the information obtained from ChatGPT to enrich their professional knowledge and skills. When given the opportunity to engage in collaborative reflective practice alongside their colleagues, teachers can further enhance their expertise within a supportive community (Arefian et al., 2024). This transition from human-ChatGPT to human-ChatGPT-human collaboration illustrates the transformative potential of integrating ChatGPT into collective human endeavours that enable teachers to innovate and grow within a collaborative and supportive environment.

3.3 Pedagogical knowledge reconstruction and reflective practice

The integration of ChatGPT into teaching acts as a catalyst for knowledge reconstruction and prompts teachers to reconsider their pedagogical approaches. Teachers, including both pre-service and in-service teachers, need to commit to updating their knowledge while reflecting on how integrating emerging technologies influences both what they teach and how they teach (Bao & Li, 2023). For instance, regular interaction with ChatGPT, such as in L2 writing instruction, enhances teachers' awareness of emerging AI technologies and develops the skills needed to integrate these advancements into classrooms (Ghafouri et al., 2024). Beyond technical mastery, ChatGPT serves as a critical partner in reflective practices, fostering deeper professional transformation. For novice teachers, it functions as a critical friend, peer, mentor, counsellor and teacher educator, all of which support their reflective processes and enhance their ability to identify and analyse pedagogical nuances through continuous interaction with the tool (Arefian et al., 2024). For experienced teachers, reflective engagement with ChatGPT facilitates conceptual knowledge reconstruction, challenges established beliefs and enables them to innovatively link theory with practice (Arefian et al., 2024). The growing versatility of ChatGPT requires teachers to make increasingly complex and professional pedagogical decisions (Jeon & Lee, 2023). Graduate student instructors, for example, adapt their approaches and advance their understanding as they uncover new possibilities with ChatGPT (Bao & Li, 2023). These reflective practices not only align teaching strategies with evolving educational paradigms but also underscore the transformative potential of ChatGPT in fostering ongoing professional growth and knowledge reconstruction.

3.4 Teachers as co-facilitators and AI mentors

As ChatGPT becomes increasingly integrated into education, teachers are adopting a dual role in the AI era, acting as both learning co-facilitators alongside AI chatbots and as technical trainers responsible for cultivating students' AI literacy (Cong-Lem et al., 2024). This involves equipping students with the analytical capabilities to evaluate and use AI platforms effectively (Al-khresheh, 2024). Additionally, teachers need to help students develop broader social, emotional, cognitive and agentic skills, which remain essential even as AI technologies become more sophisticated (Hınız, 2024). A shift in focus towards students' learning processes and higher-order thinking skills, rather than a sole emphasis on examination outcomes, has also been emphasised (Cong-Lem et al., 2024). The effective use of ChatGPT in the classroom requires thoughtful pedagogical strategies tailored to the unique dynamics of each learning environment. Teachers should consider factors such as rapport with students, individual learners' needs and the collective classroom dynamic when deciding how to integrate ChatGPT into their teaching practices (Jeon & Lee, 2023). Alongside this, students should be taught to authenticate and substantiate AI outputs by cross-referencing them with reputable resources such as textbooks and credible online materials (Ulla et al., 2023). These strategies ensure that students not only engage with AI but also acquire the analytical and evaluative skills needed to thrive in an AI-enhanced educational landscape.

