AI in English teaching: Towards effective integration into the education system

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Specialized Analytical Summary – RAE

1. General information	
Title	AI in English teaching: Towards effective integration into the education system.
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Summary	This study explores the transformative potential of artificial intelligence (AI) in enhancing students' English proficiency, integrating both theoretical frameworks and practical applications to assess its impact on communication skills. Emphasizing the importance of teachers' professional development, social appropriation of knowledge, and alignment with national and international standards, the research employs a qualitative, exploratory methodology drawing on literature from Google Scholar, the UNAD virtual library, and other reputable sources. Findings indicate that AI tools—such as virtual assistants, automated spell checkers, and interactive platforms—can significantly improve listening, speaking, reading, and writing abilities, while international experiences underscore the central role of educators in guiding effective technological integration. The study concludes by advocating for further research that considers students' perceptions, individualized learning progress, ethical considerations, and the strategic role of the educational system as both a context for implementation and a lens for critical evaluation.
Keywords	Artificial intelligence, English learning, English skills, AI as a tool, education, technology.
2. Description of the research problem	
This study examines the opportunities and challenges arising from the rapid advancement of technology and the increasing interest in integrating artificial intelligence (AI) into English language education. While AI offers promising avenues for innovation, its effective	

adoption remains constrained by several structural and cultural barriers that demand critical reflection.

A central obstacle lies in the persistence of significant digital divides affecting both students and pre-service teachers. These disparities are compounded by entrenched misconceptions, such as the notions that "teachers are born, not made," that teaching is inherently simple or short-lived, or that it is a profession confined to women. Such beliefs, if unchallenged during initial training, foster unrealistic expectations that ultimately clash with the realities of professional practice (UNESCO, 2005). Consequently, these issues limit the reflective and critical integration of AI-based tools in education (MEN, 2008), underscoring the need to strengthen teaching competencies and encourage the social appropriation of knowledge within national and international policy frameworks.

Although research indicates that technological tools can personalize learning, concerns remain about the potential dehumanization of classrooms (Barrios, Díaz, & Guerra, 2019). Additional studies caution against the misuse of these tools when narrowly tied to standardized performance metrics for students and teachers (Selwyn et al., 2022). Moreover, the risk of AI intensifying labor, economic, cultural, religious, and educational exclusion—particularly among vulnerable groups—remains a pressing concern (Barrios, Díaz, & Guerra, 2020).

These challenges are further exacerbated by the training gap, as many educators, despite their interest in innovation, lack the technical expertise required to integrate AI effectively into pedagogical practice. Finally, ethical considerations regarding the responsible use of AI in schools highlight the urgency of developing clear, context-sensitive regulatory frameworks to guide its implementation.

Formulation of the problem Question:
How can the artificial intelligence strength English teaching and learning as a foreign language considering teaching competencies and social appropriation of knowledge?

1. Objectives

General Objective

To analyze the effectiveness of using artificial intelligence considering teaching competencies and the social appropriation of knowledge to strength English teaching and learning as a foreign language.

Specific Objective

1. Describe the role of AI in English teaching and learning.

2. Explain the competencies for teacher development and social appropriation of knowledge to effectively integrate AI into English teaching.

3. Illustrate the AI technological tools that have been used to practice English skills.

2. Methodology

This monograph employs a qualitative, exploratory approach, drawing on diverse sources, including scientific journals, research articles, and digital repositories such as Google Scholar and UNAD's virtual library to generate insights and new questions throughout the research process. Following an inductive method, the study begins with the selection of specific materials and proceeds with a critical analysis that contrasts various theoretical perspectives. Moreover, it examines practical applications of technology in English language learning, assessing their influence on the development of communication skills

5. Theoretical references

Artificial Intelligence in Educational Environments

Artificial intelligence (AI) in education transcends mere technological use, enabling dynamic and personalized learning approaches that are student-centered. Recent studies demonstrate its effectiveness: Adipat (2023) implemented an AI-enhanced PhenoBL methodology for preservice teachers in Thailand, replacing traditional assignments with current and socially relevant research projects, improving interdisciplinary comprehension and English skills; Kim (2019) showed that chatbots as replicas enhance grammar learning more than human interaction; Ahmad et al. (2024) found that the combination of guided reading, reinforcement exercises, and teacher feedback in virtual environments improves vocabulary, grammar, and writing. However, the use of AI requires addressing the digital divide, ensuring both access to and meaningful use of technology, in line with MEN (2008), UNESCO (2005), and the National Research Council (2002). Several studies confirm that AI applications strengthen students' listening and writing comprehension, confidence, and autonomy (Suryana et al., 2020; Obari & Lambacher, 2019; Marghany, 2023), while integrated pedagogical approaches with AI, combining constructivism, behaviorism, and cognitive psychology, enhance the teaching of English and mathematics (Makhkamova et al., 2017; Tay et al., 2012; Alshuraiaan and Almefleh, 2023). In conclusion, AI not only optimizes language skills, but also transforms the roles of teachers and students, encourages critical thinking, and must be consciously and contextually integrated to achieve true educational innovation (Rusmiyanto et al., 2023; Hwang et al., 2020; Tapalova & Zhiyenbayeva, 2022).

The Mission of the Social Appropriation of Educational Knowledge

In Colombia, the social appropriation of educational knowledge has been driven by the State's interest in ensuring that scientific and technological advances contribute to social well-being, promoting citizen participation in solving everyday problems. Since the 1990s, Colciencias (now the Ministry of Science and Technology) has implemented scientific outreach strategies, strengthened museums, and implemented flagship projects such as the Cuclí Cuclí workshop, aimed at introducing children to the world of technology through playful and creative experiences. Subsequently, the formulation of the first national policy on the social appropriation of science, technology, and innovation in 2005, Law 1286 of 2009, and the National Strategy for the Social Appropriation of Knowledge consolidated an institutional framework that integrates academia, government, businesses, and citizens, complemented by initiatives such as Ideas for Change, which promotes community solutions through science and technology. Since 2015, the State has strengthened social participation through science centers, STEM project evaluation models, and strategic sectoral guides, culminating in educational programs such as Ondas and the formulation of the CONPES public policy, which seeks to consolidate an inclusive and participatory knowledge ecosystem committed to the country's comprehensive development.

Competencies for Teacher Development

The development of teaching competencies in Colombia has evolved since the 1980s through meetings, conferences, and projects aimed at transforming the education system and integrating new technologies. Highlights include Decree 2647 of 1984 and the National Pedagogical Congress of 1987. During the 1990s, initiatives such as the ADE Pedagogical Festival and the First Forum on Institutional Educational Projects promoted widespread teacher participation and the consolidation of spaces for pedagogical discussion.

Since 2010, the government has promoted teacher training programs in emerging technologies and strengthened strategic policies to reduce educational gaps, guided by

regulatory instruments such as Law 1286 of 2009, CONPES 3527 and 3670, and the UNAD Ten-Year Education Plan (2022-2016), which prioritized technological infrastructure, the integration of science and technology, and professional training programs. Likewise, the 2010-2014 National Development Plan established strategic objectives focused on quality, innovation, and educational equity, implementing five key strategies: teacher training with ICTs, innovative educational research, access to quality educational content, virtual education models and the production of e-learning resources, as well as expanding technological coverage. Together, these regulatory and programmatic precedents have created a solid framework for strengthening teacher competencies, adapting to the demands of the knowledge society and inclusive, quality education.

