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The Metamorphosis of AI: How Has It Reshaped ELT?

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ABSTRACT

The rapid development of Artificial Intelligence (AI) has transformed multiple sectors of society, including education, where it offers innovative tools to enhance teaching and learning processes. In the context of English as a Foreign Language (EFL), AI technologies, particularly Generative AI (GenAI) and AI-driven chatbot, provide new opportunities for personalized learning, interactive practice, and increased learner autonomy. This paper presents a systematic review of the evolution of AI over the past decade, from its early foundations in machine learning, neural networks, and natural language processing to the emergence of advanced generative models exploring how has it impacted English Learning Teaching (ELT). The study explores how these technologies are being integrated into language education and examines their potential to support the development of key language skills, with particular attention to oral communication, often considered one of the most challenging competencies for language learners. Findings suggest that while AI has great potential and can significantly enhance language learning experiences, its integration must be carefully managed through the development of AI literacy and from an ethical perspective as it cannot fully replace classroom interaction.

KEYWORDS

AI, EFL, ELT, Language Learning

1. Introduction

The emergence of Artificial Intelligence (AI) represents a paradigm shift in machine capabilities, moving beyond data analysis to replicate human cognitive skills (Ciesla, 2024). This technology has revolutionized sectors such as politics, economics, and healthcare, but its impact on education is perhaps the most profound, offering innovative tools to enhance the teaching and learning process (Solak, 2024). Once a basic computer system, AI now simulates human-like decision-making and cognitive abilities, transforming how students and teachers engage by creating interactive experiences that foster essential 21st-century skills, and democratising access to knowledge (Bozkurt, 2023; Peña-Acuña & Corga Fernandes Durão, 2024).

As AI becomes an integral part of daily life, society requires a more technologically proficient workforce. Consequently, language teaching must integrate these tools to provide a lifelong learning continuum that prepares students for a technology-driven world (Fuentes-Penna & González Ibarra, 2024). AI offers the educational community, including teachers, parents, and students; unlimited access to resources that streamline language instruction (Moorhouse, 2024; Yingi et al., 2022). Specifically, AI-driven immersive environments support language acquisition by promoting learner autonomy and providing hyper-personalised experiences tailored to individual needs and interests (Fuentes-Penna & González Ibarra, 2024).

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Despite these advantages, the role of AI requires careful scrutiny. Some scholars highlight risks regarding unreliability, academic integrity, and the potential suppression of student creativity (Creely & Blannin, 2025). Therefore, this paper presents a systematic review of the evolution of AI over the past decade, from its origins to the rise of Generative AI (GenAI), exploring its applications within the EFL classroom.

The primary aim of this study is to examine the implications of AI for second language learning, with a specific focus on the development of oral skills, often cited as the most challenging competency. By understanding the capabilities of these advanced machines, this study seeks to optimize EFL practices and enrich students' academic development. Ultimately, the goal is to enhance intercultural communicative competence, enabling learners to communicate effectively across diverse cultural contexts and strengthening global connections in an interconnected world (Dai & Hua, 2025).

2. Globalisation, language learning and machines

The number of children learning a second language has increased exponentially over the last decade, reflecting the multicultural nature of a society where diversity is perceived as a source of richness (Crompton et al., 2024; Yeh, 2024). Being able to speak a second language provides significant cognitive, mental, personal, and academic benefits (Creely & Blannin, 2025). According to Eurostat (2024), in 2021 almost 85% of primary students in the EU were learning English, rising to 98% in lower secondary and 88% in upper secondary education, suggesting that student numbers have increased across all stages at varying speeds.

