



Estrategias Pedagógicas Basadas en IA para el Aprendizaje del Idioma Inglés

Pedagogical Strategies Based on AI for Learning the English Language

Estratégias Pedagógicas Baseadas em IA para Aprendizagem da Língua Inglesa

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Resumen

Este documento explora la integración de la Inteligencia Artificial (IA) en el proceso de enseñanza y aprendizaje del inglés como lengua extranjera. Destaca el potencial de las herramientas de inteligencia artificial para mejorar habilidades lingüísticas como hablar, escribir, leer y escuchar. El estudio utiliza una metodología de revisión sistemática, guiada por los principios PRISMA, para analizar los resultados de la investigación de 2014 a 2024. Los hallazgos clave demuestran que la IA apoya la pronunciación a través del reconocimiento de voz, mejora la escritura a través de correctores gramaticales como Grammarly y enriquece el vocabulario a través del procesamiento del lenguaje natural (NLP).) herramientas. Sin embargo, también se identifican desafíos como limitaciones tecnológicas, resistencia de los usuarios y preocupaciones éticas con respecto a la privacidad. El estudio concluye con recomendaciones para la formación continua de docentes sobre los avances de la IA para maximizar sus beneficios en la educación inglesa y al mismo tiempo abordar sus limitaciones.

Palabras clave: inteligencia artificial; aprendizaje de inglés; habilidades lingüísticas; todas las herramientas en educación; innovación pedagógica.

Abstract

This document explores the integration of Artificial Intelligence (AI) in the teaching and learning process of English as a foreign language. It highlights the potential of AI tools to enhance linguistic skills such as speaking, writing, reading, and listening. The study utilizes a systematic review methodology, guided by PRISMA principles, to analyze research findings from 2014 to 2024. Key findings demonstrate that AI supports pronunciation through speech recognition, improves writing through grammar checkers like Grammarly, and enriches vocabulary via Natural Language Processing (NLP) tools. However, challenges such as technological limitations, user resistance, and ethical concerns regarding privacy are also identified. The study concludes with recommendations for continuous teacher training on AI advancements to maximize its benefits in English education while addressing its limitations.

Keywords: artificial intelligence; english learning; linguistic skills; ai tools in education; pedagogical innovation.

Resumo

Este documento explora a integração da Inteligência Artificial (IA) no processo de ensino e aprendizagem de inglês como língua estrangeira. Destaca o potencial das ferramentas de IA para melhorar as competências linguísticas, como falar, escrever, ler e ouvir. O estudo utiliza uma metodologia de revisão sistemática, orientada pelos princípios PRISMA, para analisar resultados de pesquisas de 2014 a 2024. As principais conclusões demonstram que a IA apoia a pronúncia por meio do reconhecimento de fala, melhora a escrita por meio de verificadores gramaticais como o Grammarly e enriquece o vocabulário por meio do Processamento de Linguagem Natural (PNL).) ferramentas. No entanto, também são identificados desafios como limitações tecnológicas, resistência dos utilizadores e preocupações éticas relativamente à privacidade. O estudo conclui com recomendações para a formação contínua de professores sobre os avanços da IA para maximizar os seus benefícios no ensino de inglês e, ao mesmo tempo, abordar as suas limitações.

Palavras-chave: inteligência artificial; aprendizagem de inglês; habilidades linguísticas; todas as ferramentas de IA na educação; inovação pedagógica.

Introduction

English has become one of the most widely spoken languages in the world, used in commerce, tourism, speeches, and international connectivity (Lan et al., 2023). In order to master it, it is necessary to acquire skills in speaking, listening, reading, and writing (Grabe & Stoller, 2013). Russell & Norvig (2004) define Artificial Intelligence as the combination of algorithms to create machines that have capabilities similar to those of humans and has contributed to the teaching and learning of English by supporting specific skills such as reading comprehension (Xu et al., 2019), practicing language skills on mobile devices integrated with AI (Kim, 2022), checking pronunciation with AI (Noviyanti , 2020), as well as machine learning , adaptive learning, natural language processing, data mining, crowdsourcing, and neural networks (Pokrivcakova , 2019). (Luckin et al., 2016) mention that contemporary definitions of AI differ in several aspects due to their constant changes, which generates a problem when trying to formulate a unified definition; since the interdisciplinarity of AI has been studied by computer scientists, philosophers, anthropologists, biologists, pedagogues, psychologists, linguists, as well as by cognitive sciences, neuroscience, statistics, etc.

(Russell & Norvig , 2004) understands AI as machines, computers or computer systems that imitate cognitive functions associated with the human mind, such as learning and problem solving, another group defines AI as a specific set of computer skills; while (Baker & Smith, 2019) considers that AI performs cognitive tasks associated with learning and problem solving.