6. Results

Teaching Skills for Educational Innovation and Social Transformation

To transform educational environments and contribute to social improvement, teachers must develop a comprehensive set of competencies that include attention to learning needs, pedagogical differentiation, formative assessment, and active and collaborative methodologies, such as project-based learning (MEN, 2010; UNESCO, 2012). Likewise, it is essential that education professionals commit to ongoing training, critical reflection on their practice, collaborative work, participation in institutional initiatives, and the adoption of innovative methods (Perround, 2007).

Within this framework, training competent students, capable of leveraging knowledge and transforming their educational process, requires teachers with communication, technological, pedagogical, management, and research skills oriented toward educational innovation through ICTs (MEN, 2010). Strengthening these competencies promotes a professional education system that fosters pedagogical innovation and the development of quality citizens (UNESCO, 2012).

Systematic Appropriation of Knowledge, Teacher as an Active Agent in Educational Change

To achieve sustainable educational transformations, it is essential that teachers act as active agents in the appropriation of knowledge, overcoming the role of passive recipient of imposed policies or methodologies (Vidal & Rivera, 2007). This entails maintaining continuous processes of reflection on teaching methods and strategies, observing learning dynamics, identifying opportunities for improvement, systematizing data, and analyzing evidence-based results (Minciencias, 2021a; UNAD, 2011). Models such as UNAD's solidarity-based pedagogical model foster autonomous learning, research, and pedagogical action with a social projection, integrating technological resources and teaching methodologies aligned with the institutional mission (UNAD, 2023). In this way, the systematic appropriation of knowledge through research promotes the professional growth of teachers and contributes to the transformation of social environments toward quality education.

Teacher Professional Development, ICT and Educational Innovation in Languages

Teacher professional development focused on educational innovation seeks to prepare teachers to improve educational quality by leveraging ICTs, which expand opportunities for access, interaction, and learning enrichment. In language teaching, it has been shown that second language acquisition is enhanced when technology is integrated with consistent student practice (Shin, 2021). In this context, artificial intelligence (AI) is presented as an effective tool, as it poses challenges that stimulate the development of language skills (Fitria, 2021a) and, when systematically incorporated, can improve English performance, group interaction, and student motivation by facilitating access to diverse information from multiple cultures that enrich educational processes (Zou et al., 2023).

Findings on Listening Skill

To achieve adequate comprehension in a second language, it is essential to develop listening skills that facilitate correct interpretation of the message. Frequent exposure to the language is key to becoming familiar with authentic sounds and pronunciation. To achieve this, it is recommended to use a variety of resources, such as stories, audios, songs, films, conversations, and presentations, that allow students to practice consistently. Recent studies support this approach: Indari (2023) notes that the Elsa app assesses students' pronunciation and increases their familiarity with the language; Suryana et al. (2020) highlight that Joox Music motivates students to search for the meanings of songs in English, strengthening listening comprehension; and Maulina et al. (2022) report that online classes that use news as a starting point for discussions facilitate the practice and refinement of listening skills.

Findings on Speaking Ability.

The development of oral expression is fundamental, as it allows students to construct coherent meanings, express themselves, argue, describe, and respond with fluency, intonation, and appropriate pronunciation. This skill is a key indicator of actual language acquisition and is assessed in interviews and English certifications (Makhlouf, 2021). Its development requires constant practice in grammar, vocabulary, and pronunciation, which can be fostered through activities such as conversations, debates, presentations, and descriptions. Recent studies show that the incorporation of technologies, such as artificial intelligence chatbots (Duong & Suppasetseree, 2024) and text-to-speech applications (Fitria, 2021a), allows students to listen and read simultaneously, identify errors, and effectively strengthen their oral skills through continuous practice.

Findings on Writing Ability

Writing is a skill that integrates vocabulary, spelling, and grammatical structures and can be strengthened through practice in a variety of contexts, including descriptions, reviews, emails, messages, sentences, and essays. Recent studies highlight the role of technology in enhancing this skill: Al Mahmud (2023) notes that using Wordtune improves vocabulary and syntax; Marghany (2023) recommends Grammarly to improve writing through automatic corrections; and Amyatun and Kholis (2023) show that integrating QuillBot AI makes it easier to identify errors, increasing students' confidence. Overall, consistent practice supported by technological tools promotes the progressive and effective development of academic writing.

7. Conclusions

The results of this documentary research allow us to conclude that artificial intelligence represents a valuable tool for enhancing the learning of English as a foreign language, especially when integrated with pedagogical intent. The analysis of various international experiences confirms that AI-based applications, such as virtual assistants, automatic spellers, and interactive platforms, promote the development of all four language skills: listening, speaking, reading, and writing.

Significantly, it is evident that these technologies not only strengthen academic performance but also increase students' motivation, autonomy, and confidence in using the language. Immediate and personalized feedback, as well as the opportunity to practice in different contexts, helps overcome common limitations in the traditional classroom, such as of time or diverse teaching resources.

However, the implementation of AI in educational settings also presents significant challenges. In the Colombian context, digital divides related to access, use, and critical appropriation of technology remain an obstacle to ensuring equitable, quality education. Therefore, it is necessary to strengthen public policies, improve technological infrastructure, and promote teacher training in digital skills, as indicated by the guidelines of the Ministry of National Education and the UNESCO guiding principles.

Similarly, further research is suggested on the use of different applications for English learning, analyzing student progress, classroom perceptions, their use in assessments, and personalized progress measurement. The education sector can build a clear vision of AI, as this is the area where future studies will be implemented. In short, artificial intelligence should not be understood as an isolated solution, but as a complementary resource that, in the hands of trained teachers and motivated students, can transform English teaching into a more meaningful, inclusive, and relevant experience for the challenges of the 21st century.

8. References

Bibliographic references.docx

Abstract

This study reflects on the potential of artificial intelligence (AI) as a tool to strengthen students' English skills, particularly in the educational context. Using an inductive method, theoretical positions and cases of AI application in English learning are identified, evaluating its impact on communication skills. The study also highlights the need to promote the social appropriation of knowledge, and the development of teaching competencies aligned with national and international regulatory frameworks. The research, with a qualitative and exploratory approach (Hernández, 2014), is based on the analysis of scientific literature obtained from sources such as Google Scholar, the UNAD virtual library, and other recognized databases. The findings underscore the importance of teachers' active role in educational transformation through ongoing training, critical reflection, and the intentional use of technological tools. The international experiences reviewed show that resources such as virtual assistants, automatic spell checkers, and interactive platforms can significantly improve listening, speaking, reading, and writing skills. Finally, we propose expanding research on the use of these technologies, considering student perceptions, personalized progress assessment, ethics, and the strategic role of the education system as a space for implementation and analysis.

Keywords**:** Artificial intelligence, English learning, English skills, AI as a tool, education, technology.

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Introduction

This study examines the effectiveness of artificial intelligence (AI) in education, specifically as a tool for enhancing students' English language skills. First, a theoretical framework is developed based on previous research addressing the impact of AI on teaching and learning. It also addresses regulations and guidelines related to the mission of social appropriation of knowledge, along with the teaching skills necessary to promote innovative educational environments.

Subsequently, key concepts are analyzed to contextualize the research, integrating a study of national and international regulations that guide the educational goals that contemporary teachers must achieve. The methodology adopted is then described, focusing on a documentary analysis, before presenting the results, which detail the use of AI as a strategy for strengthening English language skills and provides examples of technological tools used in other studies, evaluating their applicability in various educational contexts. In the discussion, ethical recommendations are presented, as well as a critical review of the myths, challenges, and realities surrounding the implementation of AI. The conclusions summarize the most relevant findings and argue the usefulness of smart technologies as support tools for English language learning in school settings.