3.5 Professional development needs for ChatGPT adoption

The integration of ChatGPT into educational practices requires ongoing and comprehensive professional development to equip teachers with the knowledge, skills and confidence needed to use these tools effectively. Currently, teachers' understanding of ChatGPT tends to focus on its text generation, with limited knowledge of more advanced pedagogical applications (Bao & Li, 2023). This gap between the potential of ChatGPT and its limited current use in teaching highlights the need for targeted training. Teachers should gain knowledge and skills regarding ChatGPT's merits and shortcomings (Cong-Lem et al., 2024). Furthermore, they require deeper insight into how ChatGPT responds to users and its practical applications in teaching (Chung & Jeong, 2024). To ensure the effective integration of ChatGPT into established teaching practices, professional training programmes and support systems that provide resources and clear guidance are essential (Al-khresheh, 2024). While addressing technical challenges, such initiatives should also support teachers in harnessing the pedagogical benefits of AI in language education (Hieu & Thao, 2024). For example, teacher education and professional development programmes should focus on equipping teachers with the knowledge and skills needed to integrate ChatGPT and similar AI tools into their L2 classrooms effectively and ethically (Ghafouri et al., 2024).

Policy development is another critical component of preparing teachers for ChatGPT integration. Clear standards and guidelines for the use of AI in education are necessary to ensure the quality, validity and reliability of AI-generated outputs while safeguarding the rights and privacy of both teachers and students (Ghafouri et al., 2024). Collaboration between teachers and AI developers is crucial to address these concerns and develop robust policies for effective AI integration in classrooms (Chung & Jeong, 2024). Professional development must also tackle resistance to AI adoption. Some teachers and supervisors fear that integrating ChatGPT might diminish their authority or lead to their replacement by technology (Kamali et al., 2024). Additionally, resistance from colleagues, supervisors or

institutions can hinder the widespread acceptance of AI tools (Dehghani & Mashhadi, 2024). To address these challenges, training initiatives should present AI as a complement, rather than a replacement for teachers' expertise. It is recommended that teachers neither fear nor ban AI tools but instead embrace and integrate them into language learning. (Hınız, 2024).

4. Discussion: Enhancement to Collaborative Teacher Development (CTD)

The results presented in Section 3 collectively demonstrate ChatGPT's transformative impact on language teachers' professional development. These insights provide a foundation for re-examining the principles of CTD in the context of human-AI collaboration.

This transformation is consistent with current trends in language education, which prioritise technology-enhanced learning and position teachers as adaptive designers of learning environments. As outlined in Section 3.3, interactions with ChatGPT prompt a re-evaluation of teachers' beliefs and the reshaping of pedagogical assumptions. These reflective processes align with the growing emphasis on transformative professional learning. Rather than passively adopting new technologies, teachers critically engage with ChatGPT, co-constructing knowledge and bridging the gap between theory and practice. The tool's interactive nature blurs the boundaries between knowledge consumption and creation, contributing to more agile, participatory models of professional development where teachers are central agents of educational innovation. By offering a platform for continuous engagement, ChatGPT accelerates this pedagogical shift while aligning with the human-centred principles advocated by UNESCO (2019). Teachers exercise professional judgement in balancing ChatGPT's capabilities with their pedagogical values, as Wang (2021) suggests. The empirical findings presented in Section 3 illustrate how teachers navigate this balance, making value-based decisions about when and how to incorporate AI-generated content in ways that enhance, rather than diminish, their instructional integrity. The findings also highlight the need for ongoing, socially-situated training initiatives that equip teachers to use AI reflectively and responsibly. Such efforts align with calls for ethical integration (Cogo et al., 2024), particularly in scaling individual reflective practices into sustainable professional development dynamics.

In this context, the integration of ChatGPT signifies an important shift in how teachers' professional roles are conceptualised. Rather than functioning solely as a tool, ChatGPT emerges as a collaborative partner that supports both novice and experienced teachers in adapting to AI-enhanced educational environments. Earlier frameworks of teacher development emphasise the interplay between roles, discourses, practices and contextual resources (Burns & Richards, 2009). By contrast, the affordances of ChatGPT highlight an evolution in teacher agency and pedagogical innovation, reflecting a broader movement towards digital co-design in language education. Teachers are no longer exclusively reliant on institutional resources or peer networks. Instead, they are increasingly supported by AI as a responsive, always-available collaborator. Building on Johnston's (2009) view on teaching as a collaborative endeavour, ChatGPT's capacity to act simultaneously as a content provider, an evaluator and a teaching assistant signals a distinct transformation in instructional planning. It offers a platform where teachers can personalise and iterate materials in real time, enhancing their responsiveness to student needs. These developments exemplify how human-AI interaction can reinforce the collegial nature of teacher development and foster co-creation, critical analysis and a culture of continuous improvement. Crucially, this process extends beyond individual practice to encompass broader social