In addition to this emerging ecosystem, our society has experienced a deep technological revolution, transforming how we live, work, and learn. Technology has become an indispensable part of our daily routines, optimizing lives for efficiency and providing humans with a better quality of life (Philbeck & Davis, 2018). The Fourth Industrial Revolution (4IR), represents a transition to an information age where technology becomes embedded within societies and even human bodies (Yingi et al., 2022). It involves major elements such as robotics, biotechnology, autonomous systems, the Internet of Things (IoT), and Artificial Intelligence (AI). These elements are becoming integrated into our physical and political spaces, extending human capabilities and restructuring how we see the world (Kern, 2024; Philbeck & Davis, 2018). Indeed, some experts argue that the future of education lies in a 4IR-STEM curriculum, promoting the sustainable and ethical use of science in line with the 2030 Sustainable Development Goals (Casañ-Núñez, 2021). Digital tools and online platforms have enhanced the learning experience, providing access to an unimaginable world of resources (Philbeck & Davis, 2018). Internet access has transitioned from a luxury to a basic necessity, with the OECD reporting that at least 80% of individuals had access in 2024 (Eurostat, 2025).

As a result, language learning models have shifted from traditional approaches, such as the Grammar Translation Method, toward more advanced frameworks like the Communicative Approach and Computer-Assisted Language Learning (CALL) (Kern, 2024; Moorhouse, 2024). CALL, which first appeared in the 70', involves the use of computers and technological devices to maximize language acquisition, practice, and assessment through interactive programmes, games, exercises, and tutoring systems, allowing students to create their own schemata, the mental frameworks and prior knowledge they already possess, into the process, making it more meaningful by integrating new information with their existing cognitive structures. Thus,

students are able to make connections, enhance comprehension, and create more relevant learning experiences, facilitating not only a deeper understanding but also long-term retention of new content and the effective use of language skills in a new language.

> New technologies provide opportunities that truly suport effective learning: They allow us to create learning activities, tasks, and experiences that are authentic,that take place in authentic contexts, and that involve authentic language in order to optimize Language learning (Kessler, 2017 p.207).

Considering this new paradigm, the potential of Generative AI (GenAI) in education is vast, offering real-time adaptive resources and personalized learning paths (Mosher et al., 2024; Panda et al., 2024). However, despite this rapid evolution, the specific ways in which GenAI affects English teaching and learning remain largely unexplored.

2.1 The origins of generative AI

The presence of AI was long predicted in science fiction films like Back to the Future (1985) and I, Robot (2004). While once considered a futuristic utopia, advanced AI and robotics are now "at the tip of our fingers" (Jatobá et al., 2019). Although fully humanoid robots remain rare, AI has reshaped various industries and is now ubiquitous in cars, smartphones, and appliances (García-Peñalvo & Vázquez-Ingelmo, 2023; Panda & Mohanty, 2024). In language learning this "AI Renaissance," driven by internet access and a wealth of data, is fundamentally shifting how we interact and process information (Bozkurt & Sharma, 2024; Tan & Lim, 2019).

AI's roots date back to the early 20th century, following the description of the first artificial neuron in 1943 and pioneering speech recognition in 1952. The term "Artificial Intelligence" was coined by John McCarthy in 1955, followed by computer vision research in 1966 (Mosher et al., 2024). However, it was not until 2017 that AI-powered machines surged in popularity and capabilities, performing human tasks in transport, medicine, and economics (Ciesla, 2024). The origins of Generative AI are rooted in machine learning, neural networks, and Natural Language Processing (NLP). Unlike traditional systems, Generative AI creates new content; such as text, images, or music, based on its training data. Understanding this resourceful tool requires examining the major stages of its development (Jatobá et al., 2019; Mosher et al., 2024).

2.2 Machine learning

In 1950, Alan Turing introduced the concept of "machine intelligence" by proposing the Turing Test or "Imitation Game" (Flach, 2012; Hoffmann, 2022; Zhou, 2021). This criterion explored whether machines could achieve human-like intelligence by deceiving an interrogator into misidentifying them as human (Turing, 1950). This underscored the idea that intelligence is algorithmic and "computable," forming the basis for Machine Learning (ML) techniques used in modern language tools (Ciesla, 2024; Hoffmann, 2022).

Conversely, John Searle's "Chinese Room" argument challenged this by claiming that computers merely process information syntactically without semantic understanding (Flach, 2012; Hoffmann, 2022; Zhou, 2021). Searle argued that simulating intelligence is not equivalent to possessing it, as a machine follows rules without grasping meaning (Ciesla, 2024; Oppy & Dowe, 2021). Despite critiques towards the non-computability of human intelligence (Oppy &

Dowe, 2021), the success of modern chatbots has reinforced the computable nature of linguistic behavior (Ciesla, 2024), as Turing had predicted:

> I believe that in about fifty years' time it will be possible to programme computers, with a storage capacity of about 10^9, to make them play the imitation game so well that an average interrogator will not have more than 70 per cent. chance of making the right identification after five minutes of questioning (Turing, 1950, p. 442).