Various studies argue that the integration of AI in the classroom allows for personalized teaching processes and expands opportunities for continuous practice, generates immediate feedback, and facilitates access to resources adapted to different learning paces (Adipat, 2023; Ahmad et al., 2024). Tools such as chatbots, virtual assistants, automatic spell checkers, and interactive platforms have established themselves as effective resources for strengthening

listening, speaking, reading, and writing skills in English (Obari & Lambacher, 2019; Suryana et al., 2020). According to UNESCO (2021a), this trend responds to the educational demands imposed by a globalized and digital environment.

However, AI-driven educational innovation faces significant challenges. In countries like Colombia, digital divides persist that restrict equitable access to devices, connectivity, and technological training, limiting the creation of meaningful educational experiences (MEN, 2008). In this context, the role of teachers is essential, as it requires a constant commitment to professional development, critical reflection on their practice, and the adoption of active, collaborative, and inclusive methodologies (Perround, 2007). As UNESCO (2019) warns, AI should not replace teachers' pedagogical work, but rather complement it through strategies that place students as the protagonists of learning (Alshuraiaan & Almefleh, 2023).

In this sense, the purpose of this study is to analyze the effectiveness of artificial intelligence as a support tool for the development of English language skills. Based on a review of recent scientific literature, the article explores teaching competencies linked to educational innovation, examines successful international experiences, and describes digital tools used in different contexts. It also reflects on the pedagogical contributions that AI can offer to foreign language teaching, with the aim of providing a critical and up-to-date perspective that contributes to strengthening teaching practices, reducing learning gaps, and building a more inclusive, equitable, and innovative education system.

Justification

This research is relevant and necessary due to the growing use of artificial intelligence (AI) in education and its potential to transform the teaching and learning processes of English as a foreign language. In the Colombian context, where digital divides and lack of technical teacher training continue to limit equitable access to technologies, it is urgent to analyze how AI can be implemented effectively and contextually.

Technological appropriation and knowledge of artificial intelligence (AI) have become key allies for teachers. They enrich curriculum design and facilitate the creation of materials, assessment, and the constant updating of content. In this context, ICTs make it possible to optimize English teaching, generating more active, participatory, and student-centered classes. Margins what AI is and how to incorporate it into the classroom is essential. Its conscious use can improve language skills, break technological prejudices, and empower teachers and students in the process of digital transformation. Therefore, this research analyzes how to integrate AI into English teaching, Highlighting the experiences of other researchers and international tools applied in different educational contexts.

This research seeks to provide comprehensive information to educational personnel seeking to integrate AI tools into English language teaching. By examining barriers, opportunities, and best practices, the study proposes a strategic framework to improve educational quality and align language training with contemporary global demands. It also offers resources that have facilitated effective language learning with the aim of driving educational transformation.

Finally, this research is based on the analysis of scientific articles and specialized publications. This review identified diverse perspectives and examined the impact of digital tools on the development of English language skills, thus building a solid foundation for current and necessary pedagogical reflection. Furthermore, the study contributes to the advancement of knowledge in a still emerging field in Latin America, strengthening the relationship between technological innovation and education, promoting the development of more competent students prepared for the challenges of the 21st century.

Objectives

General Objective

To analyze the effectiveness of using artificial intelligence considering teaching competencies and the social appropriation of knowledge to strength English teaching and learning as a foreign language.

Specific Objective

Describe the role of AI in English teaching and learning.

Explain the competencies for teacher development and social appropriation of knowledge to effectively integrate AI into English teaching.

Illustrate the AI technological tools that have been used to practice English skills.

Problem Statement

Currently, accelerated technological development and the growing interest in incorporating artificial intelligence (AI) into educational processes have opened up new possibilities for teaching English. However, its effective implementation still faces multiple challenges, requiring critical reflection on the factors that limit its integration into diverse educational contexts.

One of the main obstacles is related to the persistence of deep digital divides that affect both students and pre-service teachers. Added to this are certain erroneous assumptions that influence the perceptions of those beginning their teaching careers. Some beliefs as "teachers are born, not made," "teaching is a simple process," "teaching is a short career," or "it is an exclusively female profession" generate distorted expectations that, if not addressed from initial training, can lead to a marked discrepancy between expectations and the reality of teaching practice (UNESCO, 2005).

This combination of factors hinders the critical and reflective appropriation of AI-based tools in education (Ministry of National Education [MEN], 2008). Similarly, the need to promote the social appropriation of knowledge and strengthen teaching competencies, in accordance with national and international regulations, is highlighted.

Various studies have shown that technology has the potential to personalize teaching processes, but there are still concerns about the possible dehumanization of classrooms (Barrios, Díaz, & Guerra, 2019). Likewise, some research warns about the misuse of technological tools when they are focused solely on standardized performance metrics for both students and teachers (Selwyn et al., 2022). Furthermore, there is a persistent concern that AI could foster labor,

economic, cultural, religious, or educational exclusion, particularly affecting the most vulnerable populations (Barrios, Díaz, & Guerra, 2020).

Added to all of the above is the training gap, as many teachers, although interested in innovating their teaching practices, lack the technical knowledge to effectively integrate these technologies. Finally, ethical concerns arise regarding the responsible use of artificial intelligence in schools, raising the need to establish clear and relevant regulatory frameworks to guide its implementation.

Formulation of the Problem Question

How can the artificial intelligence strength English teaching and learning as a foreign language considering teaching competencies and social appropriation of knowledge?

Frame of Reference

Theoretical Framework

Artificial Intelligence in Educational Environments

Talking about artificial intelligence (AI) in education implies transcending the idea of technology. Rethinking learning from a dynamic and personalized perspective. According to Adipat (2023), unlike traditional tools, AI allows for adapting content, offering immediate feedback, and generating student-centered environments. In the study conducted by Adipat at a university in Thailand, PhenoBL-based instruction, enhanced with the support of artificial intelligence, was implemented for preservice teachers. This methodology replaces traditional course assignments and focuses learning on research projects based on current and socially relevant topics. For example, in one class, Google AI was used to hold conversations about a topical issue, while in another class, social media recommendations were analyzed, followed by a written report. Sessions were conducted via Zoom videoconferences for three months, following a structured lesson plan and under the constant guidance of a teacher who provided ongoing feedback. To assess the impact of the proposal, students were tested before and after the intervention, allowing for analysis of the results obtained. The findings showed significant improvement in both interdisciplinary comprehension and English-speaking skills.

Similarly, Kim (2019) argues that the use of chatbots favors the improvement of English grammatical skills. Kim conducted her research with Korean university students enrolled in a three hour per week English course. For the study, the initial group was divided into two subgroups: the first practiced the language through conversations with a human interlocutor, while the second used Replika, a chatbot designed to conduct conversations in natural language,

in this case English. Before and after the 16-week intervention, a grammar test was administered to assess progress. The results showed that both groups improved their skills; however, progress was significantly greater for students who interacted with the chatbot compared to those who interacted with a human chatbot.

Along the same lines, Ahmad et al. (2024) highlight in their study that the combination of guided reading, reinforcement exercises, and teacher feedback facilitates vocabulary development. This study was conducted in a school in Makassar, Indonesia, and collected data from 65 students through questionnaires, which were subsequently analyzed through path analysis. Due to the COVID-19 pandemic, classes were conducted virtually; in particular, the reading course was taught through the Google Classroom platform, using PowerPoint materials. During this process, teachers provided constant feedback to point out errors related to the proper use of words and grammatical aspects. Likewise, students expressed a positive attitude toward the use of technology in learning. The results obtained showed that the combination of virtual reading instruction, teacher feedback, and the students' positive disposition had a significant effect on improving their writing, grammar, and vocabulary skills. Together, these findings demonstrate the potential of AI to overcome methodological barriers and address different learning rhythms in English teaching.