dimensions. The emergence of triadic teacher-AI-teacher dynamics, where shared insights and reflective practices shape professional growth, reinforces the notion that teaching is inherently social and collaborative.

The role of teachers as producers of knowledge remains embedded within the context of AI integration. In today's digital landscape, teachers act as co-facilitators and mentors, fostering students' AI literacy and critical thinking skills. This reflects calls for responsible AI use and literacy, as argued by Holmes et al. (2022) and Kukulska-Hulme et al. (2024), where teachers guide learners in evaluating AI-generated outputs and developing higher-order thinking. As shown in Section 3.4, teachers demonstrate AI literacy not only by developing their own competencies through interactions with ChatGPT, but also by transferring this expertise to their students. This process supports learners in engaging with AI tools in an informed way while enhancing their analytical capabilities. The teacher-AI-student relationship thus marks a significant pedagogical development where knowledge is not simply delivered but co-constructed by teachers and AI and then communicated meaningfully to students. This evolving dynamic resonates with Miao and Cukurova's (2024) assertion that AI has transformed the traditional teacher-student relationship into a teacher-AI-student dynamic.

5. Implications

The integration of ChatGPT into language education presents significant implications for the professional development of language teachers. This section outlines key insights to support the reframing of teachers' beliefs and perceptions, the refinement of professional development frameworks and the expansion of AI's role within language education.

5.1 Reframing beliefs and perceptions

As AI tools become increasingly embedded in daily life, teachers should be provided with opportunities to actively engage with and understand these technologies. Beyond technical proficiency, teacher training should focus on reshaping teachers' beliefs and perceptions about their roles and collaborative approaches in an AI-integrated world. The introduction of AI brings new paradigms, such as human-AI and human-AI-human partnerships, which require a shift in perspectives and the adoption of innovative collaborative dynamics. AI should not be perceived merely as an administrative tool but as a dynamic partner capable of co-creating knowledge, facilitating problem-solving and fostering innovation. To support this shift, professional development programmes should implement strategies that build teachers' confidence in working alongside AI, emphasising the complementary nature of human-AI collaboration. Teachers who view AI as a valuable ally are more likely to adapt their methodologies to meet the demands of a rapidly evolving digital landscape. Training initiatives should explicitly address concerns about teacher agency, demonstrating how AI can empower rather than replace teachers. Workshops and training sessions should include practical demonstrations of how AI tools can enhance teaching expertise and amplify professional impact. Establishing collaborative learning environments within teacher training programmes is an effective way to achieve this goal. Such environments could foster collaborative networks that enable teachers to share experiences, challenges and best practices, thereby helping them to collectively navigate the integration of AI into their professional practices.

5.2 Refining professional development frameworks

The integration of AI tools such as ChatGPT into teacher development highlights the need for professional development frameworks to remain agile and responsive to technological advancements. Miao and Cukurova's (2024) AI CFT offers a robust foundation for understanding how teachers can effectively engage with AI tools. However, given the rapid pace of AI development, its dynamic nature must evolve to meet emerging challenges and capitalise on new opportunities. To ensure relevance, professional development frameworks should incorporate iterative updates informed by ongoing research and real-world feedback from teachers actively using AI in their practice. This approach would support the identification of gaps and the refinement of competencies to reflect the realities of evolving educational contexts. In addition, these updates should include case studies and examples of best practices that illustrate effective AI integration, thereby making the frameworks more actionable and contextually grounded. Broadening the scope of existing frameworks to account for diverse educational environments is equally critical. This can be achieved by aligning AI-related competencies with broader pedagogical frameworks that emphasise critical thinking, adaptability and collaboration. For example, integrating elements from frameworks focused on digital literacy and collaborative teaching methods can enhance the holistic applicability of AI tools. By situating AI-related skills within broader educational goals, teachers can better understand how these tools enhance their professional practice.