This vision was further realised in 1956 when Arthur Samuel coined the term "machine learning" at IBM, developing a checkers program that learned from past moves without explicit programming, proving that computers could perform tasks far beyond mere numerical computation (Zhou, 2021).

2.3 Neural network

An Artificial Neural Network (ANN) is a computational model designed to mimic the human brain's structure and function. Composed of layers of interconnected artificial neurons or nodes, ANNs imitate biological information processing to solve complex problems like pattern recognition, image classification, and natural language processing (Aggarwal et al., 2018; Plebe & Grasso, 2019). These networks "learn" by adjusting synaptic weights through algorithms like backpropagation and gradient descent to minimize prediction errors (Aggarwal et al., 2018).

A crucial subset of this field is Deep Learning (DL), which utilizes networks with many hidden layers (Tan & Lim, 2019). Unlike traditional machine learning that requires handcrafted feature extraction, deep learning models automatically learn complex patterns, such as textures or edges, directly from data. By adopting these techniques, computers can act without explicit programming, adapting their functions to produce autonomous decisions or predictions (Plebe & Grasso, 2019). These models are often implemented as Convolutional Neural Networks (CNNs) or Recurrent Neural Networks (RNNs) (López-Ruiz, 2018).

2.4 Natural language processing

Finally, the last stage in AI development is Natural Language Processing (NLP), which enables computers to work with human language for tasks like speech recognition and predictive text. Also known as computational linguistics, NLP involves using computational techniques to learn, understand, and produce "Human-like language processing" (Hirschberg & Manning, 2015; Jurafsky & Martin, 2020).

This process involves three key challenges: the thought process, the representation of linguistic meaning, and the integration of world knowledge (Chowdhary & Chowdhary, 2020). NLP systems typically analyze language from the morphological word level up to sentence-level grammar and broader contextual domains. Meaning remains highly dependent on context, as Hirschberg and Manning illustrate:

> A “ star” can be either an astronomical object or a person, and “star” can be a noun or a verb. In another example, two interpretations are possible for the headline “Teacher strikes idle kids,” depending on the noun, verb, and adjective assignments of the words in the sentence, as well as grammatical structure (Hirschberg & Manning, 2015, p.261).

Modern NLP is understood through the synchronic model, which views language processing as occurring simultaneously across phonetics, syntax, semantics, and pragmatics. This integrated approach emphasizes that various levels of language can interact concurrently, offering a more dynamic understanding than earlier linear, sequential models (Hirschberg & Manning, 2015).

3. What are chatbots?: past, present, future

The concept of chatbots dates back to the 1960s with pioneering systems like Eliza and ALICE, which employed pattern recognition algorithms (Adamopoulou & Moussiades, 2020; López-Ruiz, 2018). While Eliza used predefined scripts to simulate conversation, ALICE, which appeared decades later, used a more sophisticated set of pattern recognition techniques based on AIML (Artificial Intelligence Markup Language) to generate responses and PARRY, which simulated human conversation. These were followed by systems like SHRDLU in the 1970s (Aggarwal et al., 2019; Adamopoulou & Moussiades, 2020; Mosher et al., 2024). In the 2010s, advancements like IBM's Watson and Apple's Siri made AI-driven communication more accessible. Microsoft's XiaoIce, introduced in 2014, had limited success. OpenAI's Chat GPT, built on GPT-3.5, launched in 2022, using Reinforcement Learning with Human Feedback (RLHF). It is now integrated into Microsoft's Bing, marking its entry into mainstream applications (Ciesla, 2024).