However, the discussion about AI in education also requires reviewing the digital divide. This is not limited to access, but encompasses the meaningful use of technological resources. As MEN (2008) argues, technology encompasses both tangible and intangible artifacts, and its usefulness must respond to the school context. In line with this, UNESCO (2005) emphasizes the need to develop skills to solve everyday problems, while the National Research Council (2002) underlines that technological literacy seeks to equip people with tools to actively participate in

their environment. Therefore, the challenge is not only to introduce technology, but to integrate it with pedagogical intent.

Several studies support the positive impact of AI-based applications on foreign language learning. Suryana et al. (2020) show that these applications promote listening and writing skills. Obari and Lambacher (2019) demonstrate how AI-powered speakers improve oral comprehension. Similarly, Marghany (2023) points out that tools such as Grammarly strengthen students' confidence, grammar, and writing skills. These platforms—chatbots, virtual assistants, or automatic correctors—expand the opportunities for interaction beyond the classroom, without depending on class time.

From a pedagogical perspective, AI becomes a strategic resource for student-centered methodologies. Alshuraiaan, A., and Almefleh, H. (2023) highlight promising results in interactive learning in English as a Second Language (ESL) teaching contexts. However, the purpose is not to replace the teacher, but rather to complement their work with relevant resources. In this sense, Makhkamova et al. (2017) recommend combining approaches such as constructivism or behaviorism with technologies and principles of cognitive psychology. Similarly, Tay et al. (2012) propose integrating pedagogy and technology to improve comprehension of English and mathematics. Thus, AI not only enhances language skills but also promotes critical thinking, autonomy, and student confidence.

In summary, artificial intelligence applied to language teaching represents more than a trend: it is a reality with great potential. Rusmiyanto et al. (2023) assert that AI offers enriching experiences that promote constant language practice. In addition to closing gaps and updating methodologies, it transforms the roles of teachers and students. Hwang et al. (2020) highlight its value in creating educational resources and collecting data for assessment. Finally, as Tapalova

and Zhiyenbayeva (2022) warn, AI must be integrated consciously and contextually to avoid superficial use and move toward true educational innovation.

The Mission of the Social Appropriation of Educational Knowledge

Colombia has been guided by the national government's interest in ensuring that scientific and technological advances contribute to improving the quality of life. This approach involves the active participation of citizens in identifying and solving everyday problems through the use of knowledge. In this context, since the 1990s, the then-Colciencias (now the Ministry of Science and Technology) has promoted various strategies to bring science closer to society. These include scientific outreach activities, leveraging the media, and strengthening the institutional framework of science museums (Ministry of Science and Technology, 2010).

One of the flagship projects of that era was the Cuclí Cuclí workshop, designed to connect children with the world of technology through playful, creative, and analytical experiences (Colciencias, 1990). Similarly, the Science, Education, and Development Mission promoted cultural and social change, encouraging collective reflection on the role of scientific research in transforming environments.

Over the following decades, important regulatory and strategic advances regarding knowledge appropriation were consolidated. In 2005, the first national policy proposal for the social appropriation of science, technology, and innovation (STeI) was formulated, focusing on the democratization of knowledge through citizen participation. Subsequently, Law 1286 of 2009 introduced a new institutional framework that strengthened the connection between science, technology, and innovation with key sectors of society: academia, government, businesses, and citizens (Minciencias, 2010).

Along the same lines, the National Strategy for the Social Appropriation of Knowledge was launched, facilitating participatory scenarios for the collective construction of knowledge. This was complemented, in 2012, by the Ideas for Change program, an initiative that supported community-based organizations to offer solutions to specific social challenges through the use of science and technology (MinTIC, 2017). These experiences have demonstrated, over time, their capacity to generate positive transformations in community contexts.

Beginning in 2015, the State implemented new actions aimed at strengthening national development through social participation. These include the creation of science centers led by Colciencias and the design of impact measurement models, indicators, methodologies, and monitoring tools for STEM projects (Minciencias, 2021a). These tools have been essential for assessing the efforts of the various stakeholders involved.

In addition, the STEM Sectoral Guide was developed, aimed at providing strategic input to address major social, economic, and environmental challenges. Finally, in 2021, the Ondas program was consolidated, whose pedagogical and methodological proposal seeks to foster scientific culture from childhood (Minciencias, 2021b). Currently, the formulation of the CONPES public policy represents a decisive step in consolidating an inclusive, participatory knowledge ecosystem committed to the country's comprehensive development.

Competencies for Teacher Development

During the 1980s, numerous meetings, debates, and projects were held aimed at promoting significant transformations in the education system. In this context, research into new technologies was encouraged as a response to the challenges facing educational institutions. Among the most relevant milestones was the issuance of Decree 2647 of 1984 by the Ministry of Education, which regulated pedagogical innovations. Subsequently, in 1987, the National

Federation of Teachers organized the National Pedagogical Congress, and in 1989, CINEP convened the National Meeting on Pedagogical Experiences in Formal Education. These initiatives represented significant advances, as they laid the groundwork for subsequent forums for discussion and educational proposals.

In the 1990s, impactful activities continued to be developed. The District Teachers' Association (ADE) held the Pedagogical Festival in 1990, followed by the District Pedagogical Assembly in 1994. In turn, the Ministry of National Education (MEN) promoted the First Forum on Institutional Educational Projects (PEI), an event that enjoyed broad participation from institutions and teachers from across the country.

Subsequently, in 2010, the National Government, seeking to reduce educational gaps, proposed the incorporation of quality virtual content and teacher training programs in emerging technologies. These actions were complemented by the strengthening of existing policies and the establishment of new strategic goals. According to the Ministry of National Education (2010), the goal projected for 2021 was to guarantee teacher training in skills that respond to the demands of new generations, considering factors such as diversity, the knowledge society, and the construction of a multicultural and supportive citizenship.

In this regard, Law 1286 of 2009 on Science and Technology became an instrument to promote educational quality at the secondary, technical, and higher education levels. Similarly, other public policy documents were issued that guided technological integration, such as CONPES 3527 of 2008, focused on the National Competitiveness and Productivity Policy, with the goal of guaranteeing access to ICTs; and CONPES 3670 of 2010, which defined guidelines for the provision of information and communications technology services. Added to this was the UNAD Ten-Year Education Plan (2022–2016), conceived as a roadmap for educational

development. This plan prioritized actions such as: the renovation and provision of technological infrastructure, the strengthening of pedagogical processes, the integration of science and technology in educational environments, and the consolidation of training and professional development programs for teachers and administrators.

Finally, the National Development Plan (2010–2014) set out three strategic objectives to raise educational quality: Improve quality at all levels, incorporate innovation into educational processes, and strengthen the relevance and equity of the educational system. To achieve these goals, five fundamental strategies were defined: Teacher professional development through ICT-supported pedagogical practices; the promotion of educational research through innovative projects; access to and use of high-quality public educational content; and the implementation of virtual education models and the production of e-learning resources in Higher Education Institutions (HEIs). Finally, the expansion of the UNAD Ten-Year Education Plan (2022–2016) was established technological coverage, ensuring availability, access to devices and connectivity.

In summary, these regulatory and programmatic precedents have created a solid framework for the consolidation of educational policies aimed at strengthening teacher competencies, responding to the demands of the knowledge society and the dynamics of inclusive, quality education. According to the Ministry of National Education (2010).