AI is also positioned as a science; for example: (Stone et al., 2016) indicate that AI is a science and a set of computational technologies that are inspired by the ways in which people use their nervous system and bodies to feel, learn, reason and make decisions. Baker & Smith (2019) classify the AI tools used in education as student-oriented, teacher-oriented and system-oriented. Where the tools that are oriented to the student use it to learn a subject. Teachers use it in systems aimed at reducing their workload and making their performance effective through specific automation tasks such as administration, evaluation, feedback and plagiarism detection; while those that are oriented to the system provide institutional managerial and administrative information.

Brusilovsky & Miller (2001) consider that AI tools have a different perspective than a simple publication on the web, since it is the result of an extensive multidisciplinary study of system designers, data scientists, product designers, statisticians, linguists, cognitive scientists, psychologists, and education experts focused on providing facilities to teachers and supporting students in the development of their knowledge and skills. Current AI educational systems incorporate adaptive and/or intelligent operations.

Objective

In order to understand how AI can be used in the language learning teaching process, the existing systematic reviews show the need for an updated study on the application in higher education. Therefore, the following question arises:

How is AI used in the teaching-learning process as a foreign language?

Methodology

This study included a systematic review methodology to answer four guiding Questions. The systematic review began with the search, identification and selection of studies using PRISMA principles based on reporting elements and meta-analysis (Page et al., 2021). The second part involves the analysis of the studies, which involved a mixed method approach with quantitative methods to obtain basic numerical data, and then applying qualitative inductive and deductive coding techniques using a priori and grounded coding (Strauss and Corbin, 1995) to provide an Overview of how AI is used.

Search strategy

Primary research has been selected where researchers have collected data directly from participants. To ensure a level of confidence in quality, only research published in a peer-reviewed journal blinded to articles was selected.

From 2014 to 2024.

The information collection was obtained through electronic search using a boolean string on the EBSCOhost platform of educational databases and JSTOR, Science Directo and Web of Science. Boolean search for Extract, Load, Transform ELT including terms of Artificial Intelligence and teaching/learning English as a foreign language.

Table 1. Boolean Search Terms

Search Section	Search Terms
Part 1	'Artificial Intelligence' or 'AI'
Part 2	Higher Education' or 'Secondary School' or 'Professional Development'
Part 3	Language Learning' or 'Language Teaching' or 'Acquisition of Languages'

To ensure the search, AI tools are used, which will provide research branching trees with the search terms, which allowed the selection of studies focused on the terms of the systematic review.

Inclusion and exclusion criteria

The search identified 280 articles for possible inclusion in the systematic review. These were checked to see if they met the inclusion/exclusion criteria listed in Table 2.

Table 2. Inclusion and Exclusion Criteria

Inclusion	Exclusion
Articles published in journals between 2014 and 2023	Conference proceedings
Peer-reviewed journal articles	Editorials
Primary research	Teaching and learning English for native speakers
Involves teaching and learning English as a second language	
Use of AI in ELT/L	
Articles written in English	

The researchers independently reviewed each article, taking into consideration the criteria and reliability (Belur et al., 2021). Through a consensus of the evaluators' selection and based on the inclusion and exclusion criteria, 249 poorly aligned articles were eliminated, of which 28 articles met the criteria for the present study.

Data analysis

Once the articles were identified, data were obtained in order to answer the research questions that guided this study. Grounded coding (Strauss and Corbin, 1995) was used to identify the possibilities of use and the challenges of AI, developed through an inductive method; that is, the researchers did not specifically look for a set of possibilities or challenges, but rather for information of a salient nature.

The coding was based on the comparative method, through which the researchers examined and highlighted the text segments related to the questions of the present study in order to find relevant data on the language skills of speaking, writing, listening and reading (Sharadgah Talha & Rami Abdulatif , 2022) of the process of teaching and learning English as a foreign language.

Results and discussion

Contextualized through the delimitation of the systematic review proposed by the researchers, the findings are described by answering the questions posed. How is AI used in the teaching and learning process of English as a foreign language?

Speech

Grounded coding revealed commonalities in the use of AI in skills related to speaking, writing, and reading; while the listening aspect did not present much data; however, discernible patterns emerged regarding the use of AI to enrich and extend pedagogical practices, reinforcing autonomy in students.

The systematic review on the use of AI in teaching English as a foreign language (EFL) generates interest in leveraging AI-powered tools to enhance English language learning experiences (Crompton et al., 2024; Luo & Qiu, 2024; Ogunleye et al., 2024). The studies highlight the potential of AI to support various aspects of English language teaching and learning such as speaking and writing, reading, pedagogy, and self-regulation (Crompton et al., 2024). Furthermore, the importance of interdisciplinary collaboration in higher education to understand how generative artificial intelligence (GenAI) can be effectively incorporated into educational practices for assessments, teaching, and learning delivery (Ogunleye et al., 2024).