Chatbots are computer programs that are able to interact with users using natural language. They first appeared in the 1960s with the developers' initial goal being to make users believe they were communicating with a real person (Jatobá et al., 2019; Mosher et al., 2024) consist of three pieces: an interface, intelligent software which works as interpreter, and a repository or say a knowledge base and they have ganed incredible popularity over the last few years growing at a ultra speed as big tech companies, including the Big Four: Apple, Microsoft, Amazon and Google, saw it as an unexploited path to capitalism success. As a result of this, AI boots Chatbots are becoming pioneering machines which can perform complex and optimized commands and are able to process, understand, analyse, create (and many more actions) input in the form of text or voice and even images (Aggarwal et al., 2018; Adamopoulou, & Moussiades, 2020; Elhiny et al., 2023; García-Peñalvo & Vázquez-Ingelmo, 2023; Ironsi, 2024; Tafazoli, 2025; Yingi, 2022).

4. Impact of AI on English language teaching and learning

Since the expansion in popularity of ChatGPT in 2022, teaching and language learning approaches have shifted, embracing these changes and incorporating some of the facilities and benefits AI offers, especially for promoting English learning. Due to its potential, many language experts and researchers claim that AI can be employed to develop competency in the English language since it can facilitate the development of different language skills, including reading, writing, listening, and speaking in a personalised way (Crompton et al., 2024; Gökçearslan et al., 2024; Karataş et al., 2024; Nurjanah et al., 2024).

The use of AI has generated four main viewpoints: the optimists, who believe AI will revolutionize and greatly enhance various sectors; the pessimists, who focus on the potential

risks and ethical concerns; the pragmatists, who recognize both the benefits and challenges of AI; and the doubters, who remain skeptical of its capabilities and long-term impact. In order to better understand the effects of AI on ELT, it is necessary to examine relevant studies conducted in recent years.

Tafazoli (2025) argues that interaction with AI-generated content can help students develop vocabulary, grammar, and comprehension skills, contributing to overall language proficiency. In this sense, tools such as ChatGPT can act as personal tutors or virtual assistants, helping students practice grammar, vocabulary, and speaking while supporting a more adaptive and personalised learning experience (Moorhouse, 2024; Tafazoli, 2025).

AI technologies can also support the educational environment beyond learning itself, including administration and instruction (Nurjanah et al., 2024). Teachers can benefit from AI tools for creating materials and lesson plans, grading assignments, and providing feedback, which helps reduce workload and facilitates language instruction (Crompton et al., 2024; Jose & Jose, 2024). Consequently, teachers can dedicate more time to communication with students and to strengthening teacher–student relationships.

Another important advantage of AI is its ability to create course content tailored to learners' interests, abilities, and needs. This enables individualised learning experiences in which the level of difficulty and the content can be adapted to students' profiles (Fuentes-Penna & González Ibarra, 2024). Panda et al. (2024) highlighted that:

> AI offers a plethora of potential for the creation of customised teaching materials, answering questions, and developing explanatory discourse. It has the potential to improve formal and informal learning experiences in a variety of fields with continued developments (Panda et al., 2024, p. 88).

Through these possibilities, AI enables learners to learn at their own pace while providing meaningful learning experiences that meet individual needs and interests, which Yingi, (2022) refers to as the "individualization of learning." AI also supports inclusivity in the classroom, particularly for students with special educational needs, contributing to a more accessible and effective educational system aligned with the Sustainable Development Goals (Yingi et al., 2022).

Needless to there are more and more students which require of an educational response in a same classroom, presenting different levels, interest and needs which rather than being percieved as a setback, should be percieved as resourceful and enriching. With this, generative AI can facilitate the learning process of this students ensuring an inclusive, equitable, and quality education contributing to the achievement of SDG 4 (Fuentes-Penna & González Ibarra, 2024 Noroozi et al., 2024). Additionally, AI's speed of response and constant availability enhance interactivity in the English classroom. As Yeh (2024) explains, the interaction with generative AI in the EFL classroom "not only provides authentic contexts for language practice but also empowers learners to interact with English in innovative and personalized ways, thereby promising a significant enhancement in language proficiency and engagement" (p. 336).