Conceptual Framework

Artificial Intelligence Origin, Advances, and Research Approaches

Artificial intelligence (AI) is defined as a technological emulation designed to replicate human cognitive functions, with the aim of facilitating everyday life in various contexts and optimizing time management. This emerging discipline finds its roots in the pioneering work of Alan Mathison Turing, a mathematician of great relevance in the field of modern computing. In his publication Computing Machinery and Intelligence (1950), Turing proposed the possibility of developing programs capable of providing human-like responses, thus laying the foundations for the simulation of rational thought by machines.

Since then, AI has been understood as a tool designed to solve complex problems, automate processes, and analyze data with increasing precision. In this sense, Yang (2007) conceives it as a technology oriented toward problem-solving, while Boden (1996) describes it as the study of programming computers with intelligent behaviors. For his part, McCarthy (2007) highlights its ability to represent information about the world in a generalized way, thus optimizing automated decision-making.

Over the decades, artificial intelligence has experienced significant advances. A relevant milestone was the development of "Eliza" between 1964 and 1966 by Professor Joseph Weizenbaum, considered the first chatbot capable of generating automatic responses in textual interactions. Later, during the 1970s, Terry Winograd designed the SHRDLU system, a natural language understanding program that allowed users to interact with objects in a virtual environment using linguistic commands. These developments marked a paradigm shift in the relationship between humans and machines, giving rise to new forms of communication and information processing.

Similarly, the study by Stošić and Malyuga (2024) mentions the continuous advancement of algorithms and systems that have allowed AI to take on functions previously exclusive to the human intellect. In a recent bibliographic review, multiple definitions and conceptual approaches to AI have been identified. For example, Suryana, Asrianto, and Murwantono (2020) describe it as a series of computer programs created to perform tasks in a similar way to human thinking, incorporating learning and self-correction mechanisms. Likewise, Chen (2022) defines it as an adaptive technology that emulates human learning, while Stošić and Malyuga (2024) underline its ability to respond based on the data with which it has been programmed.

Natural Language Processing (NLP)

Natural language processing is a fundamental piece within the field of artificial intelligence, especially in the development of applications that require human-machine interaction. Chen (2022) this approach allows computer systems to analyze, understand, interpret and generate human language, whether oral or written. According to Chopra (2013), various methodologies are integrated to achieve these objectives, including linguistic rules, statistical models, machine learning techniques and self-tuning systems. Rusmiyanto et al. (2023) which favors continuous improvement in the results obtained. Without this language, artificial intelligence cannot take place.

Currently, NLP has expanded into multiple fields of application. As Lareyre et al. (2023) point out, its uses range from voice dictation and automated messaging systems to virtual assistants and voice-based or text-based customer service platforms. McCarthy (2007) this diversification has made it possible to incorporate it into sectors such as healthcare, education, public administration, and digital commerce. According to Chopra (2013), NLP's ability to

compile large volumes of information in specific areas contributes significantly to improving research, as it facilitates access to up-to-date, accurate, and organized data.

In this way, natural language has become a key component for the design of interactive systems in artificial intelligence. As mentioned by Mohammadkarimi, (2024) since it enables fluid communication between users and machines. In this sense, Rusmiyanto et al. (2023) highlight that the integration of NLP in machine learning environments allows not only simulating realistic interactions, but also strengthening users' language skills through constant practice. Therefore, natural language processing according to Zhai and Wibowo (2023) improves the user experience, and also represents a significant advance towards more intuitive and adaptive systems.

Artificial Intelligence in Education (AIED)

It refers to the use of technological developments aimed at supporting teaching. In this sense, it can be adapted to the individual needs of each student through resources such as educational games, learning platforms with virtual tutoring, or chatbots, which will contribute to optimizing both teaching and the evaluation of the achievement of academic objectives. According to Keerthiwansha (2018), AIED can be defined as the exploitation of technological development in educational contexts. Along similar lines, Tapalova and Zhiyenbayeva (2022) argue that this technology represents a driver of transformation within the classroom. For his part, Khairullah (2025) argues that, to date, the implementation of AIED has focused mainly on improving instruction through technological tools. Consequently, this form of artificial intelligence is positioned as a strategic tool to facilitate the teaching process for teachers.

At the same time, advances in natural language processing are enabling machines to understand and interact with human language. In this context, Zhang and Chen (2021) explain

that natural language has been developed to foster fluid communication between people and computer systems. This type of interaction has enabled the design of applications focused on language learning. For example, Fitria (2021a) points out that students significantly improved their oral fluency by practicing with the Orai application. However, the benefits are not limited solely to verbal expression. There are also platforms that facilitate preparation for exams with international standards. In this sense, Purwanti and Putri (2023) highlight, based on their findings, the importance of using educational applications to achieve satisfactory performance on tests such as the TOEFL. Thus, it is projected that the development of this type of technology will continue to advance towards the creation of increasingly effective tools for language practice and acquisition.

In addition to its impact on teaching and learning, artificial intelligence is also transforming administrative processes within educational institutions. According to Chen (2020), AI is presented as a valuable resource in tasks such as content development, curriculum design, and other administrative functions. Complementing this perspective, Khairullah et al. (2025) point out that its use has been beneficial in areas such as reviewing academic papers, providing feedback, financial management, and preparing grade reports. Likewise, Tapalova and Zhiyenbayeva (2022) highlight that these tools allow teachers to increase their effectiveness and develop skills in handling new technologies. In short, artificial intelligence is consolidating as a key resource not only in the pedagogical field but also in the administrative management of educational environments.

Technology in Education

Technology emerges as humanity's response to the diverse needs that arise in the social environment. In this sense, as proposed by MEN (2008), it should not be understood solely as a set of electronic devices, but also as any creation intended to facilitate daily life. From a complementary perspective, Hossain (2023) defines technology as the result of knowledge and the methods used for its practical application, while Haleem et al. (2022) conceive it as the development of skills aimed at the creation or improvement of existing elements. A concrete example of this applicability is evident in the Colombian educational field. According to the Solidarity Academic Pedagogical Project of the National Open and Distance University (UNAD) (2011), the implementation of the Virtual Learning Environment (VLE) has made it possible to establish channels of interaction between students and teachers, fostering both active participation and formative research. Thus, technology not only solves specific problems but is also projected as a transformative tool for social environments.

Within this framework, it is essential to integrate technology into the educational environment in an intentional and contextualized manner. MEN (2008) emphasizes that this integration must consider both tangible and intangible artifacts, always based on their relevance within the school context. Beyond its instrumental value, technology must facilitate the training of students capable of functioning usefully in society and solving the challenges they face. Consistent with this vision, UNESCO (2005) underscores the importance of developing skills that enable them to address everyday problems in different life contexts. For its part, the National Research Council (2002) emphasizes that technological literacy seeks to equip individuals with the necessary skills to actively participate in their social, cultural, and economic environment. Finally, as MEN (2008) points out again, technological competence is essential to successfully

address the challenges posed by the current educational system. Therefore, it's not simply a matter of incorporating technology, but rather doing so with a clear pedagogical approach that promotes meaningful and relevant learning.

Social Appropriation of Knowledge in Education

The social appropriation of knowledge in education is understood as a participatory process that calls upon different social actors to engage in systematic practices of observation, informed dialogue, critical analysis, and joint reflection aimed at understanding and transforming educational contexts. (Minciencias, 2021a). This process is energized through the management, application, and generation of developments in science, technology, and innovation that mediate the interaction between academic knowledge and social needs. (Minciencias, 2010). When these dynamics are sustained over time, educational environments tend to become more equitable and inclusive spaces, which opens up possibilities for transforming local realities and expanding social well-being. (Minciencias, 2021b).