5.3 Broadening the role of AI tools in language education

While this review has primarily focused on the use of ChatGPT by language teachers, further exploration of AI tools in this field requires teachers to remain open-minded and adaptable. Investigating and embracing a wider range of AI tools could unlock additional opportunities to enhance teaching practices. A broader understanding of these tools can empower teachers to leverage their potential more effectively, fostering innovation in lesson delivery, student engagement and resource creation. Such openness will ultimately contribute to a more dynamic technology-enhanced educational environment. Although AI tools like ChatGPT were not specifically designed for language education, their adoption in this context highlights their remarkable versatility. Language teachers have creatively repurposed these technologies to address the unique challenges of their field. To maximise the benefits of AI in education, as outlined in Section 5.1, further training programmes are needed to help teachers to better understand and apply these tools. Additionally, future research should focus on refining and customising AI tools to better align with the specific needs of language teaching. Such efforts will pave the way for more targeted and impactful applications of AI technologies in language education.

6. Conclusion

This review has examined the integration of ChatGPT in language education. The findings highlight its potential to reshape teacher development practices while aligning them with the demands of an AI-enhanced educational landscape. By refining the principles of CTD, the findings highlight ChatGPT's capacity to foster professional transformation. This is achieved by positioning teachers as knowledge producers and facilitating collegial collaboration within a social learning framework. This research contributes to a deeper understanding of how AI can function as a pedagogical partner rather than merely a technological tool, particularly in advancing language teacher professional development through human-AI collaboration. However, the review is not without limitations. First, the analysis

was based on a relatively small pool of empirical studies, primarily sourced from the Scopus database, which may have limited the diversity of perspectives included. Second, the exclusive focus on English language publications likely excluded valuable insights from research conducted in other languages. Third, while ChatGPT served as a representative AI tool, it did not encompass the full range of AI applications available in education. Furthermore, although systematic procedures were employed during data analysis, the absence of inter-coder verification may have limited the reliability of the thematic interpretations. Addressing these limitations in future research could yield richer insights into how AI can be tailored to diverse teaching contexts. Such efforts would help to ensure that AI tools are effectively leveraged to meet the evolving needs of language teachers, ultimately enhancing their professional practice and the broader educational landscape.

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About the Author

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Appendix 1: Summary of the Selected Journal Articles

Authors	Year	Title	Journal	Research setting	Research participants	Research methods	Data collection tools	Main research objectives
Al-khresheh, M. H.	2024	Bridging technology and pedagogy from a global lens: Teachers' perspectives on integrating ChatGPT in English language teaching	Computers and Education: Artificial Intelligence	ResearchGate	46 English language teachers from multiple countries	Qualitative research	Open-ended questionnaire	It aims to find out how English language teachers perceive the pedagogical benefits and challenges posed by ChatGPT when incorporated into English Language Teaching (ELT) and identify potential avenues for such digital innovations of the studies
Annamalai, N.	2024	Factors affecting English language high school teachers switching intention to ChatGPT: A Push-Pull-Mooring theory perspective	Interactive Learning Environments	Malaysian schools	26 high school teachers	Qualitative research	In-depth interviews	It investigates the factors that influence the switching intention of teachers from traditional classroom teaching to the use of