AI can also support a wide range of learning activities, including warm-up exercises, reading comprehension tasks, vocabulary practice, and follow-up activities (Karataş, 2024). These activities can increase students' motivation and engagement while fostering learner autonomy and enabling continuous learning outside the classroom (Gökçearslan et al., 2024;

Nurjanah, 2024). In this way, students become the centre of the learning process, actively participating in their own development (Mosher et al., 2024; Panda et al., 2024).

Moreover, chatbots like ChatGPT and other AI tools have been shown to provide English learners with an engaging learning experience that encourages interaction with technology (Tafazoli, 2025). These tools can identify areas where students need additional support and provide corrective feedback that helps them learn from their mistakes (Bender, 2024; Karataş et al., 2024; Moorhouse, 2024). As Nurjanah (2024) outlined, AI systems provides students more independence, control and freedom on their learning, allowing them to continue with the learning process outside school

There are numerous AI-based platforms and tools specially designed to promote language learning. For example, EnglishBot allows learners to practice dialogues with adaptive feedback, while Cleverbot enables open-ended conversations that adapt to the user's conversational style. Applications such as Duolingo provide gamified language learning experiences that focus on vocabulary and grammar practice (Divya & Mirza, 2024). AI tools also support specific language support and focused training. For instance, writing assistants such as Grammarly, LanguageTool, Cohere, and Ginger help proofread, correct, and edit texts, supporting the development of grammar and writing skills. On the other hand, vocabulary learning can be enhanced through applications such as Quizlet or Duolingo, which present vocabulary in dynamic and engaging ways (Wei, 2024). In terms of speaking skills, speech recognition technologies incorporated in tools such as ChatGPT or Gemini can help learners improve pronunciation and oral fluency. Applications like ELSA specifically focus on pronunciation and intonation issues (Bender, 2024).

Indeed, Yeh (2024) indicates that interactive AI tutors with voice recognition such as ChatGPT imply a significant shift and a milestone in Language lerning, offering varied and authentic language experiences that immerse learners in contextually rich dialogues and texts. This, provides excellent input and output oportunities and real-time feedback which can greatly enhance oral proficiency (Solak, 2024).

Research has also examined the effectiveness of AI in language learning. For example, Gökçearslan, Tosun, and Erdemir (2024) conducted a systematic review of 37 SSCI articles on AI in language learning. Their findings indicate that AI increases students' motivation, improves language skills, and enhances overall learning performance. The authors also highlight AI's ability to provide personalized learning environments and immediate feedback, promoting self-regulated learning and active student participation.

Expanding this, Wei (2024) conducted an experimental study comparing two groups of students, ones used the AI-driven platform Duolingo and others followed traditional language instruction based on textbooks and teacher-led activities. The results showed that students using Duolingo benefited from adaptive exercises, interactive tasks, and real-time feedback, supporting the positive role of AI in language learning.

Tafazoli (2025) has contributed significantly to this field by examining how Generative AI (GenAI) can address educational challenges in Iran's socio-political and economic context. The study explores teachers' attitudes toward AI and proposes ways to integrate GenAI into education, highlighting its potential to support inclusive learning through personalized experiences that accommodate diverse cultural backgrounds and needs. It also emphasizes GenAI's role as a transformative tool that enables teachers to innovate their teaching practices and enhance student engagement and learning outcomes.

Similarly, Liu, Li, and Luo (2024) analyse two decades of research on AI applications in English language teaching, identifying major developments in the field. Their findings indicate that AI has become a prominent research focus worldwide due to its positive impact on language learning. However, they also stress the need for further research to better understand how AI can effectively support English language teaching, as the technology continues to evolve.

Despite the many advantages of AI in language education, several researchers have also highlighted its potential drawbacks. Among the most notable limitations of AI chatbots for language learning are restricted interaction, misleading answers, and insufficiently personalized feedback (Gökçearslan et al., 2024; Kessler, 2018; Moorhouse, 2024). In addition, scholars have raised concerns regarding ethical issues related to the use of generative AI, including its possible effects on assessment practices, academic integrity, and higher-order thinking skills (Moorhouse, 2024).