The speaking skill focused on pronunciation, where there are a variety of AI systems and programs that helped students in practicing the mentioned skill (Tokoz - Göktepe , 2014). For their part, (Lin & Mubarak , 2021) used a mind-map-guided AI chatbot to teach pronunciation to Taiwanese students, concluding that AI significantly improved pronunciation by reducing the monotony of pitch and intonation patterns; that is, AI helped with a visual representation (spectrogram) of pitch to support pronunciation, since one of the biggest challenges for English learners when learning English is the lack of practice environments.

On the other hand, (Dizon & Tang, 2020) experimented with Japanese students to conduct Conversations using Alexa, concluding that its use was easy and significantly promoted interactions, as it improved vocabulary acquisition in an interesting and enjoyable learning environment, so the finding is intriguing given that a typical conversation should involve both speaking and listening skills, however, the focus on listening skills did not emerge.

In the pedagogical field, Shivakumar et al. (2019) focused on a multimodal approach in a higher education environment, which presents benefits for students who practiced pronunciation through instructions with learning patterns using text, images, audio personalized by each student. While (Lin & Mubarak , 2021) used a multimodal approach with videos, images, memes and songs in conversations, where the main finding was that higher education students spoke more fluently using consistently accurate linguistic structures. In addition, (Tai et al., 2022), mentions that the adaptive nature of AI-based systems revolutionizes the learning process by allowing continuous monitoring of progress and adaptation to the changing needs of students.

In the technological field, AI has an interesting relevance as it can recognize and interact with speech; thus, (Kazu & Kuvvetli , 2023) developed an AI-powered Pronunciation model. In order for their students to practice, record and react on the pronunciation of words. From which their findings show that the words remained in the students' memory for a longer time, allowing them to learn the sounds of consonants and vowels. While (Jadhav et al., 2023) proposes an AI-powered Natural Language Processing (NLP) application, designed to help people improve their public speaking skills by providing a platform to practice and receive feedback on voice modulation and facial expressions.

ChatGPT offers the options of speaking, where students can verbally converse with AI with advanced vocabulary, allowing to improve the skill with unlimited practice time; However,

generative AI does not offer specific and targeted feedback as experienced in the research of (Kazu & Kuvvetli, 2023).

Yang et al. (2024) used a dialogue system called TalkAI with intermediate-level English learners in higher education in China on pronunciation, grammar, and usage performance, achieving significant progress in articulating specific utterances and developing systematic judgments.

Writing

students' English writing and logical thinking skills, through tools such as Grammarly, Jasper, Quillbot, Sudowrite, and Chibi, by providing real-time grammar checks, vocabulary suggestions, and structural improvements (Aladini, 2023).

Lo (2023) examines the improvement and retention of students' vocabulary in writing texts, when students use Neural Machine Translation (NMT) as this AI helped improve or expand vocabulary, especially when specialized or unambiguous expressions are involved.

Grammarly grammar feedback checker is a trend of AI usage across disciplines (Koltovskaia, 2020); thus, (Shahriar & Laboni, 2023) used Grammarly on undergraduate students' writing, to explore the potential credibility of AI in effective learning of English writing; finding that by using AI, students had fewer grammatical errors and writing with more lexical variation, due to the predictive text generation and real-time corrective feedback. However, teachers consider that students may be stuck in an easy-going environment that is detrimental to learning, but helps reduce the workload for teachers (Huang et al., 2020). On the other hand, (Pratama & Hastuti, 2024) used Gencraft and ChatGPT to develop learning in topic transmission of students' writing skill.

In the pedagogical approach, a single feedback-oriented finding through positive spelling and grammar checkers of statistically significant improvement in behavioral, emotional, cognitive engagement, and self-efficacy in writing was presented; however, it tends to be the only relevant and common pedagogy applied in Grammarly, Google Translate, and ChatGPT, for the improvement of English writing skill (Shahriar & Laboni, 2023; Pratama & Hastuti, 2024; Huang et al., 2020).

In the technological field (Tamilselvi et al., 2023) they studied tools such as Quillbot, Grammarly and Wordtune, and analyzes content creation applications, such as WordAi, Spin Rewriter, Chimp Rewriter, Rephrase, and SpinBot to streamline your writing process and generate engaging, polished content.

Reading

Vocabulary usage strategy was the only skill focused on in the studies of English reading skills, while pedagogically the game could fit into the learning method using AI. Zheng et al. (2015) experimented with Japanese students on the process of learning vocabulary in reading using avatars in the AI game called World of Warcraft (WoW), where players (students) can take items from another person (looting), learning the words and reading the explanation of the term provided through the chat. That is, they encourage learning vocabulary and understanding its meaning through interactive visual means.