Teaching Competence

Teaching competence can be understood as the integrated articulation of knowledge, understandings, skills, attitudes, and dispositions of a cognitive, socio-affective, and psychomotor nature that educators mobilize in an organized manner to respond to the demands of their professional practice. (Ministry of National Education [MEN], 2016). From a performance perspective, these capacities must enable effective and flexible interventions, capable of adapting to emerging and challenging educational contexts. Ministry of National Education (2010). In educational innovation scenarios mediated by information and communication technologies (ICTs), technological, communicative, pedagogical, management, and research competencies stand out as core developmental competencies, whose integration

strengthens the institutional capacity to transform teaching and learning practices. (MinTIC, 2017). Consequently, the systematic implementation of these competencies contributes to raising educational quality by expanding the relevance, interaction, and pedagogical innovation supported by ICTs. (MinTIC, 2017).

Normative Framework

International Educational Context with Influence in Colombia

As part of global efforts to achieve the common good, UNESCO (2015) proposed 17 Sustainable Development Goals (SDGs) through the United Nations 2030 Agenda. This analysis emphasizes SDG 4, which promotes inclusive, equitable, and quality education for all. This goal seeks to ensure that all citizens have access to decent and relevant education. Along these lines, UNESCO (2019) notes that artificial intelligence can be a valuable tool to support educational development, provided that principles such as inclusion, equity, and quality are respected. Furthermore, in a subsequent report, UNESCO (2021) emphasizes that the use of such technology must be guided by fundamental ethical principles, including respect for human dignity, the protection of personal data, and human rights. In line with this vision, Flores and García (2023) affirm that through these principles, inclusive and quality education can be guaranteed for all.

At the European level, the Council of Europe developed a key document between 1991 and 2001 that establishes learning objectives for the different stages of foreign language acquisition. In this regard, Clouet (2010) argues that the Common European Framework of Reference for Languages (CEFR) has become a fundamental tool for those dedicated to language teaching or assessment. Additionally, the Ministry of National Education (MEN, 2002) details that this framework contemplates the assessment of four language competencies according to

level: reading comprehension, listening comprehension, speaking, and writing. As a result of its usefulness and standardization, numerous countries, including Colombia, have adopted the CEFR as a guide for language teaching, learning, and assessment.

However, technological advances continue to transform these processes. Haleem et al. (2022) introduce improvements aimed at creating and improving existing elements. Rodríguez (2024) notes that supervised language assessments using artificial intelligence are now possible. An example of this is the system described by EnglishScore (2021a), which uses facial recognition technologies to identify whether the person being assessed is fully visible, partially covered, averted, or if multiple people are present. This automation contributes significantly to the efficient and ethical development of language teaching programs.

National Educational Context and the Bilingualism Plan

Within the Colombian legal framework, national regulations establish general guidelines aimed at responding to the educational needs of the population. Several relevant provisions stand out. First, the National Constituent Assembly, through the Colombian Political Constitution (1991), in its articles 27 and 67, recognizes education as a fundamental right, which constitutes the basis for the development of public policies in this area. Subsequently, Guide 22 of the Ministry of National Education (MEN, 2008a) was promulgated, defining the guidelines of the National Bilingualism Plan, whose purpose is to promote the development of communicative skills in English at the basic, secondary, and higher education levels, aligning them with international standards.

Additionally, the Ministry (MEN, 2016) describes in greater detail the skills and knowledge that students must acquire in a foreign language, consistent with quality education. Furthermore, Guide 30, "Being Technologically Competent" (MEN, 2008b), focuses on

strengthening critical thinking by identifying problems and formulating solutions supported by technological tools. Together, these regulations contribute significantly to the continuous improvement of the Colombian education system, while also enabling a comprehensive approach to social needs related to education.

Methodology

This monograph adopts a qualitative approach, based on the collection and analysis of information from scientific journal publications and research articles. According to Hernández (2014), examining diverse sources can not only answer the research question but also generate new questions throughout the process. In this sense, the study has an exploratory nature, academically supported by digital sources such as Google Scholar, the virtual library of the National Open and Distance University (UNAD), its institutional repository, and other databases of internationally recognized scientific journals, which provide reliable and relevant information for the development of the work.

The method adopted is inductive, given that the analysis starts from specific cases to arrive at general conclusions. Initially, the study material was selected; subsequently, a critical analysis of the content was carried out, identifying and contrasting different theoretical positions on the topic. In addition, examples of technological applications used in English language learning are included, in order to examine their impact on the development of communication skills.

Results

Teaching Skills for Educational Innovation and Social Transformation

To transform educational environments and contribute to social improvement, it is essential for teachers to develop a comprehensive set of competencies MEN (2010). These include addressing learning needs, pedagogical differentiation, implementing formative assessments, and promoting active and collaborative methodologies, such as project-based education UNESCO (2012). Furthermore, it is essential for education professionals to commit to ongoing training, critical reflection on their practice, collaborative work, participation in institutional initiatives, and the adoption of innovative methods, both individual and collective (Perround, 2007).

Within this framework, training competent students who are capable of leveraging knowledge and transforming their educational process requires the development of skills that allow them to intervene in a relevant and meaningful way in the organization of school learning. In this regard, the Ministry of National Education (MEN, 2010) identifies key competencies for teachers geared toward educational innovation through the use of Information and Communication Technologies (ICT), such as communicative, technological, pedagogical, management, and research competencies. Finally, by adapting to this reality and strengthening these competencies, a professional education system is being promoted that fosters educational innovation with the goal of developing quality citizens, as established by UNESCO (2012).

Systematic Appropriation of Knowledge - Teacher as an Active Agent in Educational Change

The orientation of sustainable educational transformations requires that the teacher assume the position of an active agent in the appropriation of knowledge, avoiding being limited to the role of passive recipient of imposed policies or methodologies. Vidal & Rivera (2007) Adopting this position implies sustaining continuous reflective processes on teaching methods and strategies, observing learning dynamics, identifying opportunities for improvement, systematizing data and analyzing results with evidence, Minciencias (2021a) from this analytical perspective, teachers are better positioned to make decisions that favor the teaching-learning process, UNAD (2011) a reference for this orientation is the UNAD solidarity pedagogical model, which bases its proposal on autonomous learning, research and pedagogical action with social projection, integrating technological resources and didactic methodologies consistent with the institutional mission of UNAD (2023). In this way, the systematic appropriation of knowledge through research promotes professional growth for teachers and contributes to the transformation of social environments toward quality education.

Teacher Professional Development, ICT and Educational Innovation in Languages

Professional development focused on educational innovation aims to prepare teachers to impact educational quality by harnessing the potential of ICTs. Technology opens up expanded opportunities for access, interaction, and enrichment of learning experiences. In the field of language teaching, it has been suggested that second language acquisition is enhanced when technology is integrated with the student's consistent practice (Shin, 2021). Within this same framework, artificial intelligence (AI) emerges as an effective tool because it poses challenges that stimulate the development of learners' language skills (Fitria, 2021a). Additionally, the

systematic incorporation of AI-based technological solutions can enhance not only English language performance but also group interaction and student motivation by facilitating access to diverse information from multiple cultures that enrich educational processes (Zou et al., 2023).

Findings on Listening Skill

To achieve adequate language comprehension, it is essential to have that facilitates the correct interpretation of the message. In learning a foreign language, frequent exposure to the language is essential, as it allows students to become familiar with its authentic sounds and pronunciation. For this reason, it is advisable to use a variety of resources, including stories, audios, songs, films, conversations, and presentations, so that students can practice listening. Several studies support this approach. Indari (2023) points out that the Elsa app assesses students' pronunciation to identify errors and, at the same time, promote their familiarity with the language. Likewise, Suryana et al. (2020) highlight that the use of Joox Music motivates students to search for the meaning of songs in English, thus strengthening their listening comprehension. On the other hand, Maulina et al. (2022) report that online classes use news as a starting point for discussions, which helps students practice and perfect their listening skills.