Another concern involves the risk of students receiving biased or inaccurate responses from AI systems. As AI systems generate answers based on existing datasets, they may sometimes lack originality or reliability, which can encourage plagiarism if used improperly (Gökçearslan et al., 2024). For this reason, researchers emphasize the importance of developing digital and AI literacy among both teachers and students, particularly in relation to transparency, trust, surveillance, and data privacy (Karataş et al., 2024).

In response to these challenges, Bender (2024) proposes an AI literacy framework that includes understanding, accessing, prompting, corroborating, and incorporating AI into the language learning process. Such frameworks aim to help students use AI tools responsibly while benefiting from their potential to enhance language skills. Nevertheless, excessive reliance on AI may also limit students' creativity, as learners might depend on machine-generated responses rather than exploring their own linguistic expressions (Ironsi & Solomon Ironsi, 2025; Lo et al., 2024; Panda et al., 2024).

Karataş et al. (2024) further warn that overdependence on AI could negatively affect communication and learner autonomy, reinforcing the importance of teachers' roles in guiding the learning process. Developing students' critical thinking and digital competence will therefore be essential in future educational contexts, enabling learners not only to use AI effectively but also to critically evaluate the reliability and ethical implications of AI-generated information (Bender, 2024).

Therefore, although AI provides adaptive learning and immediate support, it cannot replace essential human aspects of teaching, such as emotional intelligence, understanding individual learner needs, and promoting deep critical thinking (García-Peñalvo & Vázquez-Ingelmo, 2023; Gökçearslan et al., 2024; Jose & Jose, 2024). As Karataş et al. (2024) note, "AI tools like ChatGPT offer significant benefits, they should be used as complementary aids in language education, ensuring a balanced, holistic approach that incorporates both AI and traditional teaching methods". Classroom interaction remains essential for developing social skills, cultural understanding, and creativity, elements that cannot be fully replicated by artificial intelligence (Creely & Blannin, 2025).

5. Conclusions

In this rapidly evolving world, AI is completely transforming the educational paradigma, redefining the teaching and learning process and opening a new horizon of possibilities (Bozkurt, 2023; Noroozi et al., 2024; Panda et al., 2024).Therefore, it is extremely important to embrace and incorporate it in ELT to unlock both students and teachers full potential in English as seen in this paper.

On the one hand, AI provides students with multiple input opportunities that are crucial for the development of cognitive functions and the learning process. It enhances language skills in a personalized way and encourages real-time interaction and feedback (Bozkurt, 2023; Moorhouse, 2024; Yeh, 2024). On the other hand, it can support teachers in planning and material creation, reducing workload and helping them address diverse student needs (Crompton et al., 2024; Panda et al., 2024). This contributes to higher-quality learning that is more meaningful and contextualised (Noroozi et al., 2024; Yeh, 2024). As a result, learners are placed at the centre of the process, gaining greater autonomy and a more personalized learning experience based on their knowledge, skills, and abilities, placing the learners in the center of the process (Nurjanahg, 2024) This aligns with one of the main goals of 21st-century education: ensuring inclusivity and equality in the classroom and the development of 21st century skills such as critical-thinking, creativity or problem-solving among others (Tafazoli, 2025).

AI tools have proven particularly useful for developing speaking, listening, and writing skills, allowing students to overcome their language difficulties with greater determination and confidence (Panda et al., 2024). Nevertheless, despite its benefits for learning English, AI also presents potential drawbacks, including limited interaction, misleading answers, and risks such as plagiarism or overdependence, which may reduce students' critical thinking and creativity (Gökçearslan et al., 2024).

For this reason, researchers emphasize the importance of developing AI literacy and advocate for a balanced integration of AI with other teaching methods in order to promote a more holistic and ethical learning experience (Bender, 2024). AI should therefore be progressively incorporated into teaching practices while maintaining the importance of social interaction for human development (Crompton et al., 2024; Panda et al., 2024). Although AI holds considerable promise for the future of English language learning, its continuous evolution requires ongoing research to better understand both its benefits and potential risks. Future studies should examine how AI influences learner autonomy, critical thinking, privacy, and inclusivity, as well as how the roles of teachers and students may evolve. Such research will be essential for guiding the responsible and ethical integration of AI into education, ensuring that it serves as a tool to enhance learning rather than replace the fundamental elements of human-led instruction.

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