(Liu et al., 2020) experimented with an AI thinking visualization tool with mind maps for teaching foreign language reading, improving students' thinking skills and reading ability, as comprehension, memory and thinking skills were motivated.

Reading as an English language skill was the least frequently reported skill in the studies, as AI capabilities focus on natural language processing aligned with speech and writing, which were the skills researchers emphasized in their findings; while reading is less closely aligned with AI.

Implications

In the selected studies, researchers focused on the ability of how AI systems were used for skill development in the process of teaching and learning English as a foreign language; a situation that led to an orientation of positive findings and raised possible challenges; however, negative aspects such as technological failures, limited capabilities, fear and a standardized language were briefly mentioned.

Common technological problems at the device level were their access and lack of internet connection, which depends on each user. Regarding the use of AI, users did not delimit its scope, as they expected results that the system cannot do, a situation that can undoubtedly be implemented over time. For example, (Thompson et al., 2018) indicate that students required improvements in AI chatbots since they detected that the interactions with the chatbot were not natural, which implied a loss of interest; this also happened with students who interacted with virtual humans as conversational agents to develop the ability to speak, as the students were not heard or understood (Ericsson et al., 2023).

On the other hand, the fear of the unknown regarding the use of AI was an aspect that had to be addressed and overcome with the guidance of teachers. In addition, the fear of the evaluation

process was a factor that had to be analyzed in the application of the rubrics by teachers and students in order to quantify the findings.

Crompton & Burke (2020) indicate that the use of AI for the English language learning process is more frequent than in other subjects, considering that teachers must make decisions to allow its effective use, which is a challenge of permanent updating of its use to apply in the different skills or abilities of the English language as a foreign language.

The findings of this research contribute to the selection of AI systems that can be applied in the development of English language skills and abilities as a foreign language; since AI allows, in a neutral way, inside and outside of classes, for students to reduce their fear and anxiety when making mistakes in the practice of skills and obviously improve when interacting with human peers. It is important not to ignore the resistance that students may present when using AI systems for fear that their personal information may be disseminated; therefore, adequate regulatory and ethical protection frameworks are required to promote their confidence. On the other hand, there are students who do not like the use of technology, a situation that can trigger learning problems; therefore, their correct selection is a priority.

The study reflects that the use of AI implies a permanent updating of teachers' knowledge, where issues of transparency, trust, surveillance and privacy must be considered, as well as awareness of the limitations and risks that AI entails.

The publications investigated were framed around positive findings, especially in the development of speaking and writing skills with AI, while the other skills were limited.

Conclusion and Recommendations

This systematic review prioritized the use of Artificial Intelligence (AI) in the teaching process of English as a foreign language. The study highlights how AI contributes to addressing the constant need for information updates among educators through the incorporation of recent technological advancements. AI serves as a crucial support tool in developing linguistic skills such as listening, speaking, writing, and reading, as well as enriching pedagogical approaches. This integration demonstrates significant potential in transforming educational practices, making them more interactive, efficient, and adaptive to individual student needs.

The reasoned coding process further revealed additional axial codes that outlined the broader scope of the study, allowing for the identification of specific AI tools that effectively support learning. While the findings were predominantly positive, highlighting AI's capability to enhance student

autonomy, streamline teaching workflows, and provide real-time feedback, certain challenges were also identified. These include technological failures, limited AI capabilities, and apprehension among educators and students towards adopting AI in educational settings. These issues underscore the importance of addressing both technical and psychological barriers to ensure the successful integration of AI in English education.

Recommendations

1. **Continuous Teacher Training:** Teachers must undergo regular training and professional development to stay updated with emerging AI tools and their effective applications in the classroom. This will enable educators to harness AI's full potential in enhancing teaching methodologies and student learning experiences.
2. **Ethical and Secure AI Use:** Institutions should implement clear ethical guidelines and robust privacy policies to alleviate concerns related to data security and foster trust among educators and students in using AI-based systems.
3. **Customizing AI for Local Needs:** Develop and deploy AI tools tailored to the specific needs of learners and the educational context, ensuring that the solutions address linguistic and cultural nuances.
4. **Promoting Interdisciplinary Collaboration:** Encourage collaboration between educators, AI developers, and researchers to design innovative, user-friendly, and effective AI tools that align with pedagogical goals.
5. **Future Research and Micro-Curricular Integration:** This study should serve as a foundational resource for future investigations on AI's role in language education. Additionally, its findings can inform the development of micro-curricular processes, ensuring that AI is systematically integrated into academic applications to maximize its impact.

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