Findings on Speaking Ability

The development of oral skills is essential, as it allows students to construct coherent meanings to express themselves, argue, describe, and respond with fluency, intonation, and appropriate pronunciation. According to Makhlouf (2021), this skill is key to assessing actual language acquisition, which is why it requires constant practice in grammar, vocabulary, and pronunciation. Furthermore, it is one of the most valued skills in both interviews and English certifications. In this sense, teachers can encourage its development through activities such as conversations, debates, presentations, and descriptions. According to Duong and Suppasetseree

(2024), the use of chatbots with artificial intelligence significantly contributed to improving students' oral production. Fitria (2021a) highlights that the application of technologies such as Text to Speech (TTS) allows students to listen to pronunciation and read simultaneously, thus facilitating the identification of errors. Together, constant practice and the incorporation of technological tools effectively strengthen speaking skills.

Findings on Reading Ability

Reading skill is fundamental to the process of second language acquisition, as they facilitate access to information, expand vocabulary, develop fluency, and enhance comprehension through reading. To enhance this skill, teachers can use a variety of materials such as stories, news, narratives, relevant publications, karaoke, games, and emails. According to Suryana et al. (2020), the use of subtitles in news, books, and videos contributes significantly to improving reading fluency. Similarly, Asmara et al. (2022) argue that the Quizizz app helps students increase their reading comprehension. Likewise, Dinda (2025) points out that the ReadWorks platform not only improves comprehension levels but also stimulates and energizes the learning experience. Together, these findings show that the use of digital resources and a variety of reading materials allows students to develop their reading skills in an effective and motivating way.

Findings on Writing Ability

Writing is a skill that integrates diverse knowledge, including a broad vocabulary, spelling, and grammatical structures. To strengthen this skill, it can be practiced in the classroom in different contexts, such as descriptions, points of view, emails, text messages, sentences, and essays. In this regard, Al Mahmud (2023) highlights that, by using Wordtune, students improved their writing skills at both the lexical and syntactical levels. Likewise, Marghany (2023)

recommends tools such as Grammarly to improve writing through automatic corrections. Furthermore, the study by Amyatun and Kholis (2023) shows that integrating QuillBot AI into the classroom facilitates the identification of errors, which increases students' writing confidence. Thus, constant practice, supported by technology, promotes the progressive development of academic writing. Below is a list of applications used in studies on artificial intelligence to improve the four skills in English.

Table 1

AI tools applied to English learning: a review of their effectiveness

Practiced skill	Application used in research	Overview of the technological tool	Reference
Listen and read	Netflix	Application for video series and movies in different languages with audio and subtitles.	Suryana et al. (2020)
	TuneIn	Free audio app where you'll find sports, books, debates, music, news, and podcasts.	
	Joox Music	Radio, music, and audiobook app with scrolling lyrics. Large music library, including karaoke.	
	(VOA) Learning English	Here you'll find news, stories, quizzes, and lessons, updated daily with popular science and technology content.	
Listen and speak	Google home mini and Amazon Alexa	Smart speaker that can be interacted with, answers questions, and mentions topics of interest to the user.	Obari & Lambacher (2019)
	Learn English Travel		

		App for listening to audio recordings from native English speakers with travel vocabulary.	
Speak and write	Speak2me (Lucy)	Natural language interaction program in English. Lucy asks questions and has text and audio functions.	Yang (2007)
Write	Grammarly	A tool that helps users learn to write confidently by correcting grammar, spelling, writing, and punctuation.	Marghany (2023)
Practiced skill	Application used in research	Overview of the technological tool	Reference
Speak	Chatbots Andy and English Bot	Voice-enabled tool with machine learning that generates user-appropriate responses to interact with them.	Duong & Supasetseree. (2024) Kim & Kim (2021)
Speak	(TTS)Text to speech	Converts voice to text and audio, adjusting the speed.	Fitria (2021a)
Write	QuillBot	A digital tool that allows users to perform grammar checks, perfect texts, and validate whether written sentences are correct.	Amyatun & Kholis (2023)
Write	Wordtune	An AI technology assistant that allows students to correct the grammar of their texts, making alternative suggestions.	Al Mahmud (2023)
Speak	Orai	An app for learning to speak in public. It detects how many words we say and whether we repeat them.	Fitria (2021a)

	Chatbot	English conversation app. This app can identify errors and provide suggestions. It can also show the user's progress in practicing.	
	Neo Study	It's an app that uses voice recognition to record a person's progress. It also helps improve pronunciation.	

Practiced skill	Application used in research	Overview of the technological tool	Reference
Speak and listen	Elsa, (English Learning Speech Assistant)	Used to improve speaking skills, this app uses voice recognition and AI, starting with a test so the student knows their level and can then continue practicing their skills.	Fitria (2021a). Makhlouf (2021) Indari (2023) Widyasari & Maghfiroh (2023) Hu (2021).
Write	Duolingo	Through this website, students learn grammar, vocabulary, and essential phrases. The interesting thing is that learning is presented through challenges and different levels that students must complete, where they can see their progress.	Fitria (2021a)
Listen	Podcast	Digital audio publication containing various topics. It uses technical or everyday language, depending on the topic chosen.	Maulina et al. (2022)

	Radio news	Radio broadcasts allow you to listen to pronunciation, vocabulary, news, interviews, humor, commercials, and music.	
	Audiobooks	It's a cultural tool that accompanies a literary work with sound and characters that allow students to connect with the story. Some also include subtitles and video.	
Practiced skill	Application used in research	Overview of the technological tool	Reference
Read	Quizizz	A website that allows you to create quizzes and reading comprehension tests. Students answer live, using Kahoot or homework, and the results are sent to the teacher, or they can be played individually.	Asmara et al. (2022)
Read	Read Works	Website with over 5,000 reading practice texts on a wide variety of topics.	Dinda (2025)

Note. List of applications used in different studies on AI to improve the 4 English skills.

In this way, teachers can implement various forms of practice to encourage the development of habits in their students. Among the strategies used in language teaching are those that must be adapted to the subject matter, educational level, degree of progress, available resources, and, especially, previously identified needs. As Tapalova and Zhiyenbayeva (2022) point out, platform customization allows for the analysis of individual performance, timely feedback, and continuous progress monitoring. Furthermore, according to Khan (2023),

providing students with the ability to visualize their progress contributes significantly to increasing their motivation. Along the same lines, Moybeka (2023) highlights that gamification, present in many of these applications, makes the learning experience more engaging and enjoyable. Therefore, it is essential for teachers to identify and select those tools that spark students' interest in order to enhance their skills through consistent and meaningful practice.

Discussion

The findings of this research confirm that artificial intelligence (AI) can play a significant role in improving English language skills, particularly when used in a contextualized manner and for pedagogical purposes. As highlighted by Adipat (2023) and Kim (2019), AI enables immediate and personalized feedback, facilitating student-centered environments. This assertion is reflected in the results obtained, especially in the improvement of oral skills through the use of chatbots and speech synthesis technologies (Fitria, 2021a; Duong & Suppasetseree, 2024).

Furthermore, it is observed that AI does not act as a replacement for the teacher, but rather as a strategic complement. This is consistent with what Alshuraiaan and Almefleh (2023) propose, who highlight the potential of AI in methodologies focused on active learning. The analyzed apps, such as Grammarly, ReadWorks, Quizizz, and Elsa, not only facilitate the acquisition of vocabulary and grammatical structures but also foster student autonomy, strengthening their confidence when tackling communicative tasks in English, where the teacher will be a significant guide in the process. (Marghany, 2023; Indari, 2023).