								ChatGPT in ELT based on the Mooring Theory framework
Alrishan, A. M.	2024	Determinants of intention to use ChatGPT for professional development among Omani EFL pre-service teachers	International Journal of Learning, Teaching and Educational Research	Al-Ain University in the United Arab Emirates	280 EFL pre-service teachers	Quantitative research	Structured questionnaire	It endeavours to illuminate the utilisation of ChatGPT for professional development by pre-service teachers specialising in English as a Foreign Language (EFL) in Oman
Arefian, M. H., Çomoğlu, I., and Dikilitaş, K.	2024	Understanding EFL teachers' experiences of ChatGPT-driven collaborative reflective practice through a community of practice lens	Innovation in Language Learning and Teaching	A secondary school in Iran	8 EFL teachers	Transcendental phenomenology approach	Field notes, observation and notes, and interviews	It uncovers how Iranian EFL teachers' ChatGPT-driven collaborative reflective practice, both independently and collaboratively, can contribute to their professional development
Bao, Y., and Li, B.	2023	A preliminary study on graduate student	International Journal of Computer-	A large midwestern university in	5 graduate student instructors	Qualitative research	Questionnaires, focus group interviews,	It gains insights into how graduate student instructors

		instructors' exploration, perception, and use of ChatGPT	Assisted Language Learning and Teaching	the USA			screenshots of interactions with ChatGPT, and participants' lesson plans	explore and perceive ChatGPT, as well as what knowledge they leverage to utilise ChatGPT in language teaching
Chung, J. Y., and Jeong, S.-H..	2024	Exploring the perceptions of Chinese pre-service teachers on the integration of generative AI in English language teaching: Benefits, challenges, and educational implications	Online Journal of Communication and Media Technologies	A Chinese university	134 English pre-service teachers	Quantitative approach	Questionnaire	It investigates the perceptions of English pre-service teachers in China regarding integrating ChatGPT into ELT
Cong-Lem, N., Tran, T. N., and Nguyen, T. T.	2024	Academic integrity in the age of generative AI: Perceptions and responses of Vietnamese EFL teachers	Teaching English with Technology	Various institutions in Vietnam	31 Vietnamese EFL teachers	Thematic analysis and descriptive statistics	Open-ended survey	It examines the perceptions and responses of Vietnamese teachers of EFL to academic integrity concerns that arise from the use of AI, specifically chatbots like ChatGPT, in foreign language

								education
Dehghani, H., and Mashhadi, A.	2024	Exploring Iranian EFL teachers' acceptance of ChatGPT in English language teaching: Extending the technology acceptance model	Education and Information Technologies	A private language learning institute in Tehran, Iran	234 in-service Iranian EFL teachers	Quantitative method	Survey questionnaire	It explores the factors influencing the acceptance of ChatGPT, an AI chatbot, for ELT among Iranian EFL teachers
Derakhshan, A., and Ghiasvand, F.	2024	Is ChatGPT an evil or an angel for second language education and research? A phenomenographic study of research-active EFL teachers' perceptions	International Journal of Applied Linguistics	Different state universities in Tehran	30 Iranian EFL teachers	Phenomenographic research design	Semi-structured interview	It examines the perceptions of research-active EFL teachers regarding the potentials and pitfalls of ChatGPT for L2 learning, teaching, assessment, and research
Ghafouri, M., Hassaskhah, J., and Mahdavi-	2024	From virtual assistant to writing mentor: Exploring the impact of a ChatGPT-based	Language Teaching Research	Online classes dedicated to writing skills	12 Iranian EFL teachers and 48 learners	Quantitative research	A teachers' self-efficacy scale	It explores the impact of a ChatGPT-based writing instruction protocol on EFL