Regarding listening comprehension, the use of platforms with audio and subtitles has proven effective in familiarizing students with the real sounds of the language, an aspect that aligns with the approaches of Suryana et al. (2020) and Maulina et al. (2022). This multisensory approach enhances content retention and contributes to a more meaningful learning experience. Regarding writing, data suggests that tools such as Wordtune or QuillBot AI contribute to greater grammatical accuracy and lexical richness. This observation is consistent with Amyatun and Kholis (2023), who argue that automated error identification promotes self-regulation and autonomous learning. Similarly, advances in reading comprehension through gamification

(Quizizz) or the use of contextualized texts (ReadWorks) demonstrate how AI can improve reading performance through more motivating and participatory methodologies (Dinda, 2025).

Furthermore, the results support the importance of Natural Language Processing (NLP) as a key element in human-computer interactions. Rusmiyanto et al. (2023) and Zhai and Wibowo (2023) point out that this technology not only improves the user experience but also allows for the simulation of realistic conversations, which positively impacts ongoing oral practice. In this sense, the development of communication skills is reinforced by access to adaptive platforms that allow practice at any time, overcoming the limitations of class time.

However, it is important to highlight that the positive impact of AI on English learning is not homogeneous. Factors such as unequal access to technologies and the lack of digital skills remain significant constraints, especially in contexts like Colombia. In this context, the role of teachers is essential. This requires a constant commitment to professional development, critical reflection on their practice, and the adoption of active, collaborative, and inclusive methodologies (Perround, 2007).

As UNESCO (2019) warns, AI should not replace teachers' pedagogical work, but rather complement it through strategies that place students at the center of learning (Alshuraiaan & Almefleh, 2023). In line with the recommendations of UNESCO (2005, 2019, 2021) and the Ministry of Education (MEN) (2008), the integration of technology in the classroom must be intentional, ethical, and equitable, avoiding the superficial use of available tools.

Finally, it is confirmed that the use of artificial intelligence in teaching English represents more than a technological innovation: it is a pedagogical transformation with profound implications for the development of linguistic skills, the reduction of the digital divide and the

promotion of inclusive and quality education, as required by the Sustainable Development Goals proposed by UNESCO (2015).

Problems, Myths, and Realities of the Teaching Profession

Various myths persist among those beginning their teaching careers, such as the belief that "teachers are born, not made," that "teaching is an easy process," that "the career is short," or that "teaching is a feminine profession." These misconceptions generate significant problems, including lack of social vocation, limited professional development, and the feminization of the teaching role (UNESCO, 2005). If they are not addressed from the beginning of their training, future educators may face a reality very different from the one they imagined. In this sense, being a teacher involves much more than instructing content; it entails assuming a social commitment and establishing close, empathetic bonds with students (Bustamante, 2006). Added to this is the need to develop skills that foster educational innovation and social transformation. These skills are: technological, communicative, pedagogical, management, and research skills, the integration of which strengthens teachers to transform teaching and learning practices. (MinTIC, 2017).

According to Perroud (2007), education professionals must actively participate in pedagogical projects, plan learning situations, manage student progress, implement differentiation strategies, and involve students in their own educational process. MEN (2022) Likewise, it is essential to promote collaborative work, involve families in school work, use technologies pedagogically, and address the ethical dilemmas inherent to the profession. Finally, teachers must assume continuous training as part of their practice MEN (2010); staying up to date with the national and international regulatory frameworks that govern the educational field.

All of this, carried out with a social vocation to identify the needs of students and improve educational environments.

Ethical Recommendations

The integration of artificial intelligence (AI) into education represents a significant opportunity to streamline classrooms, reduce access gaps, and update pedagogical methodologies (Ministry of Information and Communication Technologies, 2017). However, teachers, as an important part of the education system, must be committed to safeguarding students' rights (UNESCO, 2010). However, beyond its potential, it is essential to consider the ethical recommendations that should guide its implementation, especially with regard to equity, data privacy, and accountability (UNESCO, 2012).

According to UNESCO (2019), countries such as the United States, China, France, Estonia, and South Korea have developed national strategies around the use of AI. However, this reality contrasts with that of many developing nations, where adequate strategic frameworks have not yet been consolidated. In this regard, UNESCO (2021a) underscores the importance of adopting ethical values and principles as a basis for establishing regulations grounded in human rights. It also notes that a sustained global commitment is needed to ensure inclusive and equitable education UNESCO (2015).

One of the main challenges in contexts with less technological development is precisely equity. UNESCO (2010) states that the implementation of digital tools should not accentuate the marginalization of certain population groups. Khairullah et al. (2025) warn about the systems present in some AI algorithms, which could reproduce and reinforce existing inequalities. For this reason, UNESCO (2021a) urges the defense of principles such as justice, trust, and equity, ensuring that no person or nation is left behind. Along the same lines, Flores (2023) emphasizes

the urgency of establishing policies that guarantee the responsible, fair, and transparent use of AI in educational systems.

Another crucial aspect is the protection of personal data and the liability arising from the use of smart technologies. In the absence of clear regulations, legitimate questions arise. For example, Stžšić and Malyuga (2024) raise doubts about the accuracy of AI tools used in international language tests and who should be held accountable in the event of errors or biases. Similarly, Khairullah (2025) questions the impact of these technologies on the teaching role and whether their use could lead to overdependence on the part of students and teachers. They reaffirm the need for effective regulatory design that governs transparency in the use, collection, and dissemination of data (UNESCO, 2019).

Finally, the ethical and effective advancement of AI in education requires strengthening academic cooperation. As Adipat (2023) points out, although AI has the potential to transform education and optimize administrative processes, its effects will depend on how it is programmed and used. Furthermore, UNESCO (2005) highlights the importance of developing skills that allow for solving real problems in education. Fostering a research culture will contribute to the construction of sound and sustainable educational policies. As UNESCO (2019) states, the education sector has the capacity to shape the future vision of AI, as it is the space where key research on its application emerges.

Conclusions

The results of this documentary research allow us to conclude that artificial intelligence represents a valuable tool for enhancing the learning of English as a foreign language, especially when integrated with pedagogical intent. The analysis of various international experiences confirms that AI-based applications, such as virtual assistants, automatic spellers, and interactive platforms, promote the development of all four language skills: listening, speaking, reading, and writing.

Significantly, it is evident that these technologies not only strengthen academic performance but also increase students' motivation, autonomy, and confidence in using the language. Immediate and personalized feedback, as well as the opportunity to practice in different contexts, helps overcome common limitations in the traditional classroom, such as of time or diverse teaching resources.

However, the implementation of AI in educational settings also presents significant challenges. In the Colombian context, digital divides related to access, use, and critical appropriation of technology remain an obstacle to ensuring equitable, quality education. Therefore, it is necessary to strengthen public policies, improve technological infrastructure, and promote teacher training in digital skills, as indicated by the guidelines of the Ministry of National Education and the UNESCO guiding principles.

Similarly, further research is suggested on the use of different applications for English learning, analyzing student progress, classroom perceptions, their use in assessments, and personalized progress measurement. The education sector can build a clear vision of AI, as this is the area where future studies will be implemented.

In short, artificial intelligence should not be understood as an isolated solution, but as a complementary resource that, in the hands of trained teachers and motivated students, can transform English teaching into a more meaningful, inclusive, and relevant experience for the challenges of the 21st century.

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