Zafarghandi, A.		writing instruction protocol on EFL teachers' self-efficacy and learners' writing skill						teachers' self-efficacy and learners' writing skill
Guo, K., and Wang, D.	2024	To resist it or to embrace it? Examining ChatGPT's potential to support teacher feedback in EFL writing	Education and Information Technologies	An academic English course at a Chinese university	5 Chinese EFL teachers	Exploratory study	Comparative analysis and questionnaire	It examines ChatGPT's potential to support EFL teachers' feedback on students' writing
Hieu, H. H., and Thao, L. T.	2024	Exploring the impact of AI in language education: Vietnamese EFL teachers' views on using ChatGPT for fairy tale retelling tasks	International Journal of Learning, Teaching and Educational Research	Two Vietnamese institutions	9 EFL teachers from	Qualitative method	Semi-structured interviews	It investigates the perceptions of Vietnamese tertiary level EFL teachers regarding the use of ChatGPT in students' fairy tale retelling writing tasks
Hınız, G.	2024	A year of generative AI in English language teaching and learning: A case study	Journal of Research on Technology in Education	A school of foreign languages at a state university in Türkiye	14 EFL instructors and 13 students	Case study	Focus groups and one-to-one interviews	It examines the perceptions of EFL instructors and students regarding the integration of ChatGPT

Jeon, J., and Lee, S.	2023	Large language models in education: A focus on the complementary relationship between human teachers and ChatGPT	Education and Information Technologies	Ten elementary schools in South Korea	11 language teachers	Exploratory qualitative approach	Semi-structured in-depth interviews and the teachers' interaction logs with the ChatGPT	It explores the relationship between ChatGPT and teachers, with a particular focus on identifying the complementary roles of each in education
Kamali, J., Paknejad, A., and Poorghorban, A.	2024	Exploring the challenges and affordances of integrating ChatGPT into language classrooms from teachers' points of view: An ecological perspective	Journal of Applied Learning and Teaching	Various institutions in Iran	10 Iranian EFL teachers	Qualitative research	Narrative frames and Semi-structured interviews	It explores teachers' perspectives on the challenges and benefits of using ChatGPT in language classrooms
Kartal, G.	2024	The influence of ChatGPT on thinking skills and creativity of EFL student teachers: A narrative inquiry	Journal of Education for Teaching	An ELT programme at a public university in Turkey	12 English student teachers	Narrative inquiry approach	Weekly written narratives and qualitative interviews	It scrutinises the influence of ChatGPT on the development of thinking skills and creativity during the practicum part of a teacher education programme

Khasawneh, M. A. S.	2024	Academic integrity and the use of ChatGPT by EFL pre-service teachers	Journal of Infrastructure, Policy and Development	Different schools across the world	300 EFL pre-service teachers	Quantitative approach	Online questionnaire	It explores how academic integrity mitigates the desire to use ChatGPT in academic tasks by EFL Pre-service teachers, in consideration of the time factor, perceived peer influence, academic self-effectiveness, and self-esteem
Korucu-Kış, S.	2024	Zone of proximal creativity: An empirical study on EFL teachers' use of ChatGPT for enhanced practice	Thinking Skills and Creativity	A post-graduate programme in training and development	29 EFL teachers	Exploratory case study design	ChatGPT inquiry threads, lesson plans, written reflections, and an open-ended survey	It investigates the efficacy of ChatGPT in facilitating creativity, particularly among EFL teachers
Sevnarayan, K.	2024	Exploring the dynamics of ChatGPT: Students and lecturers' perspectives at an open distance e-learning university	Journal of Pedagogical Research	A South African open distance e-learning university	19 student participants and 5 lecturers	Qualitative phenomenological research	Evaluations, focus group discussions with students, and one-on-one interviews with lecturers	It investigates whether ChatGPT disrupts traditional perceptions of online distance education held by students and lecturers and identifies specific

							functions and features of ChatGPT that address challenges in open distance e-learning
Ulla, M. B., Perales, W. F., and Busbus, S. O.	2023	'To generate or stop generating response': Exploring EFL teachers' perspectives on ChatGPT in English language teaching in Thailand	Learning: Research and Practice	Universities in Thailand	17 EFL teachers	Qualitative descriptive research	Online questionnaire and semi-structured interview	It explores the perspectives of EFL teachers at a Thai university regarding ChatGPT as a language teaching tool